Co-funded by the Intelligent Energy Europe Programme of the European Union

Contract N°: IEE/13/824/SI2.675067

Energy Saving Policies and Energy Efficiency Obligation Scheme

D2.1.2: Report on Context Profiles of EU MS countries – Part III: Context analysis of countries with existing/planned EEOs.

Project Coordinator: Joint Implementation Network - JIN

Work Package 2 - Leader Organization: VITO, Flemish Institute of Technological Research

Prepared by: University of Piraeus Research Center (UPRC)

March 2015

List of Authors:

University of Piraeus Research Center, UPRC

Vlaamse instelling voor Technologisch Onderzoek, VITO

Joint Implementation Network, JIN

Italian Federation for Rational Use of Energy, FIRE

Austrian Energy Agency, AEA

Stockholm Environment Institute/University of York, SEI

Association of Bulgarian Energy Agencies, ABEA

Danish Energy Association, DEA

French Environment and Energy Management Agency, ADEME

University of Oxford, OUCE

Polish National Energy Conservation Agency, KAPE

Table of Contents

Figures

Tables

1 Executive Summary

Scope - Method

After analyzing new and existing Energy Efficiency Obligation (EEO) Schemes as proposed by all EU Member States (MS) that opt to comply with Article 7 energy saving requirements and exploring hurdles related to their adaptation or introduction (for more details please refer to Section 2.1.1 Existing EEO schemes and Section 2.1.2 Planned EEO), we analyze the general status quo of MS countries, evaluating the actual capability and readiness of countries to undertake such an Obligation Scheme.

The scope of the present report is to analyze the context profile of MS countries aiming to adopt or adapt an EEO based on secondary data from existing databases and stakeholder input for relevant indicators. Please note that countries, which have declared to rely entirely on alternatives, are also included since they have not ruled out and still consider the option of introducing an EEO in the future. The profile is linked to the general preparedness/capacity of each MS assessed with the help of contextual indicators. Challenges related to the different evaluation aspects, which call for attention, are identified.

Criteria and indicators for assessing capability and readiness of countries

We used the principle that understanding the uncertainties traced in the technological, economic, natural resource availability and political context of a country is critical for the implementation of investments (Bolton and Foxon 2014; Spyridaki and Flamos 2014; Beckert 1996), as well as the performance of climate change mitigation policies (Hayashi et al. 2006; IEA 2013), such as the case of EEO schemes. The rationale is that general external parameters (e.g. economic, environmental, market structure, governance, socio-political) may enable or impede intended policy impacts, which is also recognized by the 'Guidance document on ex-ante evaluation' released by the European Commission (EC 2013a), which states that policy evaluators should examine whether such contextual factors can be identified. Table 1.1 outlines the indicators and sources of information used to measure each of these factors/criteria.

Table 1.1: Criteria, indicators and data sources for the country profile assessment

Criteria	*Indicators*	*Data Source*
1. Economic capacity	**- GDP per capita** **- Central Government Dept.** - Annual GDP Growth* - Electricity and Gas Prices *	World Bank 2013 Eurostat 2013 World Bank 2013 Eurostat 2014
2. Energy-Climate Change/Energy-saving potential	***- Energy intensity of the economy*** ***- Energy Dependence*** *(Vulnerability to energy supply)* ***- Consumption per dwelling*** ***- Overall EE gains*** *- EE gains per sector (i.e. industry and residential sector)** *- Primary energy consumption**	*Eurostat 2013* *Eurostat 2013* *ODYSSEE-MURE 2012* *ODYSSEE-MURE 2012* *ODYSSEE-MURE 2012* *ODYSSEE MURE 2012*
3. Market status quo	***- Energy Market Concentration*** *(Herfindahl-Hirschman Index –HHI[1])* ***- SME Access to Finance Indicators*** *(SMAF index)* *- ESCO's market Development** - Technical capacity and experience in technology*	*European Commission, Single Market Progress Report, 2014* *European Commission 2013b* *European Commission, ESCO Market Progress Report, 2013* *Build up skills 2012*
4. Administrative-Legislative Capacity	**- Government effectiveness** **- Regulatory quality** - Experience against free-riders*	*World Governance Indicators 2013* *World Governance Indicators 2013*

[1] The HHI index is a composite index of industrial concentration measurement, the sum of squares of all participants in a particular industry market share ratio (i.e. electricity and gas supply and retail markets for this case), which reflects the degree of monopoly. (http://ec.europa.eu/energy/sites/ener/files/documents/2014_iem_communication_annex2.pdf). The Market share of the largest generator in the electricity market was used in most of the country reports to demonstrate the status of Liberization of the power sector in EU countries.

5. Socio – Political feasibility	- **Market Performance Indicator for electricity and Gas services** - Fuel Poverty* - Social stance* - View of the industry*	*Monitoring consumer markets in the European Union Report, 2012*

* Described and assessed (qualitatively) within individual country reports.

After defining the criteria and indicators used to describe the context-profile of countries and assess their "preparedness," we apply them to selected countries, using both rankings and cluster analysis to find the groups of countries that are better "suitable" to implement the Obligation scheme.

The results of the analysis should be taken as a starting point for more detailed evaluations of the economic, energy, market and governance profiles and characteristics of countries aiming to adopt or adapt an EEO scheme in Europe.

Contextual analysis of country profiles: country rankings

For the criteria described above, we created a simple ranking of countries, and made them comparable by normalizing all indicators to a scale from 0 to 100 (where 100 indicates the highest capacity, highest energy saving potential, market preparedness, socio-political feasibility and generally signifies for country contexts with reduced challenges and risks towards the implementation of EEOs). For criteria that include more than one indicator, the ranking was based on a simple average of indicators.

Table 1.2 presents the countries ranked for each of the assessment criteria. It shows that the different criteria yield very different lists of countries. Still, several countries appear to be suitable in terms of more than one of the assessment criteria. Middle-Northern European countries, for example, typically display high levels of economic capacity in terms of high GDP per capita and low Government Debt. In fact most of the top 10 countries in GDP per capita consist of countries with an existing EEO scheme (i.e. Denmark, France, Belgium and the UK). Austria and Ireland with a new EEO scheme, as well as Germany, the Netherlands and Sweden, opting solely on alternative measures, complete the list of top-10 countries regarding general economic capacity. Naturally, some countries with high level of economic capacity (Luxembourg, Germany, Austria, Sweden, Denmark, UK and the Netherlands) also demonstrate an improved administrative capacity and favorable market structure. Market structure is evaluated in terms of access to finance for SME's and the status of libearization of production, retail and supply electricity and gas markets, which seem to favor the introduction of a WhC mechanism and subsequently an EEO scheme. However it should be noted that this indicator is not of particular relevance for cases where obligations are focused on the distribution system (i.e. DSO's) of the energy market and not retailers (e.g.

Denmark). Least prepared countries likely to face financial challenges as well as potential market failures are south European countries weakened by the debt-driven economic recession (e.g. Portugal, Malta and Greece).

Table 1.2: Countries ranked across assessment criteria/indicators describing their general profile/capacity relevant to EEOs

Economic Capacity	Energy – climate profile	Market preparedness	Administrative capacity	Socio-Political feasibility
Luxemburg	Bulgaria	Germany	Sweden	Slovenia
Sweden	Lithuania	Austria	Denmark	Luxemburg
Denmark	Luxemburg	UK	Netherlands	Slovakia
Estonia	Poland	Italy	Luxemburg	UK
Netherlands	Slovakia	Netherlands	UK	Germany
Austria	Slovenia	France	Germany	Malta
Germany	Ireland	Lithuania	Ireland	Estonia
Bulgaria	Austria	Luxemburg	Austria	Ireland
Lithuania	UK	Ireland	Belgium	Netherlands
UK	Germany	Sweden	France	Lithuania
France	Belgium	Slovenia	Malta	Denmark
Slovakia	France	Belgium	Estonia	France
Belgium	Netherlands	Spain	Spain	Austria
Slovenia	Italy	Denmark	Lithuania	Sweden
Malta	Sweden	Hungary	Portugal	Italy
Poland	Portugal	Poland	Poland	Greece
Ireland	Greece	Portugal	Slovakia	Poland
Spain	Denmark	Bulgaria	Hungary	Hungary
Hungary	Spain	Estonia	Slovenia	Belgium
Italy	-	Malta	Italy	Portugal
Portugal	-	Greece	Greece	Spain
Greece	-	-	-	Bulgaria

The energy profile of countries is described and evaluated by looking at their energy intensity, vulnerability of energy supply and consumption per dwelling and EE gains. Countries which first drove energy efficiency like the United Kingdom (UK) have little or no indigenous energy resources and import most of their energy. Their vulnerability to energy supply and prices has led to an urging need for higher energy efficiency from early on.

Energy saving needs are especially high for some of the Balkan countries (i.e. Bulgaria's enormously elevated energy intensity[2] is almost 5 times higher than EU average intensity), as well as for Easter European countries (Lithuania, Slovakia and Poland). Lower ranked countries may signify for countries whose process of decoupling growth from energy consumption trends is more progressed (e.g. Denmark, Sweden and the Netherlands). Countries with poorer consumption per dwelling and lower EE gains (e.g. Spain, Portugal, Malta and Greece), with usually significant energy poverty issues, are also ranked low in the ranking of countries regarding their energy consumption trends.

Regarding governance issues, for countries with a long tradition in EEOs schemes like Denmark, France, and UK, it is expected to have a high ranking in government effectiveness due to their long experience. On the contrary, there are countries like Italy and Poland that appear to have lower positions than expected. The main challenge from an administrative and managing point of view for EEOs in these countries has been the capability to ensure an effective cooperation among the different subjects involved in the design and management of the EEO scheme, especially when a White Certificate mechanism is in place (e.g. Italy). Whereas one of the major weaknesses of the Polish EEO scheme introduced in 2012, has been the high administrative costs as compared to other supporting schemes, reflecting complexity of the system and lack of managerial experience of its administrator. Finally the socio political feasibility of implementing an EEO scheme is likely to be improved for countries such as Slovenia, Luxembourg, Slovakia, Malta, Lithuania and Estonia according to their Market Performance Indicator for electricity and Gas services indicating high levels of trust and satisfaction from end-users.

A composite ranking of countries was then conducted to incorporate the importance of all criteria based on a simple average across all criteria. The "usual suspects" are countries with long tradition in EEO schemes like Denmark and the UK, as well as countries with advanced energy intensive economies, mature markets and institutional capacity that have opted for alternative measures (e.g. Germany, Netherlands and Sweden), that would "qualify" as ready for EEOs. In addition Slovakia, Lithuania and Slovenia are also comparatively higher ranked, presenting a moderate economic capacity, elevated energy saving potential and a positive social stance on their energy and gas market services. It is yet not clear whether that stance reflects a whish or acceptance for an EEO scheme.

[2] (670 kgoe/1000 EUR) in comparison with the European level (143.2 kgoe/1000 EUR)

Table 1.3: Overall country ranking – all criteria with equal weights

Overall Ranking	
1	Luxemburg
2	Germany
3	UK
4	Netherlands
5	Denmark
6	Sweden
7	Austria
8	Slovakia
9	Ireland
10	Lithuania
11	Slovenia
12	France
13	Estonia
14	Belgium
15	Malta
16	Poland
17	Italy
18	Spain
19	Bulgaria
20	Portugal
21	Hungary
22	Greece

Finalizing the list of suitable countries, we find almost all Mediterranean countries in the list (Greece, Portugal, Spain, Italy and Malta) as well as Bulgaria and Hungary poorly ranked mostly due to their unfavourable economic climate still under recession; related market challenges such difficulties in access to finance as well as weak governance and administrative capacity.

Contextual analysis of country profiles: cluster analysis

For each of the criteria-indicators described above, we conducted a cluster analysis of countries based on their rankings against selected indicators as prescribed in Table 1.4. Cluster analysis is a statistical technique that allows us to generate groupings among observations (in our case countries under compliance with Article requirements), according to their proximity or similarity to each other in terms of a series of variables.

We started with a hierarchical clustering method, which allows us to see which countries are so different from all other countries that they build their own clusters. In a second step, we compared results for several amounts of clusters to decide which amount is appropriate. Luxembourg, which presents an enviable economic situation and has opted to comply solely based on an Obligation scheme, consistently constituted such an outlier. Luxembourg was hence excluded from the subsequent analysis. Belgium, Bulgaria, Estonia, Hungary Malta, and Slovakia were also excluded from the clustering due to lack of information. In a second step, we compared results for several amounts of clusters to decide which amount is appropriate. This was conducted using Ward's clustering method. In this case, we also applied the same set of indicators as the ones used for the country rankings.

Table 1.4: Cluster membership of countries regarding their economic status quo

Cluster Membership	Countries in the groups (Wards algorithm)
1st Cluster	Austria, Denmark, France, Germany, Ireland, Sweden, The Netherlands, UK
2nd Cluster	Slovenia, Lithuania, Poland
3rd Cluster	Greece, Italy, Portugal, Spain

A more thorough analysis of the features of each of the cluster can help to interpret the results. On average countries in the first cluster are the in the top 10 countries in GDP per capita while half of the countries in the group (Austria, Denmark, Sweden, The Netherlands) present a central government debt below the EU-28 average. Regarding energy consumption trends, countries clustered together in the first group are all particularly energy intensive yet with moderate EE gains (%) since 2000 and medium energy dependency (Ireland, Austria and Germany present the highest vulnerability to energy supply from countries in the group). For countries such as Denmark, with a long tradition for focusing on energy efficiency, one explanation for their relatively lower rankings in EE gains, maybe that ambitious measures, already implemented for two or three decades, could have already utilized low hanging fruits. These countries also present improved market capacity in terms of elevated SMAF index SME's, relatively improved concentration for electricity and gas supply and retail markets. Finally 5 out of 8 countries clustered in the first group either rely solely or for the most part (with a contribution to target achievement of over 75%) on EEO schemes to bring about their targeted savings until 2020 (except for Austria, Ireland and the UK). Germany, Sweden and the Netherlands opt for alternative measures. Denmark, France and the UK, all countries with long-experience with EEO schemes are part of this group, for which reportedly, minimum or no challenges at all exist regarding administering, monitoring or enforcing the scheme.

Countries in Cluster 2 are somewhat in between presenting the highest energy intensities of all countries combined with elevated EE gains in 2013 and somewhat favourable market indications in terms of access to finance for SME's and status of libearization in the energy market. Yet governance capacity comprises a significant challenge for countries of the second group. Finally countries in the last cluster have the lowest values in almost all indicators. Luxembourg as an outlier is not included in any of the clusters but due to its extremely favourable economic and market conditions and improved institutional characteristics, it should be considered among the countries prepared for an EEO scheme.

The national contexts of countries aiming to adopt or adapt EEOs are described more thoroughly for each country individually in the following chapters. These chapters provide a detailed description of the status quo of these countries and highlight key contextual challenges identified in relation to an EEO's design and operation.

REFERENCES

[1] Build up skills, Technical capacity, 2012, http://www.buildupskills.eu/en/national_projects

[2] Bolton R, Foxon TJ (2014) A socio-technical perspective on low carbon investment challenges – Insights for UK energy policy. Environmental Innovation and Societal Transitions. DOI:10.1016/j.eist.2014.07.005.

[3] Beckert J (1996) What is sociological about economic sociology? Uncertainty and the embeddedness of economic action, Theory Soc 25:803–840

[4] European Commission, Single market progress report 2014, http://ec.europa.eu/energy/en/topics/markets-and-consumers/single-market-progress-report.

[5] European Commission, (2013a) The Programming Period 2014-2020: Monitoring and evaluation of European cohesion policy. Guidance document on ex-ante evaluation. January 2013

[6] European Commission, (2013b) SME Access to finance Index (SMAF), http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/sme-access-to-finance-index/index_en.htm

[7] Eurostat database, Data regarding the Central government dept, 2013, http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&pcode=teina225&language=en

[8] Eurostat database, Data regarding the electricity prices, 2014, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_pc_204&lang=en

[9] Eurostat database, Data regarding the Gas prices, 2014, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_pc_202&lang=en

[10] Eurostat database, Data regarding the Energy Dependence, 2013, http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsdcc310&plugin=1

[11] Eurostat database, Data regarding the Energy intensity of the economy, 2013, http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsdec360&plugin=1

[12] Hayashi A, Akimoto K, Sano F, Mori S, Tomoda T (2010) Evaluation of global warming impacts for different levels of stabilization as a step toward determination of the long-term stabilization target. Climatic Change 98:87–112.

[13] IEA (International Energy Agency) (2013) Transition to Sustainable Buildings: Strategies and Opportunities to 2050 .

[14] ODYSSEE-MURE, overall energy efficiency gains, 2012, http://www.indicators.odyssee-mure.eu/online-indicators.html

[15] Paolo Bertoldi, Benigna Boza-Kiss, Strahil Panev, Nicaol Labanca, 2014, "ESCO Market report 2013", European Commission, JRC Science and Policy Reports, 2014, http://iet.jrc.ec.europa.eu/energyefficiency/sites/energyefficiency/files/jrc_89550_the_european_esco_market_report_2013_online.pdf

[16] Spyridaki N.-A., Flamos A (2014) A paper trail of evaluation approaches to energy and climate policy interactions. Renewable & Sustainable Energy Reviews 40:1090–1107

[17] The World Bank database, Data regarding the Annual GDP Growth 2013, http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG

[18] The World Bank database, Data regarding the GDP per capita 2013, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD

[19] The World Bank database, Data regarding the world government indicators, 2012, http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=Worldwide-Governance-Indicators

[20] GfK EU3C, 20 November 2012, MONITORING CONSUMER MARKETS IN THE EUROPEAN UNION, Final report

2 Austria – AEA

2.1 Economic profile

For the context analysis specific indicators have been chosen that will provide us with a contextual overview on environmental, economic and socio-political state of Austria in view of the adoption of the EEO scheme. To analyze the economic state the following indicators have been chosen:

- Gross Domestic Product
- Central Government Dept
- Electricity and Gas Prices
- Energy Dependence

2.1.1 Description of Status quo

Austria has a well-developed market economy and a high standard of living. The constant growth in GDP per capita has been combined with low income inequality, high environmental standards and rising life expectancy. These developments have been supported by generous cash benefits allowing families to provide extensive "in-house" services, a wide supply of public services and a well-functioning social partnership system have helped achieve this performance (OECD, 2013).

Its economy is closely linked to other EU economies such as Germany's. Most important for Austria is the service sector generating the vast majority of Austria's GDP followed by a sound industrial sector, and a small, but highly developed agricultural sector (The World Factbook, 2014).

Austria's economy has been quite stable until the international financial crisis in 2008. Until then its economy has been strengthened by a solid foreign demand for Austrian exports, while demonstrating one of the highest employment growth rates compared to others. The international financial crises lead to a sharp but brief recession (CIA, 2014). The main impact of the crisis has been on the banking sector and public debt. Several internationally active banks needed impermanent support, and three banks had to be fully or partly nationalized. Nevertheless Austria has come through the global economic and financial crisis relatively well, due to its stable development beforehand. Compared to the EU average the unemployment rate remained low and employment as well as output have recovered to well above 2008 levels (IMF, 2014).

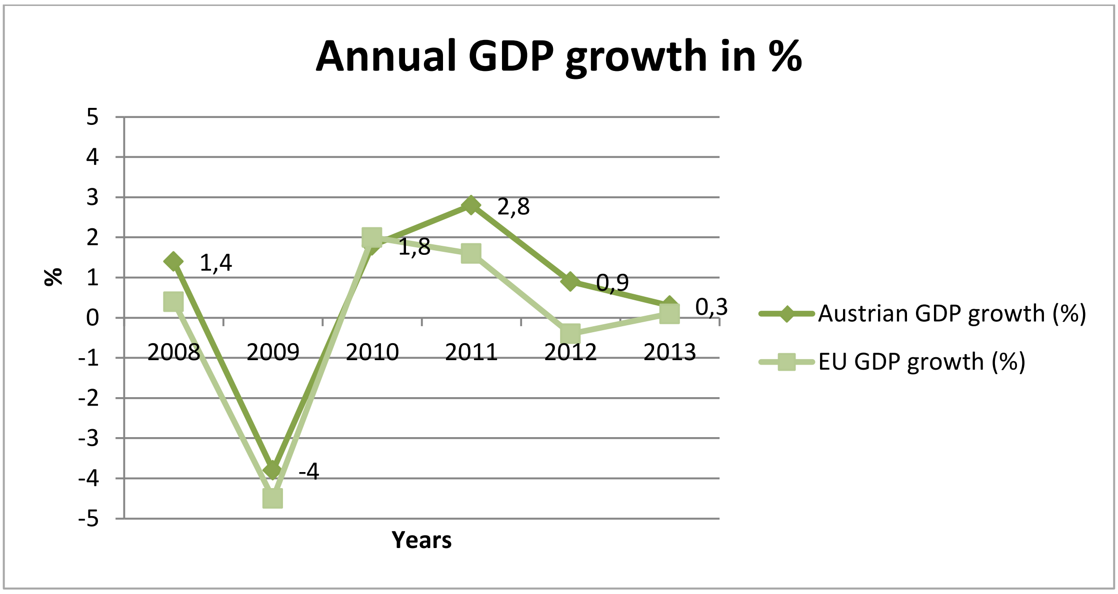


Figure 2.1: Annual GDP growth in %. Annual percentage growth rate of GDP comparing Austria and EU (%) based on local currency

Source: The World Bank

As indicated in Figure 2.1 Austrian GDP decreased by 3.8% in 2009 but increased about 1.8% in 2010 and 2.8% in 2011. Growth fell to 0.6% in 2012. Unemployment did not rise as steeply in Austria as elsewhere in Europe, partly because the government subsidized reduced working hour schemes to allow companies to keep employees. The 2012 unemployment rate of 4.3% was the lowest within the EU. Stabilization measures, stimulus spending, and an income tax reform pushed the budget deficit to 4.5% in 2010 and 2.6% in 2011. In 2011 the government was aiming to pass a constitutional amendment which sets a limit to public debt at 60% of GDP by 2020, but it was unable to obtain sufficient support in parliament and instead passed this requirement as a simple law. Together with the downturn, this has contributed to an increase in public debt from 60 percent of GDP in 2007 to about 80 percent of GDP in 2014 (IMF, 2014). In March 2012, the Austrian parliament approved an austerity package consisting of a mix of expenditure cuts and new revenues that will bring public finances into balance by 2016. In 2012, the budget deficit rose to 3.1% of GDP (CIA, 2014).

As mentioned above, one of the main impacts of the international financial crisis of 2008 has been on the banking sector. Austria’s largest banks have been investing heavily in central, eastern, and southeastern Europe and faced large losses due to the crisis. In order to stabilize the banking system the government provided bank support, also by nationalizing some banks. Compared to other EU countries Austria's fiscal position is quite good.

Nevertheless it faces external risks, such as Austrian banks' continued exposure to Central and Eastern Europe as well as political and economic uncertainties caused by the European sovereign debt crisis (CIA, 2014).

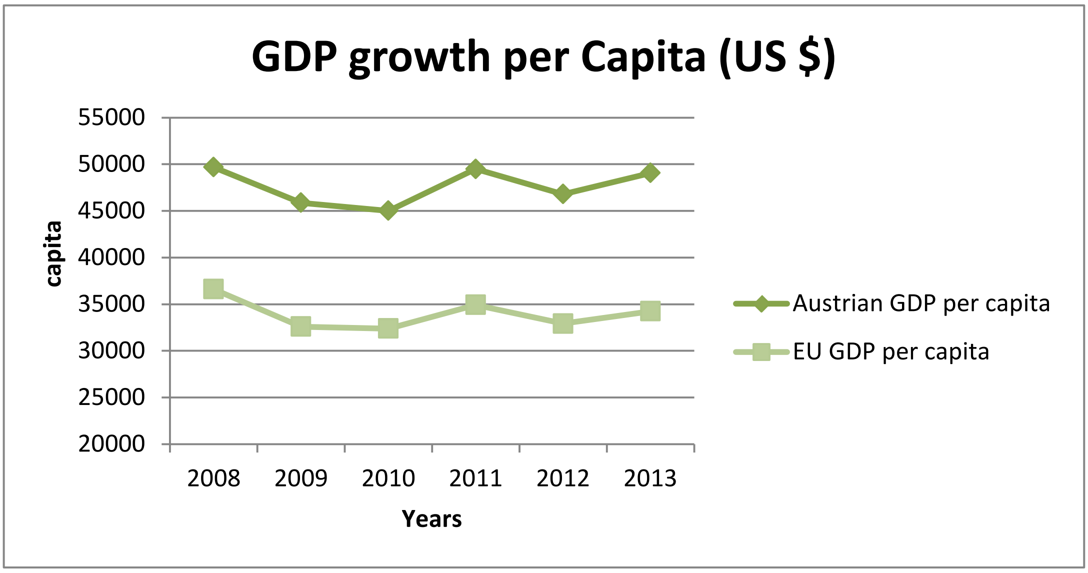


Figure 2.2: Annual GDP Growth Austria and EU per capita (US$)

Source: The World Bank

Austria’s entire stock of direct government fixed-term contractual obligations to others (including domestic and foreign liabilities such as currency and money deposits, securities other than shares, and loans) amounts up to 81.1% of GDP as measured by the World Bank in 2012 (World Bank, 2012). Hence, Austria’s general government stock increased by 7% from 74.1 % of GDP in 2011. In fact it has been constantly rising during the past years.

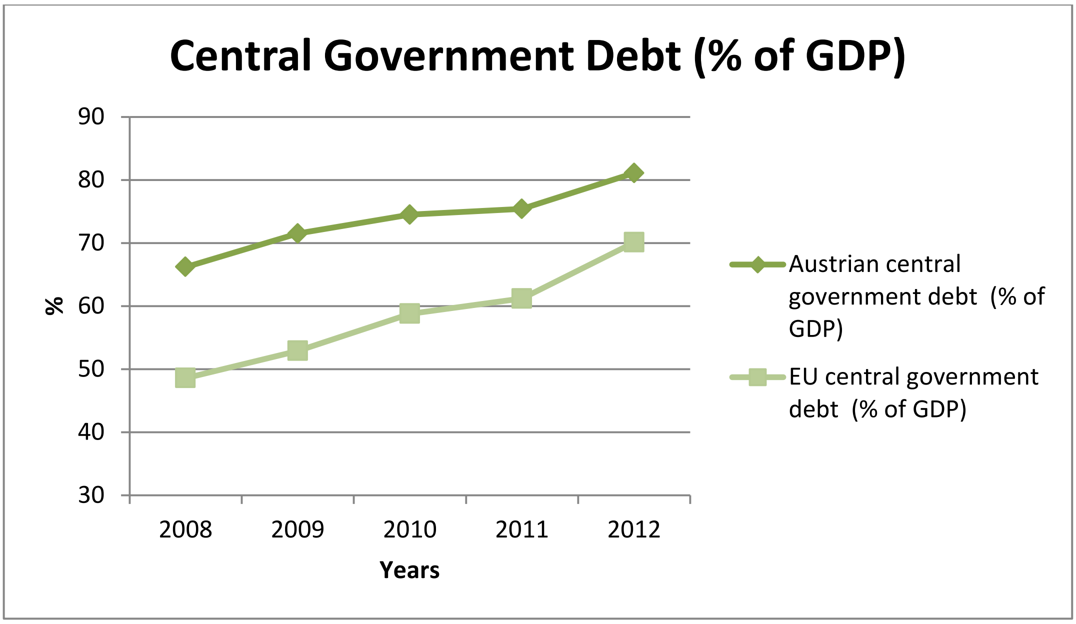


Figure 2.3: Central Government Dept (% of GDP)

Source: The World Bank

The Austrian Energy Agency calculates the Austrian Electricity Price Index (ÖSPI©) monthly. The ÖSPI is an indicator for the market price development. After a peak in January 2009 the prices have been constantly sinking. Currently the index amounts to 68.9 points. According to the calculations of the Austrian Energy Agency, the ÖSPI will continue falling in November 2014 to 68.42 points (base year 2006 = 100) which corresponds to its lowest level in November 2004. The ÖSPI© only reflects the mere energy component, being about 35% to 40% of the overall electricity price. The remaining 60% to 65% are net fees, taxes and levies. Further factors that influence the electricity price such as, for example, the procurement strategies of energy providers, are not taken into consideration at the ÖSPI©. An increase or decrease of the ÖSPI© indicates therefore only a relevant lesser increase, respectively decrease, of the total price for electricity (AEA, 2014).

The Austrian gas price index (ÖGPI) reveals how the gas price is developing in the short term. The gas price index reflects the energy percentage of the final end consumer price that incorporates the additional network tariffs, taxes and levies. The end consumer price may also divert from the gas price index in its development due to the different price policies of energy providers. According to the calculations of the Austrian Energy Agency the gas price index in November 2014 has reached 132.87 points, which means a slight increase compared to October (base 2006 = 100). It is a very stable development compared only a slight rise (+0.2 %) from October till November 2014. Compared to November 2013 the gas price index has decreased by 0.4 % (AEA, 2014).

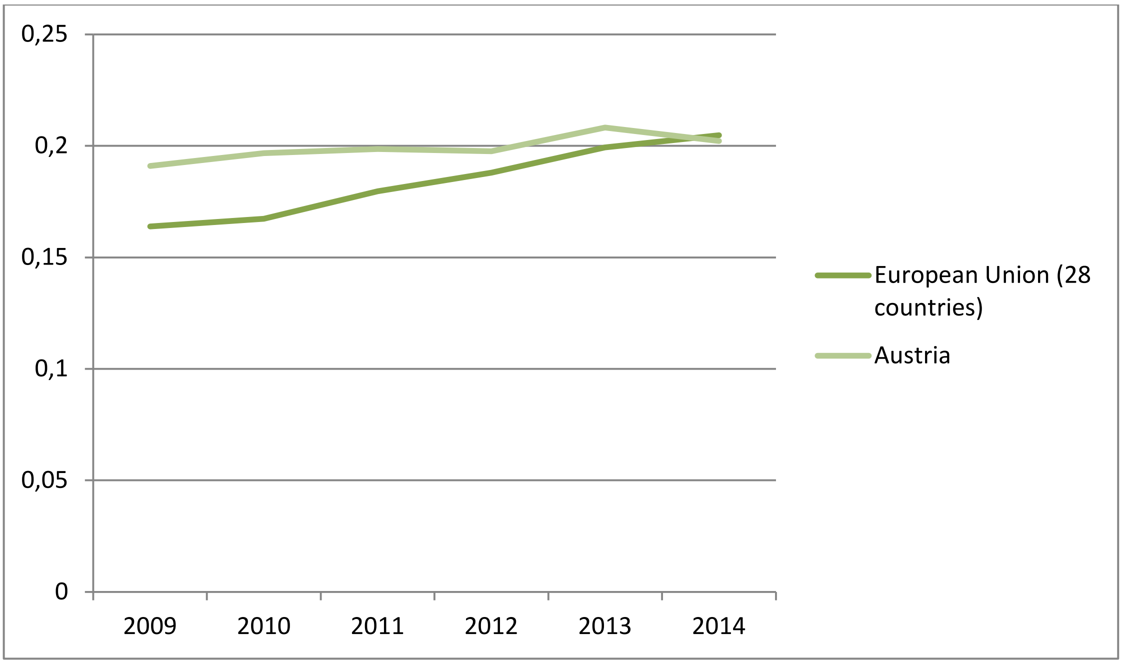


Figure 2.4: Electricity prices for domestic users in euro/kWh (including taxes and levies)

Source EUROSTAT

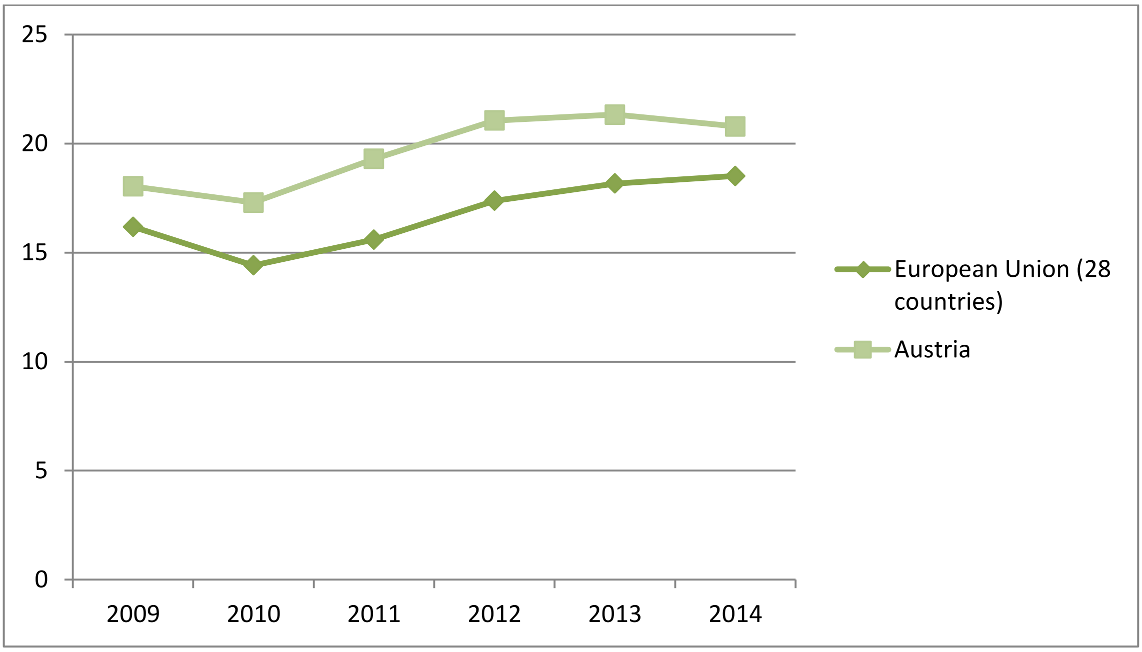


Figure 2.5: Average national price in Euro per GJ including taxes and levies applicable

Source EUROSTAT

According to Eurostat the electricity prices for domestic consumers account for 0.2021 €/kWh in 2014 whereas the EU-28 average accounts for 0.2047 €/kWh (2014 Eurostat). Until 2014 Austria's electricity prices have been higher that the EU average. Since 2014 prices are slightly lower than EU average (Figure 2.4). According to Eurostat the gas prices for domestic consumers account for 20.78 €/GJ in 2014 and the EU-28 average accounts for 18.51 €/GJ (2014 Eurostat). Gas prices in Austria are higher than the EU average (Figure 2.5).

Energy dependence in Austria has been relatively stable during the last years between 60 and 70%, lying above the EU average. In 2012 Austria's energy dependence amounted up to 63.3%. Due to the high level of dependence on energy imports that are associated with increasing uncertainty, the efficient use of energy is becoming increasingly important (Eurostat, 2012). In Austria fossil fuels are the main energy source: oil is number one with a share of 37% of gross domestic consumption, followed by gas (25%) and coal (10%) (Austrian Energy Agency, 2012).

2.1.2 Evaluation of economic preparedness - Identification of financial challenges

Austria's economy can be considered as rather strong within the EU28. It is diverse and seems to be well balanced. After the crisis the economy recovered and Austria's real GDP has exceeded the levels before the crisis in 2008. The unemployment rate is one of the lowest among the EU28.

Currently the government has a sufficient financial capacity to introduce, implement and monitor an EEO scheme. Nevertheless Austrian banks' continued exposure to Central and Eastern Europe makes it vulnerable to external influences. Hence, Austria needs to complete its bank restructuring process and strengthen the macro-financial stability. Due to this financial insecurity a financing risk remains. Many EEO actions like retrofitting will demand large investments and it is not secured that these investments can be supported by the governments or done by the end consumers.

Moreover it is not clear at this stage what proportion of costs will be finally passed on to customers from obligated parties. Cost recovery is thus not regulated in the Energy Efficiency Act. The financing of measures as well as the cost recovery is up to the obligated parties. Nevertheless the purchase power of households is still high combined with record-low interest rates.

As an open economy, rising energy prices and costs are a concern in the country since global price shifts are quickly reflected domestically, and decisions on energy prices and costs that affect the competitiveness of industry and the welfare of citizens are only partly in the hands of national decisionmakers. This can be seen by the fact that energy prices are mostly explained by the cost of imported energy. In addition, taxes on many energy products have been increasing for fiscal reasons, and these reasons are likely to sustain. Tariffs related to grid use may have to be increased to attract the needed investment in the grid. The government, however, has several options to tackle the impact of energy prices and costs. One of these is the promotion of energy efficiency, and Austria has been both ambitious and successful in this area, in particular as regards buildings (IEA, 2014).

2.2 Energy & Climate Change profile (Energy Savings' Potential)

In this section, we evaluate the general energy and climate state of Austria in relation to the EEO scheme, by exploring the energy saving's potential under the scheme. The main indicators considered in this part of the analysis involve:

- Primary energy consumption
- Energy intensity of the economy that measures the energy consumption of an economy and its overall energy efficiency.
- Final energy consumption both by sector and in residential dwellings
- Energy efficiency gains in households and industry which is a metric for energy efficiency progress in each sector.

2.2.1 Description of Status quo

Austria consistently pursued the way towards a safe, sustainable as well as affordable energy supply. According to Austria's National Energy Efficiency Action Plan (NEEAP) from April 2014, the indicative national energy efficiency target is a indicative final energy consumption of 1,100 petajoules in 2020. This target value of 1,100 PJ represents a reduction of around 20% compared to 1,367 PJ[3]. This is an ambitious target which will require substantial effort. Part of the 2020 target will be met adopting an EEO scheme according to Article 7 of the EED.

In 2012 Austria's primary energy consumption amounted to 31.8 Mtoe, which means a slight increase compared to the year 2009 where the energy consumption accounted for 30.5Mtor.

[3] The PRIMES 2007 model forecast used in the EED gives a final energy consumption for Austria in 2020 of,1 325 PJ. Given that PRIMES 2007 had forecast that the population of Austria would be 8.44 million in 2020, and that this figure had already been exceeded by 2012, with the national population projections from Statistics Austria indicating a figure of 8.71 million for 2020, this final energy consumption value should be adjusted to 1,367 PJ.

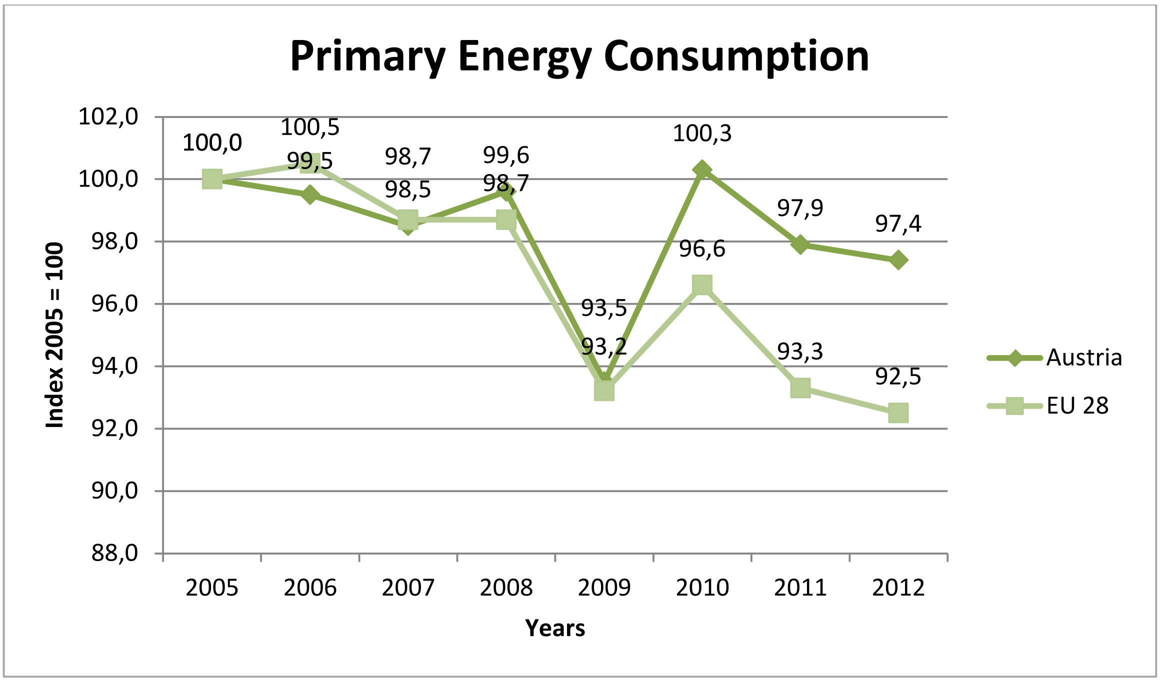


Figure 2.6: Primary Energy Consumption

Source EUROSTAT

Austria's final energy consumption is accounting for 27.3 Mtoe in 2011 (Eurostat).

In Austria fossil fuels are the main energy source: oil is number one, followed by gas and coal. The obligation to add more biofuels to fossil fuels and the increased generation of district heating from biomass have resulted in a record high use of renewable energy sources in Austria. Renewable energy sources account for 31% gross domestic consumption, which is higher than the indicative target for the 2011-to-2012 period (25.4 %). Biomass is being the most important renewable energy source (41%), followed by hydro power (36%) and solid biomass for electricity (4 %). Other renewable energy sources include solar, wind and geothermal energy with a share of 5%. Austria has adopted a constitutional law in the 1970ies that rules out the generation of electricity from nuclear energy (AEA, 2012).

For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 4.0 %. In order to reach the 2020 target, an average annual growth rate of 0.9 % is needed for the period from 2011 to 2020. This corresponds to 0.3 times the cumulative effort up to 2011. (Climate and energy country profiles —Key facts and figures for EEA member countries)

Concerning the Energy intensity of its economy, Austria lies within 123.9 kg of oil equivalent per 1,000 EUR while the EU average lies above at 143,2 kg of oil equivalent per 1,000 EUR. None of the EU Member States reported a rise in their energy intensity between 2002 and 2012, with the smallest decreases recorded for Austria beside Italy and the Netherlands.

Over the past few decades, Austria has placed energy efficiency at the center of its energy policy. As a result, energy efficiency has improved significantly during that period and energy consumption trends have been decoupled from economic growth.

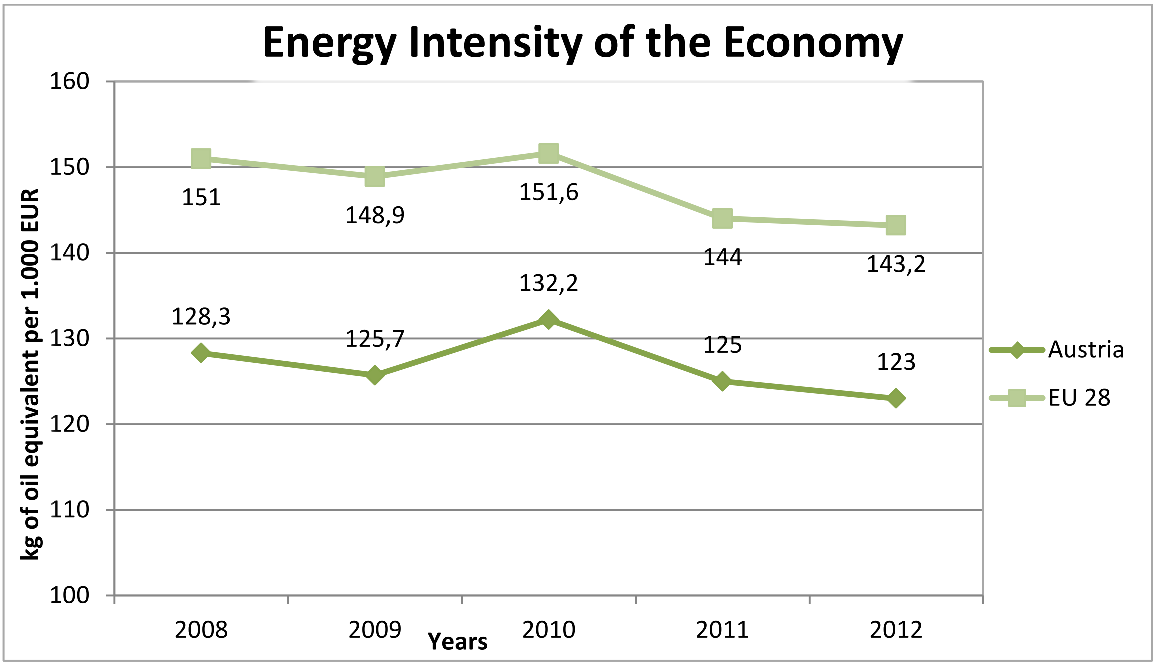


Figure 2.7: Energy Intensity of the Economy

Source EUROSTAT

According Statistics Austria concerning the preliminary energy balance, the final energy consumption (FEC) increased by about 2% to 1,117 Petajoule (PJ), compared with the year 2011.

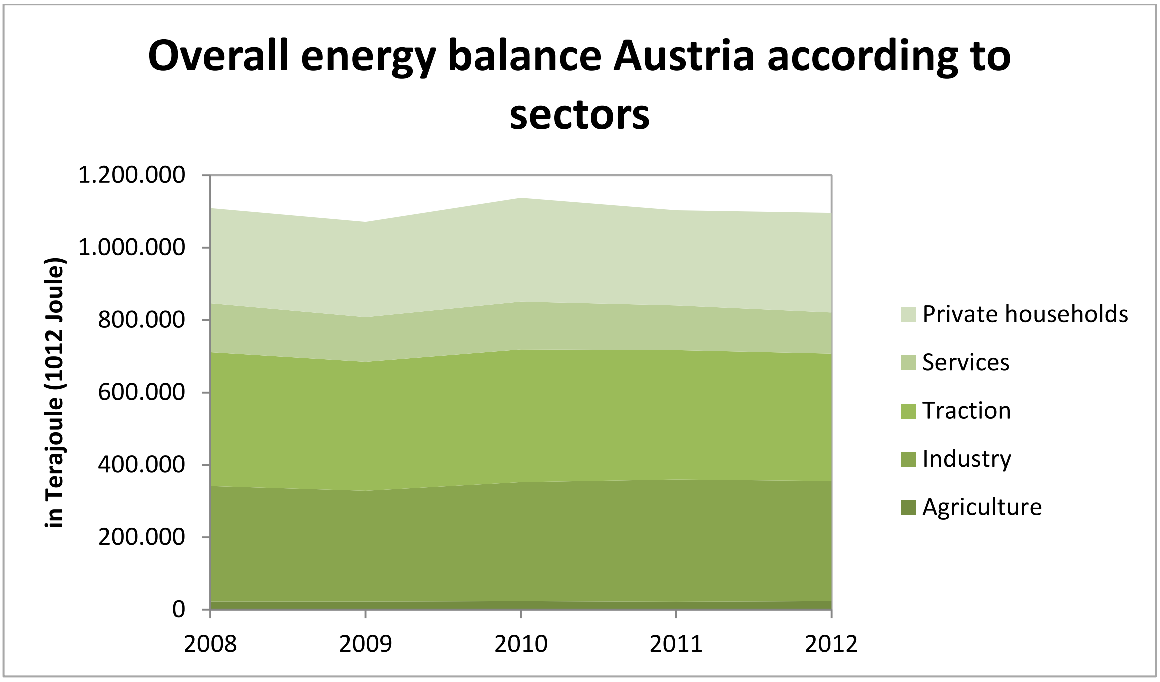


Figure 2.8: Overall Energy Balance Austria according to sectors

Source Statistik Austria

In 2012, Austrian final energy consumption decreased moderately compared to 2011 by about 0.7% to 1 096 petajoule (PJ), reaching a level close to the result of the year 2008 (1 109 PJ). According to Statistics Austria, final energy consumption decreased in industry by 1.7% to 332 PJ and in transport by 1.6% to 352 PJ, whiles the consumption of private households increased by 4.7% to 275 PJ (Statistik Austria, 2013).

Industry and transport have the highest share in overall final energy consumption. Austria has a rather high share of heavy industry and due to price differentials a considerable amount of “fuel tourism” from neighbouring countries.

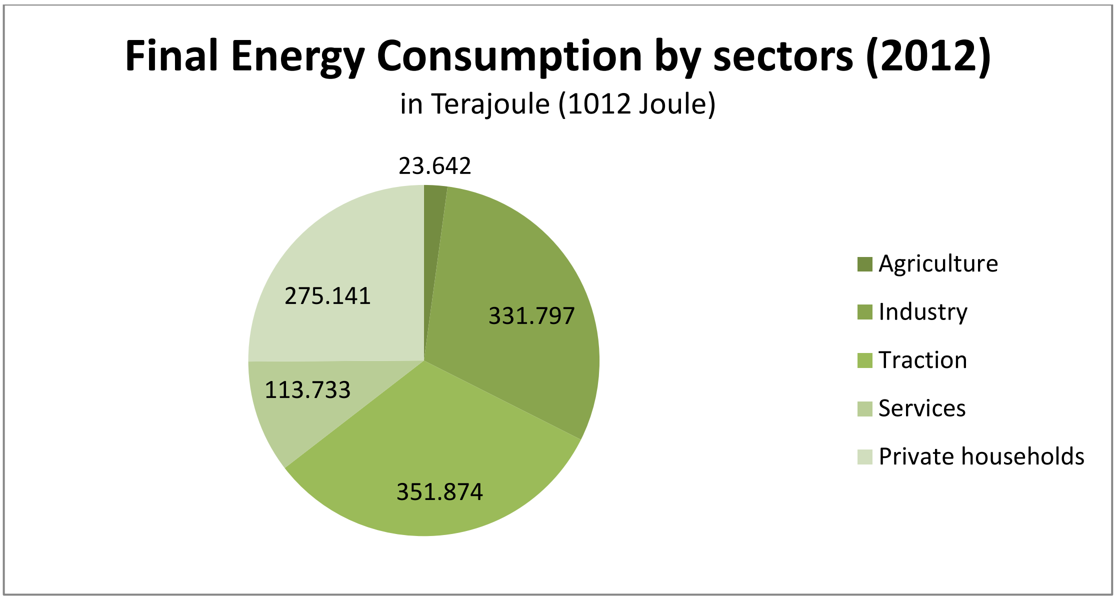


Figure 2.9: Final Energy Consumption by Sectors

Source Statistik Austria

Austria's greenhouse gas (GHG) emissions have grown by around 6% from 1990 to 2011, while the country's target under the Kyoto Protocol is to reduce them by 13% from 1990 to 2008-12. The largest source of GHG emissions is CO2 from energy use, which has risen by around one-fifth from 1990 to 2011, mainly because of increases from the transport and industry sectors. Austria will use flexible mechanisms to bridge the gap between its target under the Kyoto Protocol and its actual emissions. In a positive development, despite higher GHG emissions than in 1990, total emissions peaked in 2005 and have been trending downward since then. This downward trend reflects the reduced CO2 intensity of Austria's overall energy supply in recent years, with fossil fuels declining from 77% of primary energy in 2002 to 67% in 2012. Both oil and coal use declined in absolute terms over that same period (IEA, 2014).

2.2.2 Evaluation of energy savings' capacity - Identification of challenges

The stabilization of final energy consumption in recent years at a time of rising economic output indicates that final energy consumption in Austria is becoming increasingly decoupled from economic growth. Since 2010, energy intensity has been falling in Austria.

Austria is making progress in reducing energy consumption, but further improvements are necessary in energy efficiency policy implementation, the policy package development, or in both.

A range of measures is available to the Austrian government in the area of energy efficiency policy, including regulatory measurers (such as minimum efficiency standards or energy taxation rules); research, technological development and demonstration, and promotion of market penetration; dissemination of information to energy consumers; and subsidies for the implementation of energy-saving measures.

2.3 Market preparedness

This section aims to provide a description of the status quo of the Austrian market in terms of energy efficiency performance, the structure of the energy market, the technical capacity in terms of expertise, certification/training procedures for energy operators as well as the ease of access to finance for beneficiaries (either individuals or enterprises, SME's).

The main indicators used in this section are:

- Electricity Market Structure
- ESCO's market Development
- Energy efficiency performance of the market
- SME Access to Finance Index, which depicts developments and access to funding resources for small and medium sized enterprises.
- Technical capacity and experience in technology.

2.3.1 Description of Status quo

The Structure of the Austrian Electricity Sector

The Austrian electricity sector has traditionally consisted of vertically integrated and government-owned monopoly utilities whereas "Verbund" generates the vast majority of electricity which accounts for almost 50%, followed by the provincial utilities with around 27%, and other utilities and autoproducers. The "Verbund" is primarily running hydro power plants and operating the high transmission network. Besides the nine provincial and four municipal utilities of the provincial capitals ("Stadtwerke") there are another 150 small private utilities serving local customers (especially in the provinces of Styria and Upper Austria).

The dominant distributors within the Austrian electricity supply industry are still the provincial utilities "Wienstrom" and "EVN" located in the eastern region of Austria. Already in 1999 first steps towards opening the market where taken, nevertheless most of the new suppliers started their business with the full opening of the market in October 2001.

Austria's electricity market comprises of about 4 million customers (approximately 3 mio households, 150,000 farms, 19,000 industrial and public sector customers and 30,000 other commercial customers).

Electricity consumption is divided as follows[4]:

- 35.5 % industry,
- 23.5% households,
- 13.5 % commercial sector,
- 16.5% public sector (incl. public transport) and
- 11 % losses, internal demand and pumped storage. Changes in annual power demand are mainly determined by weather conditions and economic growth.

ESCO's market Development

Austria provides a successful example in the implementation of energy performance contracts and the development of an ESCO market. Nevertheless the expansion that has been observed since its start in the mid-1990s has stopped (Bertoldi et al 2014).

Currently there are 41 ESCOs on the market, which are responsible for the realisation of the 79 projects in the field of Energy Performance Contracting (EPC) as well as Energy Supply Contracting (ESC). Currently 21 of these ESCOs are member of the Dienstleister Energieffizienz & Contracting Austria (DECA), the main association of Austrian energy contractors. DECA is an independent network acting across all sectors standing up for an ambitious and effective energy policy (Windsperger et al 2014).

The ESCO market generates €10 - €15 M in energy savings out of €12 000 M in investment opportunities. (Bertoldi, 2013 oder JRC 2014)

Typical ESCO projects are in the field of space heating, air conditioning, control and automation as well as lightning. Projects concerning building envelope are increasing. (Bertoldi, 2013 oder JRC 2014). In Austria the ESCO business model is applied to industry, public service providers as well as to municipalities. Interest in the model on the private market is on the rise, however this market still represents a small share of total ESCO market since the private sector bears some risks for the contractors concerning amortization times (AT NEEAP, 2014).

[4] http://www.e-control.at/portal/page/portal/medienbibliothek/strom/dokumente/pdfs/WP7.pdf

The Austrian Eco Label (Österreichisches Umweltzeichen) is currently the only eco-label of the federal state indicates the quality of ESCO services and their compliance with standards. (http://www.contracting-portal.at/show.php?nid=4&mid=46)

SME Access to Finance Index which depicts developments and access to funding resources for small and medium sized enterprises.

According to information from the Small Business Act (SBA) Fact Sheets 2013 Austrian SMEs are doing well. As one of the few EU countries Austria managed to expand the SME sector during the crisis. For example, it is estimated that Austrian SMEs created a net 39,000 additional jobs (a 2.2 % increase) between 2008 and 2012. The sector managed to withstand the crisis through a combination of innovation and international exposure, most notably within the single market. Austria provides a favourable business environment for SMEs, with particular strengths in the SBA areas of 'think small first', 'state aid & public procurement', 'skills & innovation' and 'environment'. The areas that saw most progress in 2012 and the first quarter of 2013 were 'entrepreneurship', 'skills & innovation', 'responsive administration' and 'access to finance'. There is, however, still room for improvement in some areas. Notwithstanding recent measures, more efforts on 'responsive administration' would be desirable, e.g. to facilitate the setting-up of new businesses. One emerging issue which needs to be tackled is a shortage of skilled personnel in some industries. Also, despite the relatively good performance on 'access to finance', further measures are needed to improve SMEs' access to capital, particularly venture capital and crowdfunding. (http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/situations-in-member-states/at/)

Energy efficiency performance of the market

Energy efficiency improvement is a basic, yet significant, way of addressing both energy security and environment concerns. Energy efficiency in the household sector improved by 34% in 2010 compared to 1990. The efficiency index is based on eight different types of end-use: space heating, water heating, cooking and six large electrical appliances (refrigerators, freezers, washing machines, dish washers, TV sets and dryers). (Energy Efficiency Trends in the EU Lessons from the ODYSSEE MURE project)

Technical capacity and experience in technology

Within the EU project BUILD UP Skills (supported by the IEE) surveys on the competence levels in regards to energy efficiency as well as the use of renewable energy have been conducted. The main aim in Austria is to bring together all relevant Austrian stakeholders on training and qualification activities/initiatives in the building sector. The identification and quantification of all relevant professions and skill levels will be one of the first steps in order to achieve a workforce qualified in energy efficiency and renewable energy.

The building sector is responsible for 30 % of final energy consumption in Austria and has significant potential to save energy and reduce greenhouse gas emissions. Due to significant redevelopment potential, the required passive and low-energy standards for new buildings, and in order to reduce the amount of damage caused by deficiencies in the design, highly qualified staff is becoming increasingly important.

Austrian status quo report indicates that changing regulatory framework such as EU guidelines, building codes, directives and increasing technical requirements, demand for further training of sector workforce. The report concluded that there would be a shortfall of craftsmen in the building sector. Especially the numbers in apprenticeship beginners are declining. According to a forecast 138.964 skilled workers will be needed between 2011 and 2020 (Build up skills, 2014).

2.3.2 Evaluation of market preparedness – Identification of challenges

According to the literature Austria is considered to be one of Europe's showcase examples. From its start in the 1990s until 2010 market growth has been rapid. The main drivers for this market growth habe been large programmes driven by regional governments mainly. (JRC 2014). Growth has been fostered by good framework conditions such as trust, competition and demand for improved energy efficiency that have been created trough policies. Since 2010 growth has stopped due to the decrease in federal programmes and a halt in the Austrian market (JRC 2014).

The key drivers for the rapid growth were governmental leadership and support at national and federal level, faciliators, bundling of projects, dissemination of successful examples, quality labels for ESCOs and their services. Nevertheless attractive ESCO developments in the private sector should receive stronger support.

Moreover the inadequate workforce qualification can be considered as a challenge as far as the implementation of the EEO is concerned.

2.4 Administrative preparedness

At this section we analyze the general administrative system of the Austrian government associated with the implementation of the EEO scheme while also looking at the following indicators:

- Government effectiveness
- Regulatory Quality

2.4.1 Description of Status quo

When looking at World Governance Indicators, especially the Government effectiveness (Figure 2.10), which reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies it can be observed that the government effectiveness in Austria has slightly decreased since 1999. Nevertheless it remained rather stable since 1999, hence it shows enough strength to effectively implement energy efficiency policies.

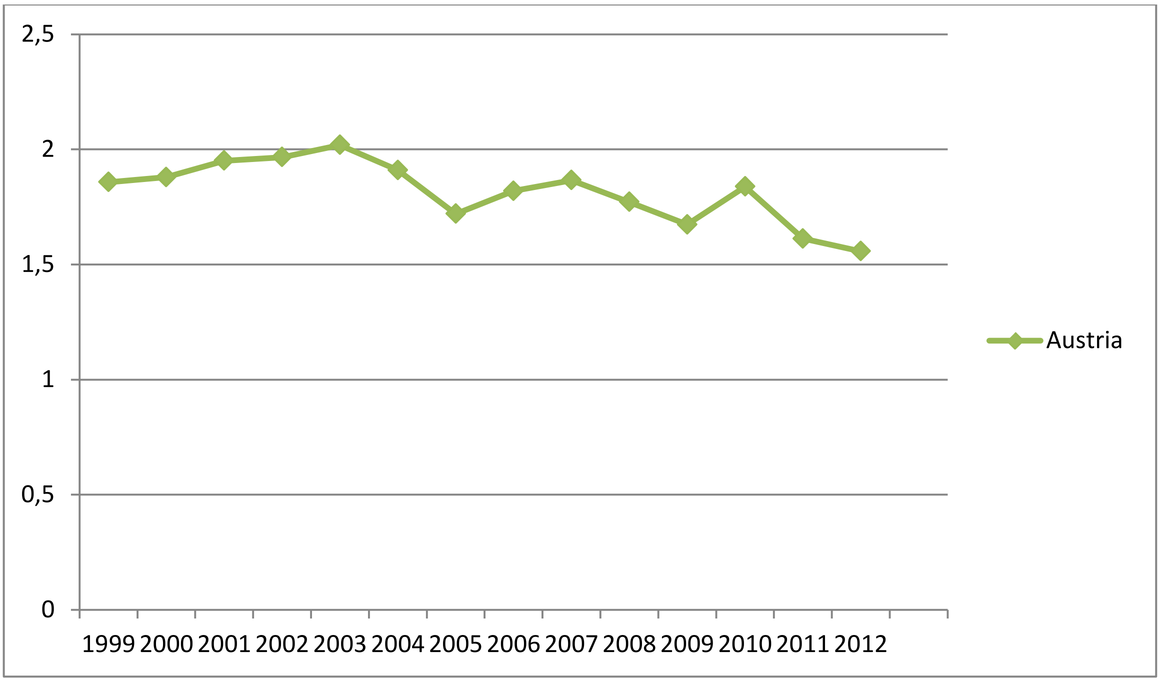


Figure 2.10: Government effectiveness

Source World Development Indicators

The regulatory quality index in Austria shows a rather stable performance. The index has never gone beneath 1.3.

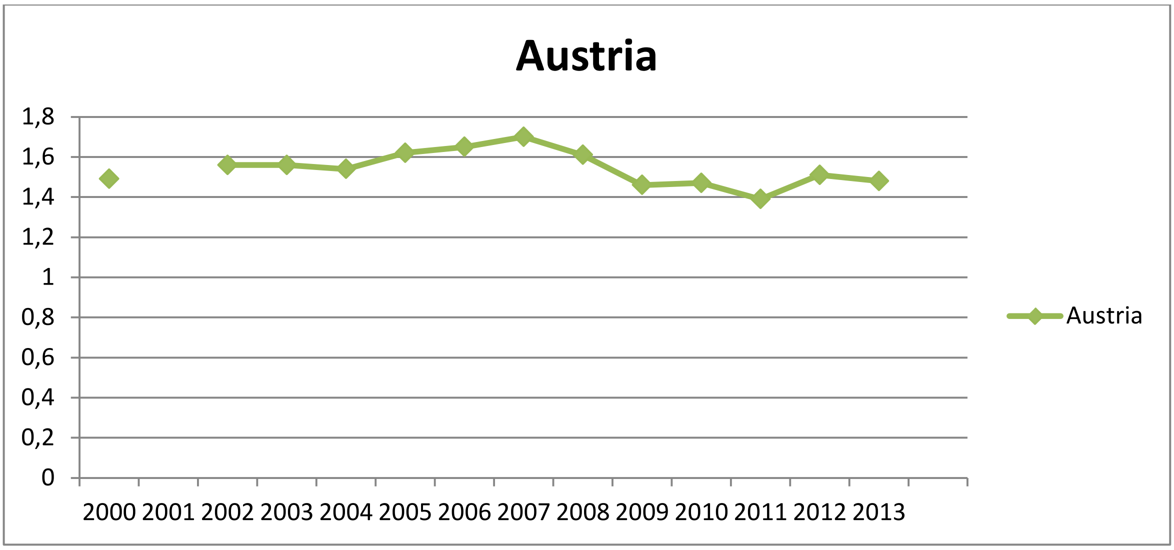


Figure 2.11: Regulatory Quality

This ranking indicates that Austria is quite capable of implementing any type of legislation including what is required as a result of the EED article 7.

2.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

The energy efficiency law foresees the installation of a national energy efficiency monitoring body for the following tasks:

- To administrate registers for obligated companies and certificated energy advisor
- To support the government in energy efficiency topics
- To inform the public
- To evaluate energy efficiency measures
- To prepare and compose national and international reports
- To monitor the national energy efficiency developments
- To monitor the energy efficiency measures in obligated parties

Thus in principle the administration of the EEO will be outsourced in Austria. There have been however delays in the decision on the appointment of an organization that will conclude the tasks of the national energy efficiency monitoring body.

2.5 Legislative preparedness

At this section, we consider the legislative preparedness of Austria in terms of implementing the obligation scheme within a suitable and comprehensive legislative or regulatory framework.

2.5.1 Description of Status quo

The Austrian Federal Energy Efficiency Act foresees the introduction of an energy efficiency obligation scheme that will contribute to the implementation of Article 7 of the EED. 9 July 2014 the national energy efficiency law has been decided by the national council of Austria and it will come into force 1 January 2015.

2.5.2 Evaluation legislative preparedness – Identification of challenges

In Austria, under the constitutional division of powers, the implementation of the EED is the responsibility of the Federal Ministry of Science, Research and Economy and the respective governments of the nine federal provinces. There is an obligation of the federal state and federal provinces to issue legislation that is required to implement the EED and achieve the national energy consumption goal in 2020.

Austrian Article 7 target is 290 PJ cumulative for 2014-2020. This target is reduced to 218 PJ (-25%) due to measures, which were implemented between 2008 and 2013 and have an impact in 2020. Austria has chosen the alternative approach to reach this target−Policy measures (Energy taxes, financing instruments, etc.) combined with an EEO. Hence the obligation schemes in Austria are only a part of the article7 requirement of the EED. The objective of the EEO is to achieve final energy savings between 2014 and 2020 that amount to 159 Petajoule in total.

The legislation has been concluded in 2014 and will come into force in 2015.

2.6 Social & Political acceptance/feasibility

In this section, we explore the social and political acceptance of the EEO scheme by looking at the following indicators:

- The Market Performance Indicator, which indicates to what extent the market brings the expected or desired outcome to final consumers.
- Level of fuel poverty within the country
- Social stance
- View of the industry

2.6.1 Description of Status quo

Austria is right in the middle of implementing the EEO scheme and there hasn't been one in place before.

The term energy poverty or fuel poverty has neither been (uniformly) defined nor properly measured in Austria. According to Boardman (2010) a combination of factors accounts for fuel poverty: high energy prices, low incomes and low energy efficiency of flats. In a report by e-control the following definition was proposed: A household is considered energy poor if its income is below the at-risk-of-poverty threshold and, at the same time, it has to cover above average energy costs.[5]

The public view regarding the introduction of EEOs is neutral. At this stage there is limited awareness among the general public. According to the conducted interviews, social acceptance will play, to some extent, a significant role in the implementation of EEO scheme.

2.6.2 Evaluation of social acceptance/feasibility – Identification of challenges

Fuel poverty and the possible increase of energy prices for the final energy consumers influences the fact that society is skeptical about EEO schemes implementation, which causes multiple challenges for different stakeholders and obligated parties. At this stage it is not clear whether the EEO will be financed via the energy bills, thus being a burden for the end consumers. Nevertheless the end consumers might be the ones that will gain from improved energy efficiency. Low-income and/or fuel poor households will be affected as well. An open question is how to counteract fuel poverty and how the energy burdens of these households could be overcome by increasing the energy efficiency of the homes. Hence it is crucial that aspects as fuel/energy poverty will be taken into account when implementing the EEO and effectively addressed. Nevertheless if the costs for the EEO will be financed via the energy bill it is important to offer public funding.

Among industry there is uncertainty when it comes to the EEO. At this stage it is clearly defined who will have to set measures but it is not clear how these will influence industry.

---

[5] http://www.e-control.at/portal/page/portal/medienbibliothek/publikationen/dokumente/pdfs/Energiearmut_Definitionen%20und%20Indikatoren_14082013_en.pdf)

It will be important to inform the public very well in order to ensure social acceptance which will play a significant role in the implementation of EEO scheme. In Austria there have been no efforts so far to inform the broader public.

REFERENCES

OECD 2013, Economic Surveys AUSTRIA, http://www.oecd.org/eco/surveys/Overview_Austria-Eng.pdf, last visited October 2014.

Central Intelligence Agency (CIA) *The World Factbook,* https://www.cia.gov/library/publications/the-world-factbook/geos/au.html*, last visited October 2014).*

http://www.statistik.at/web_en/statistics/energy_environment/energy/energy_efficiency_indicators/index.html

Austrian Energy Agency (AEA), 2014, Austrian Gas Price Index – ÖGPI©, http://en.energyagency.at/facts-services/energy-in-figures/gas-price-index.html, last visited October 2014.

Austrian Energy Agency (AEA), 2014, Austrian Electricity Price Index - ÖSPI©, http://en.energyagency.at/facts-services/energy-in-figures/electricity-price-index.html, last visited October 2014.

The Worldbank Group, Central government debt, total (% of GDP), http://data.worldbank.org/indicator/GC.DOD.TOTL.GD.ZS/countries/1W-AT-EU?display=graph, last visited October 2014

Marino A., Bertoldi P., Rezessy S. 2010: Energy Service Companies Market in Europe - Status Report 2010. Ispra, Italy: European Commission, Joint Research Center (JRC). http://iet.jrc.ec.europa.eu/energyefficiency/esco, pp. 9 – 12.

Bertoldi P., Boza-Kiss B. Labanca N. Panev S. 2014: ESCO Market Report 2013, Ispra, Italy: European Commission, Joint Research Center (JRC). http://iet.jrc.ec.europa.eu/energyefficiency/esco pp. 21 – 25.

Windsperger A., Windsperger B., Schörner G., Umsetzung der Energieeffizienzrichtlinie in Österreich, Analyse des Energiedienstleistungsmarktes auf Potentiale der Weiterentwicklung (2014)

Austrian Energy Agency (AEA). 2007. “Energy Efficiency Action Plan of the Republic of Austria in Accordance with EU Directive 2006/32/EC”. Vienna: Federal Ministry of Trade, Industry and Labour. http://ec.europa.eu/energy/demand/legislation/doc/neeap/austria_en.pdf.

Austrian Energy Agency (AEA). 2011. “Second National Energy Efficiency Action Plan of the Republic of Austria 2011”. Vienna: Federal Ministry of Economy, Family and Youth.

International Monetary Fund (IMF), 2014, http://www.imf.org/external/np/ms/2014/070114.htm, last visited December 2014.

http://www.e-control.at/portal/page/portal/medienbibliothek/strom/dokumente/pdfs/WP7.pdf

(http://www.contracting-portal.at/show.php?nid=4&mid=46)

http://www.e-control.at/portal/page/portal/medienbibliothek/publikationen/dokumente/pdfs/Energiearmut_Definitionen%20und%20Indikatoren_14082013_en.pdf

Boardman, B., 2010. Fixing Fuel Poverty. Challenges and Solutions. Earthscan, London.

DECA - Dienstleister Energieffizienz & Contracting Austria, http://www.deca.at/view_site/site.php?lang=de&mid=77, last visited 10.10.2014

ÖGUT, Österreichische Gesellschaft für Umwelt und Technik, www.contracting-portal.at, last visited October 2014

Österreichisches Umweltzeichen, Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, Abteilung VI/5 Richtlinie. 2010. UZ 50, Energie-Contracting, http://www.contracting-portal.at/_downs/95.pdf

Austrian Energy Agency (AEA) 2012, Energy Efficiency Policies and Measures in Austria/ Monitoring of EU and national energy efficiency targets http://www.energyagency.at/fileadmin/dam/pdf/projekte/klimapolitik/NationalReport2012.pdf.

BMWFW (Bundesministerium für Wissenschaft, Forschung und Wirtschaft) 2014: Energiestatus Österreich 2014. Entwicklungen bis 2012.

Umweltbundesamt GmbH, Vienna, 2014: Austria's Annual Greenhouse Gas Inventory 1990 - 2012" des Umweltbundesamtes.

IEA, 2014: Energy Policies of IEA Countries - Austria -- 2014 Review.

Intelligent Energy Europe, Programme of the European Union, October 2013, BUILD UP Skills – EU overview report, Staff working document, http://ec.europa.eu/energy/intelligent/files/library/doc/overview-report.pdf

Intelligent Energy Europe, Programme of the European Union, February 2013 BUILD UP Skills Status Quo Bericht, http://www.buildupskills.at/fileadmin/dam/docs/StatusQuoBericht-final.pdf

Austria's National Energy Efficiency Action Plan (NEEAP), April 2014. http://ec.europa.eu/energy/efficiency/eed/doc/neep/2014_neeap_en_austria.pdf

http://www.bmwfw.gv.at/EnergieUndBergbau/Energieeffizienz/PublishingImages/Energiestatus%20%C3%96sterreich%202014_HP-Version.pdf

IEA, 2014; http://www.iea.org/Textbase/npsum/austria2014SUM.pdf

BUILD UP Skills – EU overview, October 2013, revised June 2014, reporthttp://www.buildupskills.at/fileadmin/dam/docs/StatusQuoBericht-final.pdf)

3 Bulgaria - ABEA

3.1 Economic profile

Based on the set of national financial indicators, an analysis/ comprehensive description of the economic profile of the country is provided. The aim of this section would be to identify challenges and potential financial hurdles related to the introduction of the Bulgarian EEO scheme.

Bulgaria is a parliamentary democracy and a former Communist country that entered the EU on 1 January 2007. The economic growth averaged more than 6% annually from 2004 to 2008, driven by significant amounts of bank lending, consumption, and foreign direct investment. Successive governments have demonstrated a commitment to economic reforms and responsible fiscal planning, but the global downturn sharply reduced domestic demand, exports, capital inflows, and industrial production. GDP contracted by 5.5% in 2009, and has been slow to recover in the years since. Despite having a favourable investment regime, including low, flat corporate income taxes, significant challenges remain. Corruption in public administration, a weak judiciary, and the presence of organized crime continue to hamper the country's investment climate and economic prospects. (http://www.indexmundi.com/bulgaria/economy_overview.html/). Today, it is an upper-middle-income economy of 7.3 million people with a per capita income of $6,870 (GNI per capita,2012).

In the decade leading up to EU accession, Bulgaria embraced difficult reforms to build macroeconomic stability and stimulate growth. It built fiscal buffers by accumulating fiscal surpluses between 2004 and 2008, and reduced public debt from over 70% of GDP in 2000 to 18.5% in 2012, the second lowest debt level in the EU. Between 2000 and 2010, average annual growth reached 4.7%. During that same period, Bulgaria's per capita income as a percentage of the EU average increased dramatically, from 28% to 44%.

To build on the achievements of the last decade and move to a higher growth path in the current economic environment requires bold government actions and investments. To stimulate private sector-led growth, the Government of Bulgaria has placed better roads, rail and water infrastructure and created an enabling business environment at the top of its agenda. It has also pledged to strengthen the delivery of public services and is working towards ensuring all citizens reap the benefits of growth.

At a time of tight government budgets, removing constraints to development and financing much-needed investments poses a daunting challenge. This is where EU Structural and Cohesion Funds can play a critical role in Bulgaria's quest for growth. Under the previous EU financial perspective covering the years 2007-2013, Bulgaria had access to approximately €7 billion in grants. The Government estimated low absorption rates and has identified the efficient use of EU funds as an important opportunity to finance public investments and accelerate EU integration.

The International Finance Corporation (IFC) focused its private-sector investments on renewable energy and climate change-related infrastructure and industries, social sector private investments, and selectively in agriculture. The IFC provided support to address the impact of the crisis in Bulgaria by helping the recovery of the private sector and reducing job losses. As of February 2014, the IFC has 38 projects (completed and ongoing) in Bulgaria with total commitments of over $981 million. The single biggest investment of the IFC in the country is in the field of renewable energy, in the form of a loan for the construction of the largest photovoltaic park in Bulgaria. The IFC is also involved in a number of sizable investments in various projects in manufacturing sectors, oil and gas, financial markets, and agriculture. (http://www.worldbank.org/en/country/bulgaria/overview#2)

3.1.1 Description of Status Quo

Annual GDP Growth

The GDP maintained constant growth until 2009, when it turned negative before starting gradually to increase. This tendency is explained by the international financial crisis that affected all of the European economies during 2008 and 2009. Unlike the period 2000-2008, in the period 2009-2013, Bulgaria could not maintain a high GDP growth.

Figure 3.1: GPD growth (%) in Bulgaria between 2000 and 2016

Source: The World Bank

GDP per capita

The GDP per capita increased constantly during years 2000 - 2008 while in more recent years the value was roughly at the same level. The introduction of the energy efficiency measures could potentially have a positive impact on the Bulgarian economy and on the international economic indexes. The energy intensity, for example, is a measure of the energy efficiency of a nation’s economy. It is calculated as units of energy per unit of GDP.

Figure 3.2: GDP per capita, USD in Bulgaria between 2000 and 2012

Source: The World Bank

Central government debt

The central government debt stayed stable until 2011, when it started to increase substantially. The central government debt increased from 15.4% of GDP in 2011 to 18.0% in 2012. Central government debt as a percentage of GDP remained below the European Union average between the years 2009 and 2012. The recent Bulgarian Government intents to take half billion euro loan for energy efficiency measures implementation in residential buildings.

Figure 3.3: Central government debt in Bulgaria, 2009 – 2012

Source: The World Bank

Electricity prices (domestic users)

Electricity prices gradually increased in Bulgaria and the EU during the years 2007 – 2013, as shown in the chart. In terms of PPP the prices reached the European level. The level of taxes in the electricity prices for domestic use is 23,47 % of the total price.

Figure 3.4: Electricity prices-domestic use (€/kWh) in Bulgaria, 2007-2013

Source: Eurostat

Figure 3.5: Electricity prices-domestic use (€/kWh) in Bulgaria 2007-2013 in terms of PPP

Source: Eurostat

Gas prices (domestic users)

The natural gas price for domestic use gradually increased in Bulgaria and the EU during the years 2009 – 2012 and is much higher than the EU average. If the electricity and gas prices increase, the energy consumption will probably decrease but this case could not be connected to the realization of energy efficiency interventions.

Figure 3.6: Natural gas prices for domestic use (€/MWh) in Bulgaria 2007-2013

Source: Eurostat

Figure 3.7: Natural gas price for domestic use (€/kWh) in Bulgaria 2007-2013 in terms of PPP

Source: Eurostat

Vulnerability to energy supply

Bulgaria’s dependence on imports of energy resources is 70-72% and not 36.1% (Eurostat), as claimed in the manipulated considerations of nuclear energy as a local energy source. Actually, nuclear power is not a local source, and therefore Bulgaria's dependence on energy imports is high through the years -- from 72% to 60%. The intervention of energy efficiency could reduce the dependence on import of energy resources.

At a time when the European Union is considering energy dependence as one of the main problems of energy security, expansion of nuclear energy in Bulgaria does not help resolving this problem; the reason is that such unexpansion does not lead to diversification of energy supplies, as 100% of nuclear fuel delivery and treatment is sourced from Russia.

3.1.2 Evaluation of economic preparedness - Identification of financial challenges

Key economic indicators, such as real growth of GDP and GDP per capita, show that the Bulgarian economy after the 2009 financial crisis is slowly coming back to a path of growth. The central government debt remains stable. Recently the economy has been experiencing some big stresses due principally to the international economic crisis and there are also some indications of debt growth.

The crisis in the energy sector brings some uncertainty to the capacity of the Bulgarian economy to overcome these stresses.

The high vulnerability of energy supply is based on a low availability of energy resources: 40% of the electric energy is produced from local coal. Sustainability of coal is very low (its CO2 emissions are very high and it is a non-renewable source). Integration of 1036 MW PV and 696 MW wind power in 2012 requires high investments from the government side to recover feed-in tariffs. Bulgaria needs to integrate its national energy market into the European market and increase the interconnections with European suppliers.

Energy security in Bulgaria is compromised by its energy dependence on Russia. Bulgaria is 100% dependent on imported gas from a single supplier (Russia) and needs to face its dependency on local coal and nuclear fuel, as well as look for other gas suppliers besides Russia.

The electricity and natural gas prices (in terms of PPP) reached social unacceptance by end-customers to deal with the increase that electricity and gas prices have experienced in the last 10 years. The liberalization of the electricity market that eventually could experience a decrease in prices has been offset by the big investments required to reduce dependence on oil and its substitution from more renewable sources.

Within the recessionary environment the EEO scheme in Bulgaria might be more favoured by residential end-users looking for ways to bring their energy costs down through energy efficiency investments.

2020 targets

According to the second NEEAP an interim target for the period 2011-2013 equal to 2/3 of the national target by 2016, i.e., **418 ktoe / year or 4,860 GWh till 2016, is envisaged.**

In accordance with Art. 10 of the current EEL, the national target of energy savings is distributed as individual targets of energy savings between three groups of obligated persons, namely:

- Energy traders
- Owners of buildings - state and/or municipal property, in exploitation with the floor area over 1000 square meters.
- Owners of industrial systems with an annual energy consumption over 3 000 MWh.

At this moment the total number of obligated persons is 649, of whom:

- Energy traders - 52
- Owners of buildings - 300
- Owners of industrial systems - 297

The target that the obligated persons have to reach is 647,5 ktoe (485,63 ktoe with full use of the 25% reduction according to article 7(2)), and it represents 82% of the total national target for energy savings. The remaining 18% will be met by non-obligated persons - final energy consumers.

Figure 3.8: Individual targets of obligated persons in GWh

The savings that will be achieved following the introduction of the new EEO scheme for each year from 1 January 2014 to 31 December 2020 shall be at least equivalent to new savings of 1,5 % of the annual energy sales to final customers of all energy distributors or all retail energy sales companies by volume, averaged over the 2010-2012 period.

The overall amount of energy savings, over the obligation period, in order to meet the target set in accordance with article 7 (1), represents a total of 647.50 ktoe during the period from 1 January 2014 to 31 December 2020.

The minimum combined amount of energy savings achieved by all energy traders must include new energy savings equal to 1.5% of the annual amount of energy sold to all final customers.

Table 3.1: Breakdown of the obligation scheme by year (2014-2020), ktoe

Year	Obligations excl. transport	Obligations excl. transport and with full use of the 25 % reduction permitted by Article 7(2)
2014	92.50	69.38
2015	185.00	138.75
2016	277.50	208.13
2017	370.00	277.50
2018	462.50	346.88
2019	555.00	416.25
220	647.50	485.63

3.2 Energy & Climate Change profile (Energy Savings' Potential)

3.2.1 Description of Status quo

In the following charts we analyze some indicators about energy situation in Bulgaria.

Bulgaria intends to take measures (institutional and fiscal incentives) to accelerate the gasification of the country. This should allow access to the gas distribution system for 30 % of households in 2020 and the substitution of electricity used for heating purposes with gas. The investments are high, but the implementation of this measure will have long-term effect on the amount of GHG emissions even after 2020 and will reduce 2,476.4 kt CO2 cumulatively by 2020. There are plans for improving the energy efficiency of buildings: restoration of the specified annual percentage of the overall public and governmental buildings (with total area over 250m2), replacement of the obsolete and inefficient equipment for the production of energy with new equipment. Also mandatory energy savings in end-use are envisaged (based on Directive 2012/27/EC), such as a White Certificate Scheme. Plans for introducing nearly zero energy buildings, standards for sustainable buildings, the introduction of a public registry of energy efficiency certificates, technical passports for buildings and further raising of awareness are also envisaged. In the industry sector, industrial systems with annual energy consumption of more than 3,000 MWh are required to have their energy efficiency audited every three years since 2008, based on the Energy Efficiency Act. (European Environmental Agency: Climate and energy country profiles – Key facts and figures for EEA member countries, EEA technical report, No17/2013).

Primary energy consumption

Figure 3.9: Gross Inland Consumption (in million toe) in Bulgaria 1997- 2012

Source: Eurostat

Primary energy consumption in Bulgaria kept close to 18-20 million toe since 1997. A substantial decrease occurred between 1990 and 1999. After that it remained relatively stable until 2014

Energy intensity of the economy

Figure 3.10: Energy Intensity of Economy, Ktoe per1000EUR, in Bulgaria 2001-2012

Source Eurostat

Although the energy intensity of the Bulgarian economy decreased, it is still very high (670 kgoe/1000 EUR) in comparison with the European level (143.2 kgoe/1000 EUR). The energy intensity reduction is mainly due to energy efficiency measures taken by the industry.

Final consumption of residential dwellings

Figure 3.11: Final energy consumption of residential dwellings (toe/dw) in Bulgaria 2001 – 2012

Source: Odysee-Mure

The final consumption per residential dwelling is notably low compared with the European average. The gap between them is around 0.5 toe/dw. The reduction of energy consumption in residential dwellings is due policies of Bulgarian Government in the support of interventions of energy efficiency but also in the international economic crisis.

Final energy consumption - by sectors

Figure 3.12: Final Energy Consumption (ktoe) of all sectors in Bulgaria

Source: Eurostat

The final energy consumption experienced a drastic decrease between 1990 and 1992. Since 1992 and until nowadays, it remained around 9,000 ktoe.

The final energy consumption by sectors (industry, transport, households, services and agriculture) is the following:

Figure 3.13: Final energy consumption by sectors in Bulgaria

Source: Eurostat

During the years 1990 – 2012 the final energy consumption for industry and agro-forest sectors decreased, while it increased for services and transport. In the residential sector the final energy consumption was quite constant during years 2000-2012.

Energy efficiency gains in households

During the period 1996-2012, energy efficiency improved by 38% in Bulgaria compared with 17% for the EU as a whole (as measured by the decrease of the overall energy efficiency index, ODEX). This fast rate in Bulgaria is mainly due to the improvement in the industrial sector.

The impact of the economic crisis was a 2% increase of the ODEX in 2009, followed by a 3% reduction in 2010. This shows that in 2010 despite the increase in energy intensity, energy efficiency improved and additional energy savings were achieved. The energy savings are due to the support of Bulgarian government in the interventions of energy efficiency but also to the international economic crisis.

Figure 3.14: Energy Efficiency Gains in Households (%)

Source: Odysee-Mure

Energy efficiency gains in households were higher in Bulgaria than the European average until 2005. After 2006 the gap between the energy efficiency gains in Bulgaria and the European average continued to grow due to the slow improvement regarding the energy efficiency gains in Bulgarian households. Improving the energy efficiency of the Bulgarian building stock might provide important energy savings estimated about 30% of the total energy consumption.

Between 1996 and 2002, energy efficiency improved by 20% in households. This happened in a situation of considerable growth of private household's consumption. After 2002 the ODEX of Bulgarian households remained virtually unchanged, although since 2004 there has been a slight downward trend implying insignificant energy efficiency improvements. In 2010 the ODEX decrease was 1%, while the index for space heating remained constant. There were no significant energy savings in 2010 compared with 2009.

Energy efficiency gains in industry

Figure 3.15: Energy Efficiency Gains in Industry (%)

Source Odysee-Mure

Bulgarian industry has showed higher energy efficiency gains rates in comparison with the European average. This rate shows the potential of Bulgarian industry to reduce the energy intensity of the Bulgarian economy. The biggest potential in fact is further mainly related to the SMEs (subject to EEO scheme).

In the industrial sector, the energy efficiency index has decreased by 72% over the period 1996-2009. Under the influence of the economic crisis in 2010 the ODEX of the Bulgarian industry remained virtually unchanged (down 0.3%).

The most significant reductions of ODEX are in the energy-intensive branches: 80% in chemicals, 57% in the steel industry. This fast rate of energy efficiency improvement in industry was due to the low initial level of efficiency in this sector at the beginning of the period, very important drivers were also the rapidly rising prices of fuels and energies during that period.

Table 3.2: Distance to target (2012 versus 2020 target): primary and final energy

Target in energy savings in PEC	1590 ktoe
Target in energy savings in FEC	716 ktoe; from obligated parties – 486 ktoe
PEC 2012 - 17.8 Mtoe	PEC 2020 - 15.8 Mtoe
FEC 2012 - 9,241 Mtoe	FEC 2020 – 8,639 Mtoe

3.2.2 Evaluation of energy savings capacity - Identification of challenges

Based on the description of the country's profile on energy consumption trends and savings potential in relation to the country's political commitment to energy efficiency (i.e. 2020 targets) an evaluation can be made of whether the introduction/adaptation of the EEO scheme would enable or hinder the country to bring about its energy efficiency potential. Aspects related to the energy and climate change country profile that deserve attention or improvements or seem to favour the introduction/implementation of the EEO scheme are highlighted in this section.

The minimum combined amount of energy savings achieved by all energy traders must include new energy savings equal to 1.5 % of the annual amount of energy sold to all final customers

Table 3.3: Breakdown of the obligation scheme by year (2014-2020), ktoe

Year	Obligations excl. transport	Obligations excl. transport and with full use of the 25 % reduction permitted by Article 7(2)
2014	92.50	69.38
2015	185.00	138.75
2016	277.50	208.13
2017	370.00	277.50
2018	462.50	346.88
2019	555.00	416.25
2020	647.50	485.63

In Bulgaria the EEO scheme aims to achieve energy savings during the period 2014-2015 through the following types of measures:

- Households sector: technical, organizational and behavioral measures;

- Services: technical and organizational measures;

- Transport sector: technical, organizational and behavioral measures;

- Industrial sector: technical and organizational measures.

3.3 Market preparedness

3.3.1 Description of Status Quo

In order to define Bulgarian market preparedness for EEO schemes implementation the following indicators have been chosen.

SME access to finance

The SMAF index provides an indication of the changing conditions of SMEs' access to finance over time for the EU and its Member States.

The EU index score for 2013 is 108, indicating an improvement of 8 points with respect to the score in 2007. France, Austria and Finland are the highest performing countries in terms of access to finance for SMEs, all with an index value ranging between 122 and 126 (approx. 24 points higher than the EU overall in 2007). Greece, Cyprus and Romania have the lowest scores (index values of 78, 82 and 85 respectively). In the European Union Bulgaria is in the sixth position with a SMAF index of 98 in 2013. This value is very close to baseline of EU 2007=100. Other countries with a similar value are Hungary, Portugal and Spain. In the following chart we can see that the SMAF index is increased quickly during the period 2011-2013 while during the period 2007-2011 it was quite constant (Source: website of European Commission – Enterprise and Industry). In the EEO scheme the SMEs can receive financings for the intervention in energy efficiency, as analyzed in the document D2.1.2.

The EU index score for 2013 is 108, indicating an improvement of 8 points with respect to the score in 2007. France, Austria and Finland are the highest performing countries in terms of access to finance for SMEs, all with an index value ranging between 122 and 126 (approx. 24 points higher than the EU overall in 2007). Greece, Cyprus and Romania have the lowest scores (index values of 78, 82 and 85 respectively). In the European Union Bulgaria is in the sixth position with a SMAF index of 98 in 2013. This value is very near to baseline of EU 2007=100, other countries with a similar value are Hungary, Portugal and Spain. In the following chart we can see as the SMAF index is increased quickly during the period 2011-2013 while during the period 2007-2011 it was quite constant (Source: website of European Commission – Enterprise and Industry). In the EEO scheme the SMEs can receive financings for the intervention in energy efficiency, as analyzed in the document D2.1.2.

Figure 3.16: SMAF index in Bulgaria 2007 – 2013

Source Odysee-Mure

Until 2007, only two companies offered ESCO-type contracts supplementary to their core business, and the market was limited to a few transactions with the public sector involving mainly public buildings.

The high level of governmental support (Energy Renovation of Public and Residential buildings) created barriers to the market for ESCOs by removing the incentive to look for ESCO services that have a financing element. Municipalities use structural funds for energy system improvements, while the industrial sector has internally the technical and financial capacity to implement energy efficiency measures (EC DG JRC 2007).

Identified barriers for the establishment of ESCOs and long-term contractual agreements include election cycle-based thinking and attitudes and changing regulatory framework (EC DG JRC 2007).

Table 3.4: Summary of basic data of the Bulgarian ESCO Market Source: Energy Service Companies Market in Europe- Status Report 2010

(http://iet.jrc.ec.europa.eu/energyefficiency/sites/energyefficiency/files/jrc_89550_the_european_esco_market_report_2013_online.pdf)

Number of ESCOs	20
Size of the market	EUR 6 million
ESCO Association	NO
Type of ESCOs	Building refurbishment
Market development	Slow growth
Sector ESCO Projects & main EE measures	Public sector involving public buildings - thermo-modernisation and lighting

The stakeholders of energy efficiency system in Bulgaria are:

1- Obligated parties are envisaged to be energy traders that meet one or more of the following conditions:

a. Sales of energy to final customers in the previous calendar year that were greater than the equivalent of 75 GWh (6.45 ktoe) annually, including:

- Electricity companies selling electricity to final customers in amounts exceeding 75 GWh on an annual basis;
- Heat transmission companies selling heating to final customers in amounts exceeding 75 GWh on an annual basis;
- Natural gas traders selling more than 8 million normal cubic meters on an annual basis to final customers;
- Liquid fuel traders selling liquid fuels to final customers in amounts exceeding 6 500 t on an annual basis, excluding fuels for transport purposes;
- Solid fuel traders selling to solid fuels to final customers in amounts exceeding 13 000 t on an annual basis;

b. A minimum of 10 members of staff in the previous year, irrespective of the amount of energy traded;

c. Annual turnover or end-of-year balance for the previous year of more than BGN 3.9 million (1,99 million EUR), irrespective of the amount of energy traded.

2- E.S.Cos, Energy Service Company;

3- Engineers, architects and others professionals that work on energy efficiency projects;

4- Firms, societies, SME and companies that produce, distribute and consume energy;

5- Firms that realize heating plants, air condition plants and similar plants;

6- Construction companies;

7- Firms that design and/or realize RES projects.

Market share of the largest generator in the electricity market.

The nuclear energy (Kozloduj NPP) accounts for 33,45% of the total electricity produced. The share of coal based electricity producers (Maritsa East I, II, III – local coal) is 42,26% of the total electricity production (2012).

3.3.2 Evaluation of market preparedness – Identification of challenges

Bulgaria is one of the European economies in which a large potential for energy savings exists but little energy efficiency activity has been undertaken until recent years.

About 20 companies worked as ESCOs as of 2009, where a lower number (around 5) actually declared themselves as ESCOs and offered guarantees on savings. In comparison, 12 ESCOs were present in the market in 2007 (of which 1-3 offered guarantees on savings) (EC DG JRC 2007). In 2009, with the exception of one larger national company, the providers were mainly small local companies. Only around 3 companies have energy services as their core business, while the others are equipment manufacturers and distributors, building manufactures and engineering consultants. The public building sector attracts the majority of the projects involving more energy services (e.g. lighting and HVAC) and complex refurbishment, whereas a lower number of projects is implemented in the street lighting projects and private non-residential buildings. Only a few projects are carried out in the industrial sector. EPC and other performance-based contracts are used. Guaranteed savings, shared savings and CEM are offered. Fixed monthly instalments for the repayment of the contract are used, too.

Projects are mainly financed with ESCOs' own funds, through financial institutions (commercial banks and the EBRD credit line to industry) and dedicated funds such as the Bulgarian ESCO fund (BEF) 8 and the Bulgarian Energy Efficiency fund (BEEF).

In Bulgaria, the combination of rising energy prices, high energy efficiency potential, limited capacity and experience in the implementation of energy efficiency measures and reduced financial resources (particularly in the municipal sector) has increased the interest in ESCO solutions. Governmental policy promoting ESCOs such as the new Energy Efficiency Law has created a better environment with increased security for the development of ESCO projects.

Opinions differ on the impact of the financial crisis on the Bulgarian ESCO market. In general, the higher interest rates have lowered the access to finance. Mistrust in the market is perceived as the most important barrier to ESCO projects. (Source: Energy Service Companies Market in Europe – Status Report 2010 – JRC Scientific and Technical Reports).

3.4 Administrative preparedness

Government effectiveness

Although the indicators show a below EU average placement for Bulgaria, governmental efforts in energy efficiency are increasing and further improvements in policy implementation are taking place within the administrative public sector. Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

The value of Government effectiveness in Bulgaria during the period 2000 - 2013 is about 60 while for others European countries as Germany, Finland, Sweden or Norway, during the same period, the value is about 90 or more.

Figure 3.17: Government effectiveness in Bulgaria 2009 -13

Source World Bank

Regulatory Quality

Figure 3.18: Regulatory quality in Bulgaria 2000 - 2013

3.4.1 Evaluation of administrative preparedness in relation to the EEO scheme

National Sustainable Energy Development Agency – functions of an EEO Scheme administrator, coordinator of EEO Scheme and is responsible for:

1- Establishment of overall energy end-use savings target;
2- Determination of specific obligated parties and obligations for the given time periods;
3- Adoption of methodology for calculating savings;
4- Carry out quality control, savings calculation, monitoring and evaluation;
5- Verification that the obligated parties have implemented the measures at the requisite level of quality;
6- Gather information about the implemented efficiency measures;
7- Draw up the reports, according to the achieved results.

3.5 Legislative preparedness

3.5.1 Description of Status Quo

New EEO in Bulgaria will be established by the new Energy Efficiency Act and corresponding regulation that will implement the Directive 2012/27/EU/.

A methodology for the operation of the energy efficiency obligation schemes has been developed in accordance with the requirements of Article 7 of Directive 2012/27/EU on energy efficiency. This national methodology has been drawn up in line with the framework provided in paragraph 4 of Annex V to the Directive.

The purpose of the new Bulgarian WCS will be to drive energy efficiency mainly in the increasing energy savings by end users. In order to reach their individual targets, the obligated parties may implement energy-saving measures in all final customer sectors — industry, transport, households, commerce, civil society organizations, agriculture, forestry and fishery, services, etc. (Methodology for the operation of the energy efficiency obligation schemes from Republic of Bulgaria, Ministry of Economy and Energy, pag.5). The obligated parties may implement measures that achieve energy savings in the energy transformation, distribution and transmission sectors, including means of efficient district heating and cooling systems infrastructure.

The savings achieved due to introduction of the new EEO scheme for each year from 1 January 2014 to 31 December 2020 shall be at least equivalent to achieving new savings of 1,5 % of the annual energy sales to final customers of all energy distributors or all retail energy sales companies by volume, averaged over the 2010 – 2012 period.

The calculation of the energy savings target in Bulgaria is based on the annual average final energy consumption for 2010-2012, from which non-energy use and energy use in transport are excluded. The basis for calculating the obligation under Article 7 of the EED on energy efficiency is 6 167 ktoe, set as a baseline excluding the non-energy and transport use for the average of 2010-2012. On top of that, the 1.5% target set implies that Bulgaria must achieve 92.50 ktoe of new savings annually for the period 2014-2020, where in cumulative figures amounts to 647.50 ktoe. Furthermore, next to the EEO scheme, Bulgaria sets targets at 25% for energy savings, by making use of the provisions of Article 7(2).

3.5.2 Evaluation legislative preparedness – Identification of challenges

Compliance with the requirement in the second sub-paragraph of Article 7(1) of Directive 2012/27/EU will be ensured by introducing various types of mechanisms and obligations to promote the implementation of energy efficiency measures leading to measurable energy savings. This will involve appropriate amendments to Bulgaria's primary and secondary legislation. (Source: Republic of Bulgaria, Ministry of Economy and Energy, Methodology for the operation of the energy efficiency obligation schemes).

3.6 Social & Political acceptance/feasibility

3.6.1 Description of Social & Political acceptance/feasibility

Consumers' trust in their energy supplier

The overall market assessment for the EU27 is 77.5 in 2012, whereas Bulgaria's overall MPI for 2012 is 71.6. In Table 3.5 and Table 3.6, the market assessment of electricity and gas services in EU27 and Bulgaria is shown. Whereas there is little difference in the market performance for electricity and gas in EU27, in Bulgaria there is a significant difference for 2012. The performance advance in electricity services from 2011 to 2012 is similar on the European and national levels. Regarding the gas sector on the European level, the advance is negative (-0.9), but still higher than on the Bulgarian national level (-2.1).

Table 3.5: Normalized MPIs – EU 27

	Normalized MPIs – EU27	Diff 2012 – 2011	2012	2011	2010
Electricity services	96.3	0.6	26	25	23
Gas services	98.4	-0.9	21	16	19

In the Bulgarian energy sector, the difference between the EU27 market performance and the national one is insignificant regarding gas services (0.0.), but highly significant, with a negative advance, regarding electricity services (-9.4). In the period 2010-2012, the electricity market performance had an advance at a continuing high rate, and the gas market advanced negatively at a slow rate.

Table 3.6: Normalized MPIs – Bulgaria

	2012 MPI	Diff 2012 2011	Diff 2011 2010	Diff. EE EU27
Electricity services	85.8	0.7	-2.5	-9.4
Gas services	99.3	-2.1	-1.9	0.0

According to the Bulgarian National Statistical Institute in 2012 research, the major income of Bulgarian households comes from monthly salary (52.7%), pension (26.7%) and private small business (6.4%). Other sources of income are rent, social bonuses, pension bonuses, etc. On the other hand, Bulgarian household expenses are 83.5% of their income, and 15.3% of the total household expenses are related to electricity, water, gas and heating demands. Through the period 2010-2012, these percentages increased steadily, and in 2012 utility payments (not including telecommunication expenses) were 18% of domestic expenses. Table 3.7 presents the average prices per unit and quantities bought by 100 Bulgarian household for the period 2010-2012.

Table 3.7: Average cost per unit and quantity per 100 households

		2010		2011		2012	
	Unit	Quantity	Av. price/unit (BGN)	Quantity	Av. price/unit (BGN)	Quantity	Av. price/unit (BGN)
Wood	**m3**	261.3	52.72	272.1	53.87	271.5	60.51
Coal	**Kg**	21 600.0	0.21	21 500.0	0.23	23 800.0	0.27
Liquid fuels	**L**	87.0	1.41	43.3	1.41	38.0	1.31
Electricity	**kWh**	363 315	0.15	366 914	0.16	382 353	0.17
Gas	**l**	1 357.8	1.11	1 470.7	1.24	1 270.5	1.31

Consumers' trust in their energy supplier reflects the extent to which consumers feel confident that businesses comply with consumer protection rules. Proper enforcement of consumer legislation is also of crucial importance to protect reputable businesses from unfair competition. Trust has a very high correlation with MPI scores (0.8), indicating that if trust is high in a market, the overall performance of that market is likely to be positive as well.

The trust levels for electricity and gas markets for the whole EU27 market are shown in Table 3.8. For Bulgaria, the trust levels have been assessed, not directly measured.

Table 3.8: EU27-Trust levels for electricity and gas services

	Low	Average	High	2012	Diff 2012 2011
EU27-services trust levels	15%	42%	44%	6.7	0.0
Electricity services	23%	39%	39%	6.2	0.0
Gas services	19%	38%	43%	6.5	-0.1

Within the electricity and gas market in EU27, overall satisfaction with the provided services is another important element highly correlated to overall MPI scores (0.8). It reflects the extent to which different markets meet consumers' expectations. In the general EU-statistics, Bulgaria's customers' overall satisfaction has been estimated (Table 3.9).

Table 3.9: Bulgarian satisfaction levels for electricity and gas services

	Low	Average	High	2012	Diff 2012 2011
EU27-services trust levels	9%	37%	55%	7.3	0.0
Electricity services	13%	36%	51%	7.0	0.1
Gas services	10%	38%	52%	7.1	-0.1

Level of fuel poverty within country

There is no official definition in Bulgarian legislation of fuel poverty or in-depth research on the topic. For instance, governmental energy bill assistance through the Winter Supplement Programme (WSP) is one of the ways of targeting people who cannot afford adequate thermal comfort, but this is not directly referred to as fuel poverty. The programme is focused on assisting people whose average monthly income for the previous six months is lower than the differentiated minimum income. The fuel poverty policies in Bulgaria are fundamentally income support-orientated and fail to address the causal factors of the condition. They only focus on short-term household budget support, which is highly inefficient.

A recent survey on Statistics on Income and Living Conditions in households reports that In 2013, 46.6% of the total population answered that they could not keep the home 'adequately warm`, thus placing the country the first place among EU-28, while the average EU numbers are 10.8 %.

Table 3.10: Percentage of population unable to keep home adequately warm

Inability to keep home adequately warm					
Below 60 % median equivalised					
	2009	2010	2011	2012	2013
% of population					
Single person	80,6	81,8	70,7	72,0	-
One adult 65 years or over	79,0	80,2	69,8	74,9	-
Two adults	76,6	80,3	66,2	64,0	-
Total	80,2	83,3	68,9	70,0	
Above 60 % median equivalised					
	2009	2010	2011	2012	2013
% of population					
Single person	68,3	72,0	50,1	51,6	-
One adult 65 years or over	72,6	77,1	56,6	54,9	-
Two adults	63.1	65.9	47.8	47.2	-
Total	59,7	62,1	39,8	40,2	
Total					
	2009	2010	2011	2012	2013
% of population					
Single person	75,5	77,0	60,6	61,2	56,0
One adult 65 years or over	77,2	79,0	64,7	65,9	60,1
Two adults	66,5	68,8	51,3	50,1	49,1
Total	64,2	66,5	46,3	46,5	46,6

Source: Eurostat

Nearly half of Bulgarians are left to cope for themselves, while researches in this area are rather new. Yet energy poverty is quite severe in Bulgaria. All major factors that could exacerbate energy poverty are present in Bulgaria: low incomes, upward rebalancing of energy prices, poor energy efficiency standards of the dwellings and faster rising energy costs compared with household income. The specific measures and the social policies for each factor are ineffective, targeting a very limited part of the population and providing very low heat allowances, for the poorest groups, in particular. Therefore, energy subsidies and direct financial support to households for heating cannot provide a sustainable long-term solution to the fuel poverty problem.

Coverage: The percentage of fuel-poor households covered by the policy, EEO.

The Winter Supplement Program (WSP), administrated by the Ministry of Labour and Social Policy, is the only existing program providing support for fuel-poor households. The program provides direct financial support towards heating bills, electricity, coal briquettes, wood and natural gas for heating. According to the programme`s rules, every household with earnings less than the guaranteed minimum wage for a period of 6 months is eligible for heating assistance. In order to receive the social aid, the applying households should also satisfy additional conditions, including not having sold real estate for the last 5 years and not having travelled abroad on their own expense for the prior 12 months. The amount of the social aid is based on the equivalent of 450 kWh of electricity, of which 300 kWh is day-time tariff electricity and 150 kWh is night-time tariff electricity, and is based on the electricity prices at the beginning of the heating season. The aid is granted for a period of 5 months and through a one-time payment in advance, in cash, for the entire heating season. The WSP currently falls under the jurisdiction of the Ministry of Labour and Social Policy, which has an extensive network of offices to distribute the aid, while maintaining a database of vulnerable consumers.

Even though Bulgaria currently has some of the lowest energy prices in the EU, a large number of households relies on social support. In 2013, 251 876 households received funding through the Winter Supplement Program. According to data from the National Statistical Institute based on undertaken national census undertaken in 2011, the population of Bulgaria is 7,369,431 and is living in 3,005,589 dwellings; thus, between 7% to 9% of all households are receiving heating social support. The individual amounts granted for the period of 5 months for the same period have increased by 19 %, due to increased electricity prices.

Table 3.11: Number of supported households and individual household grants between 2009 and 2013

	2009	2010	2011	2012	2013
Number of supported households	259 395	206 452	219 760	210 711	251 876
Individual household grant, euro	141,20	145,36	148,07	168,00	168,00

Within the period 2009-2013 between 30 and 42 million euro were granted to poor households without improving their living conditions or energy efficiency, or creating sustainability.

Table 3.12: Total amount granted through the WSP in million euros

	2009	2010	2011	2012	2013
Total amount granted, million euros	36,66	30,00	32,54	35,40	42,32

Leakage: The proportion of support going to households that are not fuel-poor.

There is no official definition of fuel poverty or in-depth research on the topic. However, the number of households suffering from fuel poverty can be derived from other existing academic research. According to the statistics from the Statistics on Income and Living Conditions survey of people unable to keep their homes adequately warm, conducted in 2013, 46.6% of households in Bulgaria are living in difficulty, while the state is able to help only 7-9% of all households. On the other hand, in order to receive social heating assistance, every household must meet very strict criteria, such as the requirement that their income has to be less than the guaranteed minimum wage for a period of 6 months. Thus the leakage of support going to households that are not fuel-poor is limited almost to zero.

View of the industry[6]

The energy intensiveness of the national GDP is 89% higher than the EU average. There is high dependency on energy resource imports: Bulgaria meets 70% of its gross demand through import. Over the period 2008-2012 the energy efficiency in the country continued its improving run, mainly due to the improvement in the industrial sector and to the low initial level of efficiency in it.

The energy intensity ratio of the economy in Bulgaria is 669.9, while the average ratio in the EU-28 is 143.2. While in 2001-2009, average annual reduction in energy intensity of industry was 5,5%, the 2012 level compared to that of 2009 showed an increase of 0,7 %. An increase in energy intensity occurred consequently in 2010 (1,11 %) and 2011 (5,20 %), followed by a decrease in 2012 (5,05 %) compared to the 2011 level. The increase in energy consumption of the industry between 2009 and 2011 was caused by the increased consumption of natural gas, heat, coal and biomass. The greatest factor is the increase in fossil fuels, respectively biomass with 114% and coal with 30%. These are the fuels with low final consumption efficiency and their growth, combined with a reduced consumption of electricity, is one of the reasons for the increase in energy intensity.

Table 3.13: Energy intensity of Bulgaria and EU-28 between 2008 - 2012

Countries	Energy intensity					
	2001	2008	2009	2010	2011	2012
EU-28	**170,9**	**151,0**	**148,9**	**151,6**	**144,0**	**143.2**
Bulgaria	**1040,1**	**711,7**	**661,4**	**668,8**	**705,5**	**669,9**

[6](i.e. energy intensive sectors such as the power sector, construction sector etc.)

Figure 3.19: Energy intensity of Bulgaria vs EU-28

Industry is the sector with the highest impact on the Bulgarian final energy intensity. Looking specifically at industry, in 2012 there were a total of 29,895 manufacturing enterprises in Bulgaria, 99% of which are SMEs. The Industry is responsible for 28,5 % of the final energy consumption in 2012, compared with 37,3 % in 2006.

The most significant energy user is industrial manufacturing, with a share of 95% of final industry energy consumption in 2012. The most intensive sectors in the country are: the chemical industry (31,6 % of final industry energy consumption in 2012); the non-metallic mineral sources industry (19,5 %); the food industry (8,96%); the pulp, paper and printing industry (8,42%); the ferrous metals industry (5,33%) and machinery, metal products and equipment (4,58%).

Figure 3.20: Intensive sectors and the share from final industry energy consumption in 2012 (%)

In the industrial sector, the energy efficiency index decreased by 72% during the period 1996-2009 and remained at this level in 2010 as result of the economic crisis in the sector. The most significant drivers of this energy efficiency improvement are energy intensive branches: an 80% of improvement in chemicals and 57% in steel industry during 1996-2010.

Some of the key barriers to improving EE in industry are: outdated equipment and technologies; lack of professional capacity; lack of interest from enterprises in using innovative technologies; and lack of awareness of SMEs of various procedures for applying for funding. EE is a key priority in the new energy policy of Bulgaria, and the government has set ambitious targets in the Energy Strategy of Republic of Bulgaria and in the National Development Programme – Bulgaria 2020.

3.6.2 Evaluation of social acceptance/feasibility – Identification of challenges

Indicatively, fuel poverty may affect the introduction/implementation of EEO within a country to a great extent; one may argue that it will be not so easy from a social perspective (e.g., higher energy prices will concern a lot of people), provided that cost recovery under the scheme is allowed by the government. On the other hand, if fuel poverty is addressed within the scheme's provisions and objectives, consumers may as well welcome and support its introduction.

REFERENCES

1. Bulgarian National Statistical Institute, www.nsi.bg
2. The World Bank, http://www.worldbank.org/
3. Eurostat, http://ec.europa.eu/eurostat
4. Energy Efficiency Watch, 2013
5. Methodology for the Operation of the Energy Efficiency Obligation Schemes, Ministry of Economy and Energy, 5.12.2013
6. Odysee-Mure, http://www.odyssee-mure.eu/
7. Report on the national situation on fuel poverty - REACH IEE project –Energy Agency of Plovdiv
8. Energy poverty policies in the EU: A critical perspective - Stefan Bouzarovski, Saska Petrova, Robert Sarlamanov;
9. Energy poverty in the European Union: landscapes of vulnerability – by Stefan Bouzarovski;
10. Statistical information: Bulgarian agency for social assistance, Bulgarian national statistics institute, Eurostat, World bank, ODYSSEE-MURE project

4 Denmark - DEA

Denmark is located in Northern Europe, bordering the Baltic Sea and the North Sea and consists of the peninsula of Jutland (Jylland) and some 400 named islands. Of these, 82 are inhabited, the largest being Funen (Fyn) and Zealand (Sjælland).

Figure 4.1: Map of Denmark

Total area: 43 094 km² (excluding the Faroe Islands and Greenland)

Population: 5.5 million

Denmark entered the EU in 1973. Regarding the criteria to join the European Economic and Monetary Union (EMU), so far Denmark has decided not to join, although the Danish krone remains pegged to the euro.

The country has a modern market economy, which features a high-tech agricultural sector, modern industry with world-leading firms in pharmaceuticals, maritime shipping and renewable energy, and a high dependence on foreign trade.

Danish economy is characterized by extensive government welfare measures and an equitable distribution of income. Denmark is a net exporter of food and energy, but depends on imports of raw materials for the manufacturing sector. Within the EU, Denmark is among the strongest supporters of trade liberalization.

Denmark has quite a large fishing industry, and possesses a merchant fleet of considerable size. The manufacturing sector's main areas of activity include food products, chemicals, machinery, metal products, electronic and transport equipment, beer, and paper and wood products. Tourism is also an important economic activity. Natural resources are: petroleum, natural gas, fish, salt, limestone, chalk, stone, gravel, and sand[7].

Below is presented a number of indicators that can provide a contextual overview on the environmental, economic and socio-political state of Denmark.

4.1 Economic profile

In this section, we consider the economic indicators from the following domains:

1. Status for the economic landscape in recent years
2. Gross Domestic Product (GDP),
    - per capita
    - per sector
3. Central Government Debt,
4. Electricity and gas prices, and
5. Energy Dependence.

4.1.1 Description of Status quo

Statistic overview on staus of GDP in Demark

[7] European Union, Member state information: Denmark (2015).

Table 4.1: GDP in Denmark

GDP (purchasing power parity = PPP)	**$211.3 billion (2013 est.)[8]**
GDP growth	0.1% (2013 est.)[9]
GDP per capita (PPP)	$37,800 (2013 est.)
GDP by sector	Agriculture: 1.5% (2013 est.) Industry: 21.7% (2013 est.) Services: 76.8% (2013 est.)
Public Debt	47% of GDP (2013 est.)

Source: CIA, The World Factbook

After a long consumption-driven upswing, Denmark's economy began slowing in 2007 with the end of a housing boom. Housing prices dropped significantly in 2008-09 and prices have declined until to the last half of 2013 and in 2014, where housing prices have started to rise again. Household indebtedness is still relatively high. In 2013 it was at more than 275% of gross disposable income. The global financial crisis has exacerbated this cyclical slowdown through increased borrowing costs and lower export demand, consumer confidence, and investment. Denmark made a modest recovery in 2010, in part because of increased government spending; however, the country experienced a technical recession in late 2010-early 2011. Furthermore historically low levels of unemployment rose sharply with the recession to an average level of about 6% in 2010-13, based on the national measure, about two-thirds average EU unemployment. In 2014, with the economy getting stronger, unemployment has dropped to the level 4%.

[8] In 2013 US dollars
[9] Real growth rate

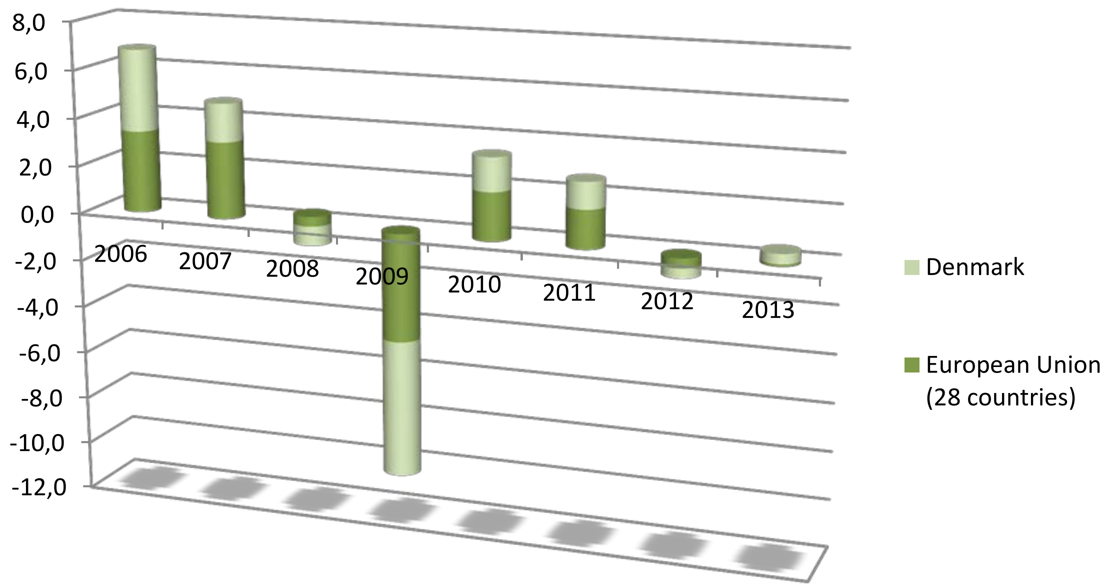


Figure 4.2: GDP growth at market prices

Source: Eurostat

Although real GDP rose by 0.4% in 2013, the recovery from recession remains fragile. According to the National Bank of Denmark, Gross domestic product is expected to grow 0.8 percent in 2014 and 1.7 percent in 2015, slightly lower than previous projections with expected 1.5 percent growth in 2014. The lower projection is due to less expected growth in export revenue. The bank still expects GDP to expand with 2 percent in 2016[10].

Since the end of the crisis, growth has been held back by a weak domestic demand, against the large housing sector adjustment and low consumer confidence. Export performances has also been poor, owing in part to weak growth in some of Denmark's main export markets, however export is expected to pick up gradually[11].

The highest price level among the EU Member States was observed in Denmark, at 42 % above EU-28 average. The high price level can be explained by e.g. high labour costs.

[10] Bloomberg, Danish Central Bank cuts 2014 economic growth forecast to 0.8 percent (2014).
[11] OECD, Economic surveys DENMARK (2014).

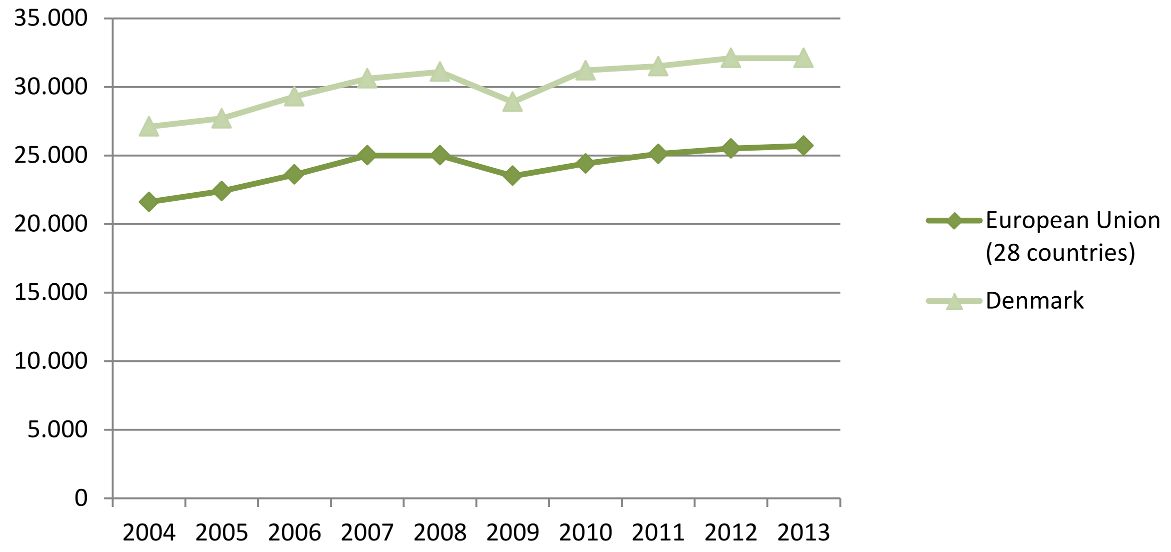


Figure 4.3: GDP per capita in Denmark, EUR purchasing power adjusted

Source: Eurostat

Denmark managed to maintain a healthy budget surplus for many years up to 2008, but the budget balance swung into deficit in 2009. In spite of the deficits, the government delivered a modest stimulus to the economy in 2012. Nonetheless, Denmark's fiscal position remains among the strongest in the EU with public debt at about 46% of GDP in 2013. As the EEO is in no way funded over the state budget public debt is not foreseen to have any significant impact on the existing EEO in Denmark.

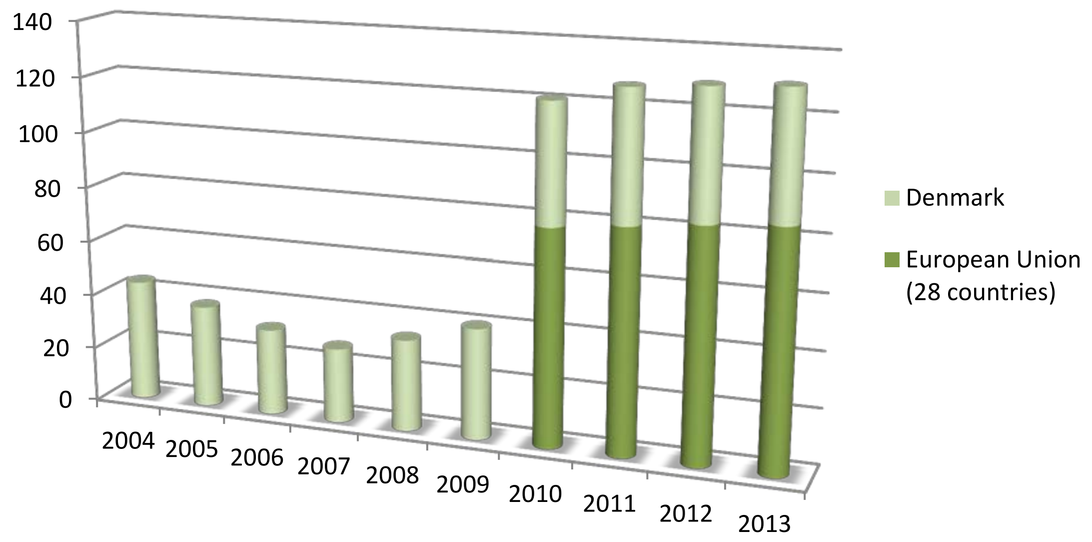


Figure 4.4: Government gross debt, % of GDP

Source: Eurostat

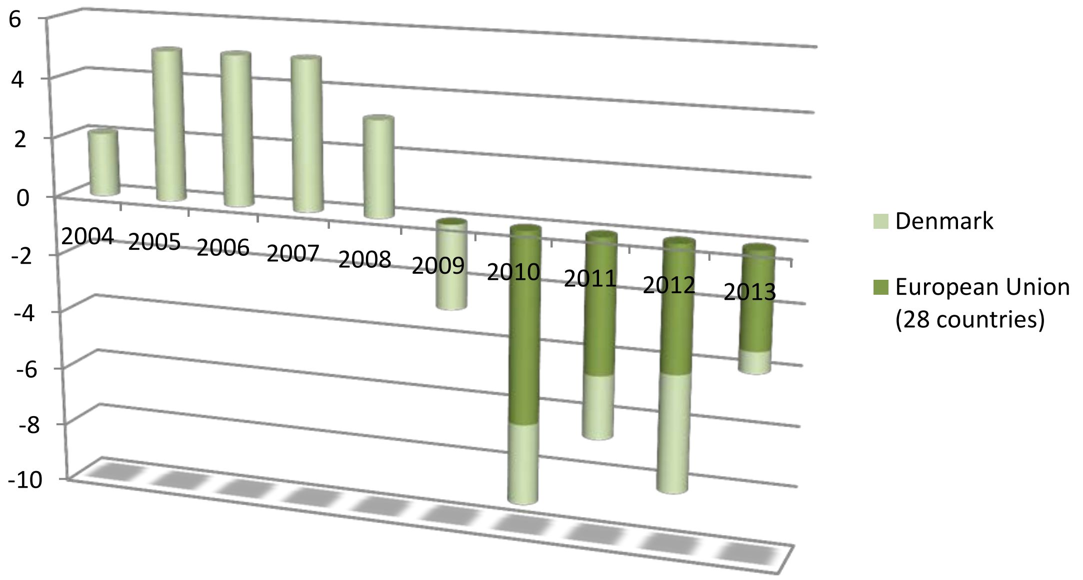


Figure 4.5: Government net deficit, % of GDP

Source: Eurostat

Electricity and gas prices in Denmark are higher than the EU average. However as electricity price has started to rise in recent year, gas price has fallen slightly.

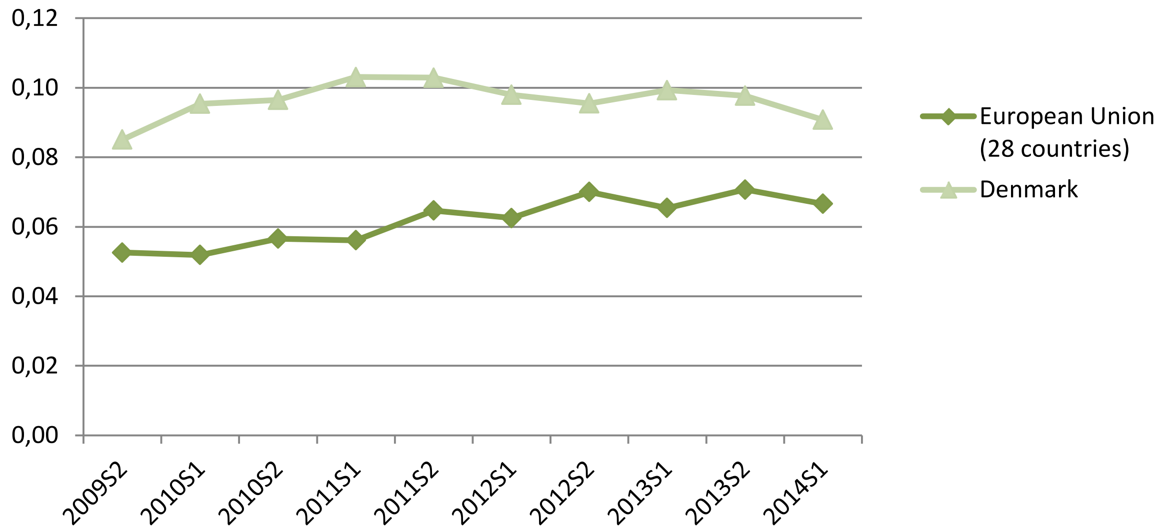


Figure 4.6: Gas prices for households, Euro/kWh

Source: Eurostat

Note. Consumer retail prices including all taxes, levies and VAT.

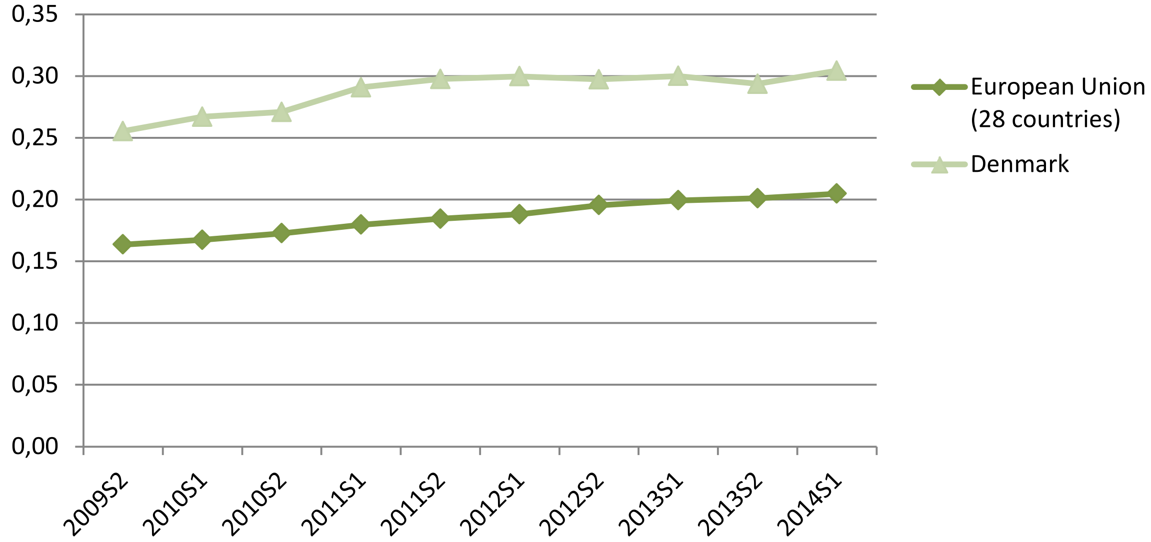


Figure 4.7: Electricity prices for households, Euro/kWh

Source: Eurostat

Note. Consumer retail prices including all taxes, levies and VAT.

The average price of electricity for household consumers in the EU-28 (the prices for each Member State are weighted according to their consumption by the household sector in 2012) was EUR 0.199 per kWh in the first half of 2013. The price of electricity for household consumers in Denmark for the same period was EUR 0.300 per kWh. That is 3.2 times as high as in Bulgaria (EUR 0.092 per kWh)[12].

The reason behind the price difference is that Denmark has highest proportion of taxes in the final price of electricity for household consumers in the EU, where more than half (56.7 %) of the final price is made up of VAT, taxes and levies. Also the final price of natural gas for consumers are made up over half (55.9 %) of the price of taxes in Denmark.

The high prices on electricity and gas are reflected further in relation to industry, where again, Denmark is positioned above EU average due to the amount of taxes and levies put on energy prices. Compared to average energy price in all EU countries, industries in Denmark pay the highest price per kWh[13].

[12] Eurostat, Energy price statistics (2014).
[13] Eurostat

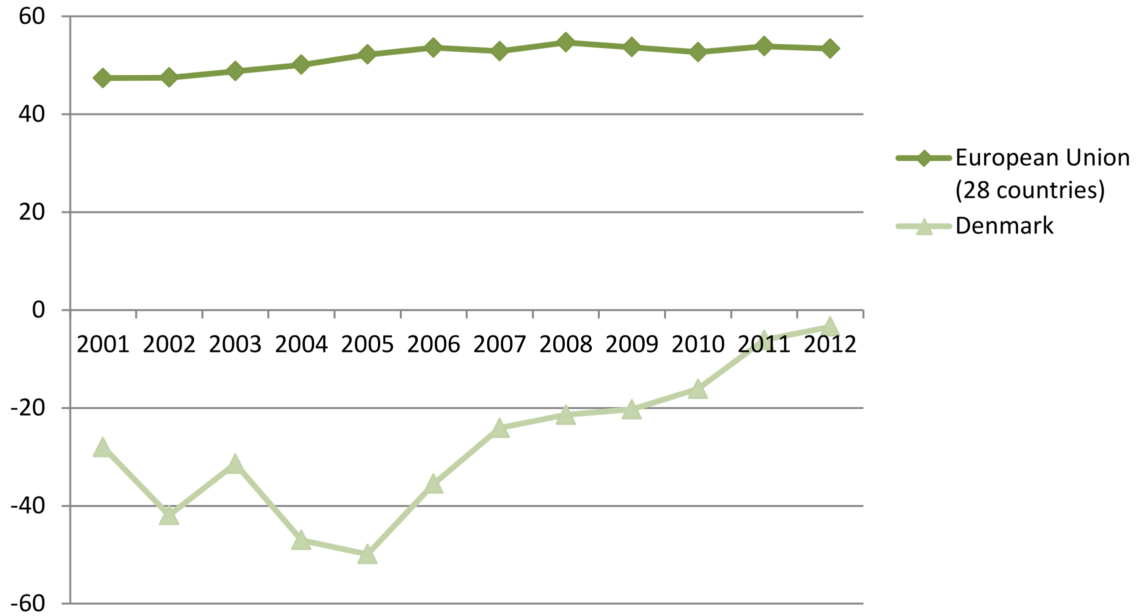


Figure 4.8: Energy dependence all fuels, % of gross inland consumption

Source: Eurostat

Note. Energy dependency shows the extent to which an economy relies upon imports in order to meet its energy needs. The indicator is calculated as net imports divided by the sum of gross inland energy consumption plus maritime bunkers.

Denmark is the only EU member to be a net-energy exporter, although increasingly less so; energy dependence went from -6,1 % in 2011 to 3,4 % in 2012. Denmark still has a positive energy balance, although on a declining trend since 2006 where it was 2,1 % of GDP to a mere 0,1 % in 2013. This decrease is happening mainly on the back of decreasing primary production while the share of exports expressed as percentage of primary production remained stable at around 75-80%[14].

4.1.2 Evaluation of economic preparedness - Identification of financial challenges

Even though Denmark has experienced a rise in GDP the last two years, economic growth has remained subdued since the crisis ended. Denmark is affected by low export to some of their main export countries e.g. Germany and now also Russia. Growth is yet expected to gradually pick up as export demand and confidence returns. A major effect caused positively

[14] DG ECFIN, Member State's Energy Dependence: An Indicator-Based Assessment (2014).

by the national support of renewable energy and energy efficiency is the rise in export in regards to energy technology. The Danish export of energy technology rose with almost 11 % in 2013 to a value of 67.6 billion DKR[15].

At consumer level: In spite of high gross household debt, the purchase power is still high combined with record-low interest rates.

The high prices on energy in DK are envisaged to act in favour of the EEO, both at household level as well as in energy intensive industry. Danish electricity prices were the highest among all EU Member States in 2013, with more than 50% of the price consisting of VAT, taxes and levies (Eurostat, 2014c).

On the other hand, the Danish Government has recently introduced a so-called "Growth Strategy", including a reform of reducing taxes on energy in energy intensive companies in 2015. This is done in an act to increase competitiveness, but it will potentially decrease the motivation for energy efficiency projects within these companies.

Figure 4.9. The major energy consuming sectors of the Danish economy are transportation, production, trade and services, and households.

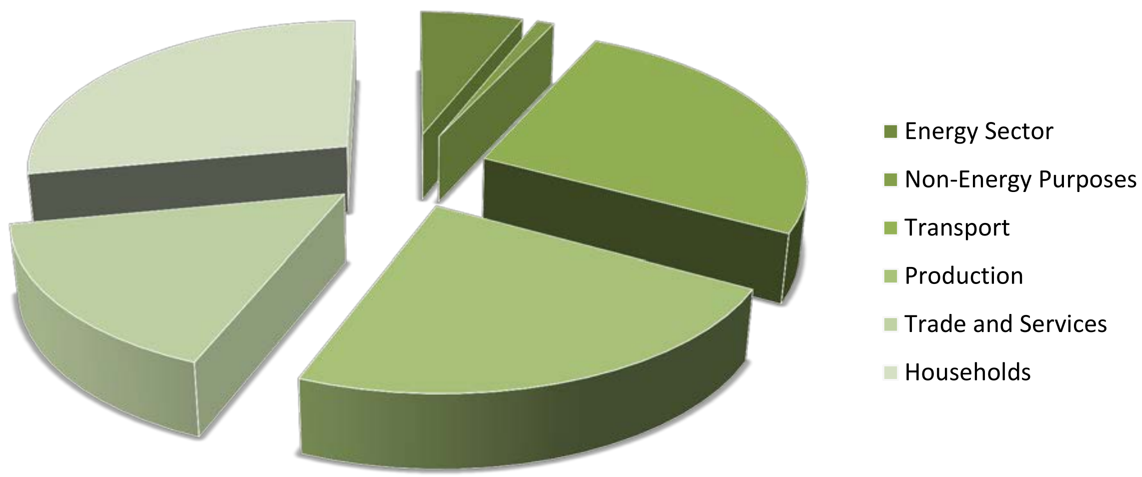


Figure 4.9: Gross energy consumption by sector

Source: Danish Energy Association, 2011

[15] DR News, The Danish export of green technology is blowing ahead (2014).

A recent development, moreover, is seen as a possible catalyst for Danish growth. As the oil price has fallen in the last quarter of 2014, GDP has increased with 0,5 %[16]. If this trend is continuing, employment can potentially rise in 2015 and spur Danish growth.

4.2 Energy & Climate Change profile (Energy Savings' Potential)

Denmark has had a long tradition for focusing on energy efficiency. In 1976 the first national energy plan was presented focusing on improvement in security of supply the two main drivers being energy savings and the restructuring of energy supply away from oil[17]. In 1990 the government presented a national energy plan with a target of 15% energy savings. On top of the sector specific measures described below considerable sums have been spend on public awareness starting with the Electricity Savings Trust in 1997.

As a result of broadly-based policy measures energy consumption in dwellings, the tertiary and industry sector has remained constant since 1980 and decreased in industry. The exception is the transport sector where energy consumption has increased by 54% since 1980.

Figure 4.10: Energy consumption in all sectors

Source: National energy statistic 2013.

[16] Borsen.dk, Lav oliepris er årets overraskelse (2014)
[17] Danish Energy Agency, En vej til flere og billigere energibesparelser (2008).

Looking at energy intensity of the economy Denmark is performing significantly better than the average for the EU with only Ireland, Portugal, and the UK performing better.

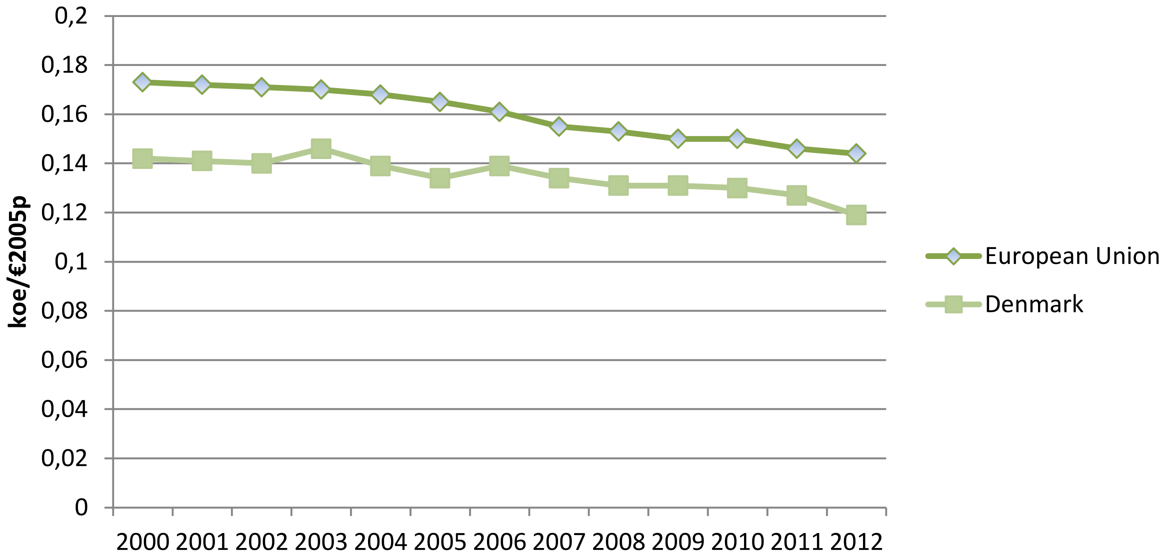


Figure 4.11: Primary energy intensity at purchasing power parities (ppp, 2005) with climatic corrections

Source: Odyssee-Mure

The energy efficiency gains in Denmark have been lower than the EU average over the past decade as can be seen from the graph below. The ambitious policies for three decades could be one of the reasons for this as low hanging fruits have been harvested since the early 1980s.

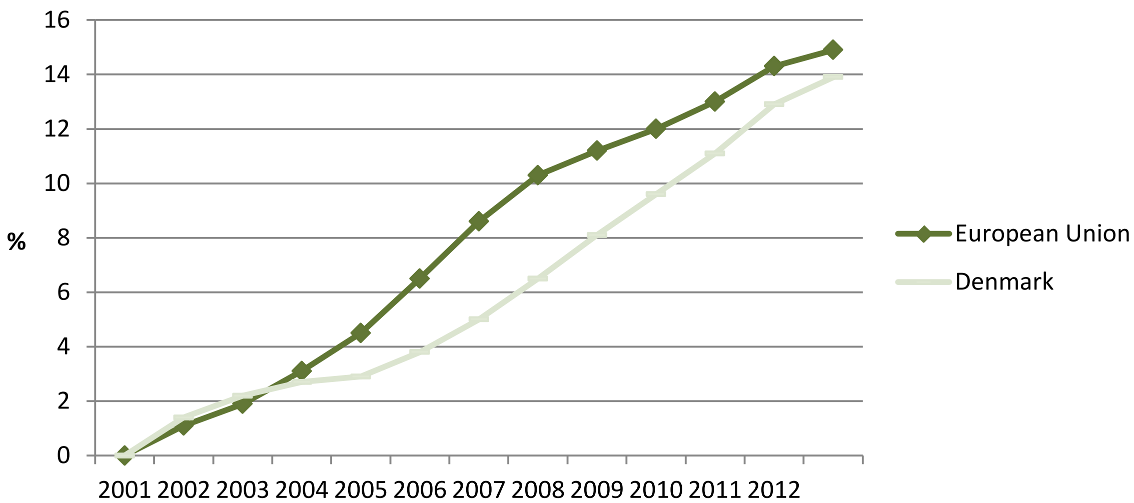


Figure 4.12: Overall energy efficiency gains (industry, residential, transport)

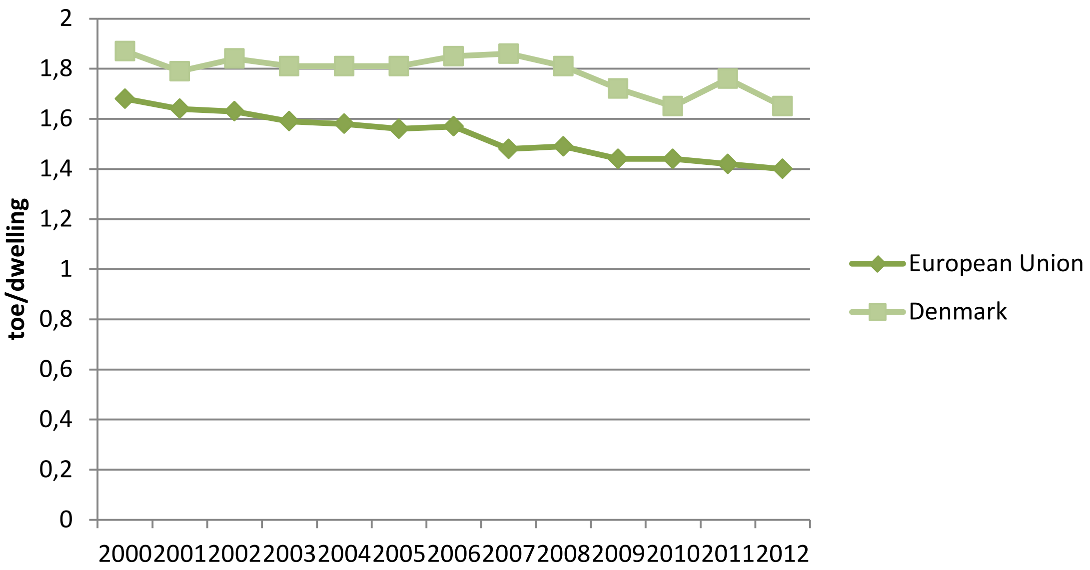
Source: Odyssee-Mure

Building stock

The requirements regarding energy consumption was introduced in the building code in 1979 reducing consumption in new buildings by 25-40%[18]. Over the years the building code has been tightened several times and an evaluation of the historic effect of the Danish building code shows a significant impact on energy consumption in building per m^2.

In 1980 (el. In the 1980s) the government decided to provide grants to energy savings in dwellings and in 1982 the energy labeling of buildings was introduced. In 1984-1985 when oil prices dropped, the government implemented significant increase in energy taxation to ensure constant consumer oil prices. Still the economically feasible potential for energy savings in the building sector is around 30-35%[19].

Around 60% of the total floor area in the building stock is used for housing and 40% is used for trade, services, and other commercial activities[20]. Compared to the EU average Danish households have a slightly higher energy consumption per dwelling but follows the same over all downwards trend in the last decade.



[18] Danish Energy Agency, En vej til flere og billigere energibesparelser (2008).

[19] Aalborg University, Potentielle energibesparelser i det eksisterende byggeri (2009).

[20] Danish Energy Agency, Status Quo for Danish energy policy, energy consumption, and vocational education for the construction sector (2012).

Figure 4.13: Energy consumption per dwelling with climatic corrections

Source: Odyssee-Mure

Industry

In the 1990s energy companies began providing advice on energy savings. In 1993 CO2 taxation of energy consumption in businesses was introduced combined with a grant scheme for energy savings (totaling 260 m € from 1996-2001) and a voluntary agreement scheme with energy intensive companies.

Energy efficiency gains in manufacturing industry have continued to see improvement over the past decade and took a significant leap in 2007 compared to the rest of the EU.

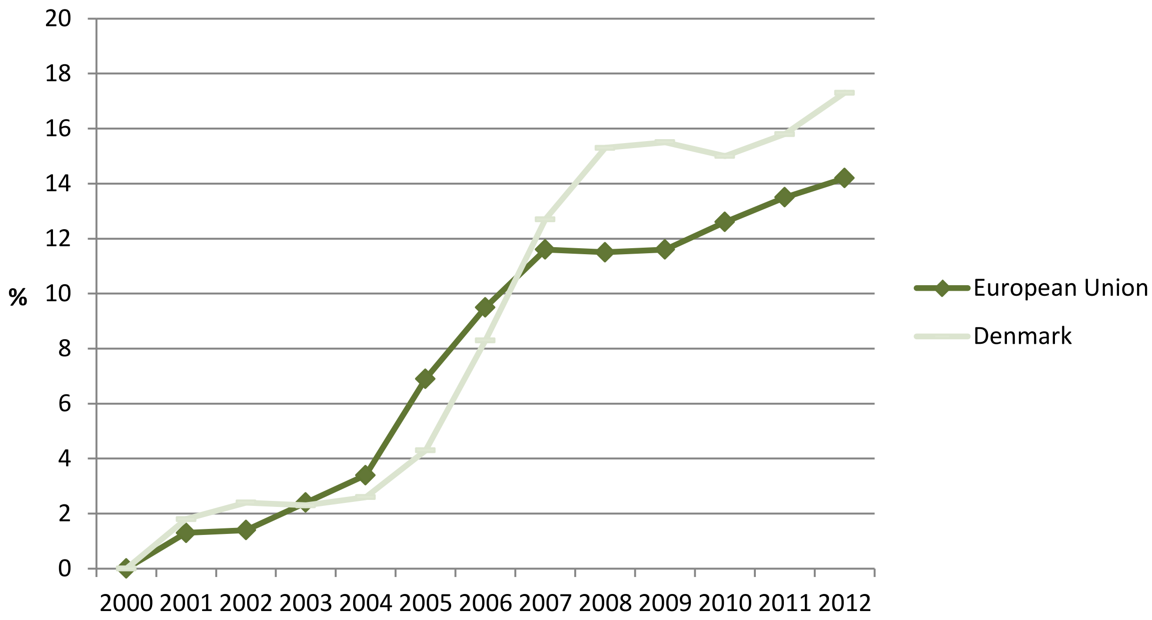


Figure 4.14: Energy efficiency gains in manufacturing industry

Source: Odyssee

Energy saving targets

The indicative target for final energy consumption (excluding consumption for non-energy purposes) in 2020 is 615.5 PJ (14.797 Mtoe). This represents a 7.2 % reduction compared with 2006[21]. Between 2015 and 2020 the annual target for the EEO in Denmark is set at 3.0 % compared to a baseline with no EEO.

4.2.1 Evaluation of energy savings' capacity - Identification of challenges

The historic focus on energy efficiency is both strength and a challenge in terms of achieving the 3% energy saving target. Low hanging fruits have been harvested already but on the other hand professional competences in the field of energy efficiency have naturally been developed. Energy saving capacity also benefits from a relatively high awareness concerning energy consumption in larger industry enterprises. The Danish energy technology companies operating on a global scale have a high share of their home markets (Danfoss, Rockwool, Grundfoss and Velux to name a few) ensure that energy efficient products are dominant in the Danish market for pumps, thermostats etc.

4.3 Market preparedness

4.3.1 Description of Status quo

In order to define the status quo for the Danish market for the EEO scheme, these certain indicators have been chosen:

- Structure of the energy market
- SME Access to finance index (SMAF)
- ESCO market in Denmark
- Stakeholders evaluation of technological capacity
- Qualifications and certification of energy operators

Structure of the energy market

As the Energy Saving obligation is placed on the DSO description of the energy market will focus on the DSO's and not retailers. The companies involved are:

- Around 70 electricity grid operators,

[21] European Commission, Denmark's National Energy Efficiency Action Plan (2014).

- Three natural gas distributors,
- Around 400 district heating companies,
- The oil sector, which takes care of the activities on behalf of six oil companies.

SME Access to finance

SMEs account for 99.7% of all enterprises in Denmark as of 2010. In particular, 89.4% of these are micro-enterprises.

During the crisis, SMEs in Denmark were challenged by lack of access to finance. Financial institutions lending to SMEs, approximated by loans which amount to less than EUR 1 million, declined by around 30% between 2007 and 2009. SME lending recovered in 2010, recording a 23% increase, but stagnated in 2011 followed by yet another increase in 2012 by almost 15%. The current level of lending to SMEs in Denmark is now very close to pre-crisis level, and the latest assessment about the availability of credit published by the Danish Ministry of Business and Growth published in September 2013 shows signs of improvement in access to credit for Danish small and medium sized businesses[22].

SME Access to finance index (SMAF) is a central indicator, which shows that SMEs over a six year period from 2007 to 2013, has a higher level of finance in Denmark than on EU level in average.

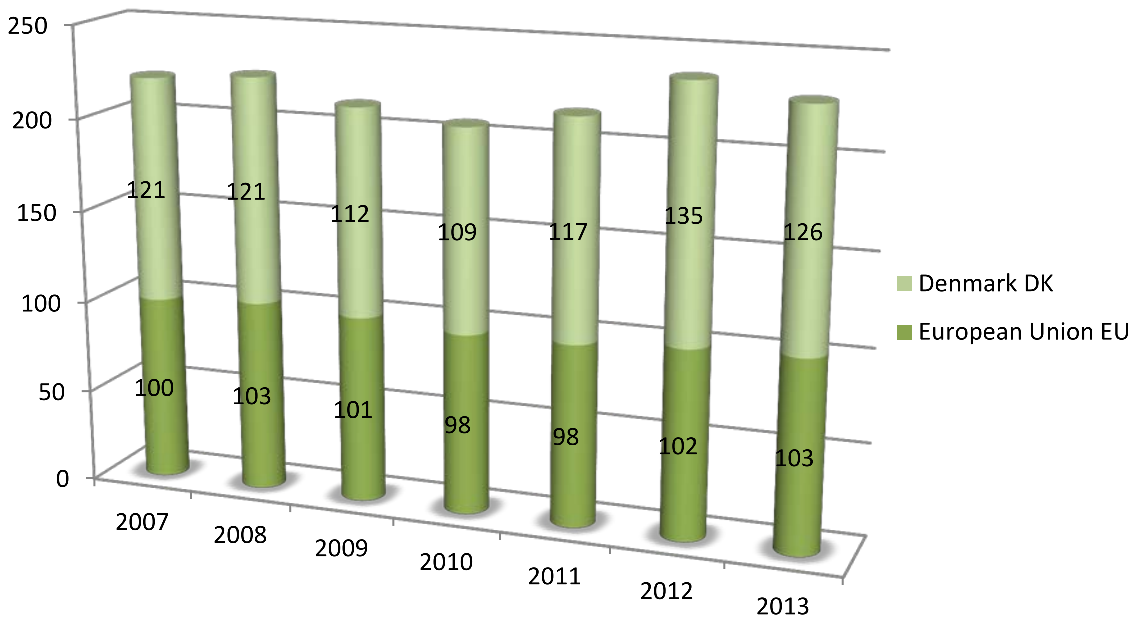


Figure 4.15: SME Access to finance index (SMAF)- index value 2007=100 in Denmark and EU average

Source: SME Access to finance index

[22] OECD, Financing SMEs and Entrepreneurs 2014 - An OECD Scoreboard (2014).

ESCO market in Denmark

The Danish market for energy renovation projects using the ESCO model has existed for more than 10 years[23]. In Denmark, the ESCO business model is applied in industry as well as mainly in the public sector, with municipalities as the largest client group. Furthermore, projects which involved regional, and central government owned buildings have been completed, with a growing interest from hospitals, schools, universities and public housing, where large saving potential exists[24]. Interest in the model on the private market is on the rise, however this market still represents a small share of the total ESCO market.

EPC with guaranteed savings is the most common contract type. Some of the most active ESCO providers, Scanenergi Solutions, Schneider and Siemens are active in both the public sector as well as in industrial projects and offer guarantied savings in EPC contracts with or without financial solutions.

Smaller companies often collaborate by forming consortiums for tenders with one contract holder. As in other Scandinavian countries, third part financing is uncommon for this type of projects. Municipalities use state funds and industrial clients fund themselves with credit lines through banks or internal funds.

The utilization of EPC is still limited among energy suppliers, construction companies and consultancies, industrial energy consumers, and technology providers in general.

Stakeholders evaluation of technological capacity

A recent project named Build Up Skills supported by the Intelligent Energy – Europe (IEEE) program, includes a survey on competence levels in regards to energy efficiency and the use of renewable energy, when it comes to craftsmen in the construction sector in Denmark[25].

The report concluded that there would be a shortfall of up to 13,100 skilled construction craftsmen if the building sector is to meet its share of the 2020 goals. The current competence level is thus insufficient and is a barrier to meeting these goals.

Characteristics of the construction sector

The construction sector in Denmark is made up of approximately 33,000 enterprises, the great majority of which are one-man enterprises or have fewer than 10 employees. The sector is very important for Danish economy; in 2010 its net value added was DKK 64 billion,

[23] Danish Energy Agency, Experiences with ESCO contracting in Denmark and abroad (2010)
[24] European Commission, Energy Service Companies Market in Europe - Status Report (2010).
[25] Danish Energy Agency, BUILD UP Skills Denmark National roadmap (2013).

and it employed over 150,000 people (Status Quo Report 2012 - Build Up Skills Denmark). The table below presents the distribution by education of employees in the main employment categories of the construction sector.

Table 4.2: Construction sector employees, distributed by education and field of employment

	Lower secondary	General upper secondary	Vocational	Short-cycle tertiary	Medium-cycle tertiary	Long-cycle tertiary	No information
	%	%	%	%	%	%	%
Development of building projects	12,4	6,7	35,0	7,3	22,5	9,3	6,8
Construction of buildings	26,8	3,0	51,4	3,3	11,0	2,1	2,5
Construction of roads and railways	41,5	2,6	37,0	3,7	9,8	2,7	2,8
Construction of utilities systems	44,9	2,2	43,4	3,4	3,2	0,6	2,5
Construction of other civil engineering projects	37,2	2,6	49,0	2,1	6,2	0,6	2,4
Demolition	46,2	2,4	36,7	1,5	5,0	0,9	7,4
Site preparation	46,7	1,7	43,3	1,1	2,7	0,5	4,1
Test drilling and boring	28,1	6,3	34,4	6,3	21,9	.	3,1
Electrical installation	19,8	3,5	58,6	14,3	2,7	0,5	0,6
Plumbing, heat and air-conditioning installation	19,4	1,5	65,9	9,8	2,3	0,3	0,8
Other construction installation	28,4	3,3	57,9	3,9	4,5	0,6	1,5
Plastering	20,0	.	65,0	2,5	2,5	2,5	7,5
Carpentry and joinery	21,3	2,4	69,6	2,1	3,2	0,3	1,1
Floor and wall covering	41,1	4,0	48,0	1,4	2,7	0,3	2,5
Painting	22,4	1,9	70,6	1,1	1,4	0,3	2,3
Glazing	23,4	1,9	69,9	1,2	1,8	0,4	1,5
Other building completion and finishing	29,1	5,4	56,8	2,2	2,8	1,2	2,6
Roofing activities	41,5	2,5	47,4	2,5	3,6	0,5	2,1
Bricklaying	23,2	1,8	69,1	1,8	2,6	0,3	1,2
Other specialised construction activities	38,7	3,4	49,4	2,3	3,1	0,7	2,4
total	**25,9**	**2,6**	**59,6**	**5,1**	**4,4**	**0,8**	**1,6**

Source: The Economic Council of the Labour Movement, based on construction employment in the registry of workforce statistics 2010.

Skilled craftsmen account for about 60% of the construction sector workforce, and semi-skilled account for a bit more than 28%; persons with general upper secondary qualifications are statistically registered as semi-skilled. The table does not present the fact that skilled workers can be employed in fields outside that of their education qualification.

In addition, one of the challenges facing the construction sector is the competence level on energy efficiency. There is a lack of knowledge in regards to energy consumption and it is therefore necessary to address the educational shortcomings and needs in the workforce by 2020.

The project has come up with nine recommendations to meet the competence level within the workforce:

1. Recommend the development and introduction of new joint competence outcomes for energy topics in both school-based and enterprise-based portions of upper secondary vocational education.
2. Recommend that trade committees review their education programmes to assure sufficient content regarding energy.
3. Recommend increased recruitment to vocational education programmes
4. Recommend establishing short cycle academy profession modules in energy topics.
5. Recommend making craftsman enterprises aware of the value of skills upgrading through the adult vocational training system (AMU).
6. Recommend more and better information to the target group about continuing and further education and training in energy topics.
7. Recommend a systematic skills upgrading in energy topics for teachers in the adult vocational training systems, in addition to the further development of quality assurance of specialist teacher competences in energy topics.
8. Recommend promoting collaborative models between architects, engineers, constructing architects, and construction craftsmen regarding energy topics. This should apply both to upper secondary vocational education programmes and to continuing and further education and training.
9. Recommend increased collaboration and communication between the trade committees and the vocational training committees regarding energy topics.

Qualifications and certification of energy operators

Denmark currently has various schemes for conducting energy audits of buildings and production processes in enterprises; the latter under the name of 'Registration scheme for energy audit consultants'. At the same time, in connection with the setting up of the BedreBolig (Better Home) scheme in 2014, a training course has been set up with the aim of training advisers to offer comprehensive, professional advice on energy renovation of homes.

Certification of energy operators:

Buildings:
Energy labelling of buildings must be carried out by an energy consultant employed by a certified energy labelling company. In order to obtain certification, the company must introduce a quality assurance system in accordance with ISO 9001 with certain

supplementary skills requirements for energy consultants[26]. Energy audit consultants must be qualified engineers or similar and must participate in a refresher course every third year.

In Dec. 2014, there were 223 certified energy labelling companies in Denmark (source: Danish Energy Agency).

Registration scheme for energy audit consultants:

Registration applies to individuals. The scheme is a combined registration and quality assurance scheme for energy audit consultants at levels A and B, technical experts and verifiers for the benefit of industry and commercial enterprises. The registration and quality assurance scheme is aimed at ensuring that energy audit consultants registered under the scheme are qualified to:

- Perform voluntary energy audits;
- Assist enterprises that wish to enter into an energy efficiency agreement with the Danish Energy Agency in drawing up and implementing energy management systems, including carrying out energy mapping, screening and drawing up energy action plans;
- Assist enterprises in selecting and performing special audits.

Registered energy audit consultants have an engineering background, advanced marine engineer, professional bachelor degree in marine engineering or technical manager offshore, and have proven theoretical and practical experience in implementing energy efficiency improvements and energy saving measures in commercial enterprises.

The following qualifications and professional experience must be able to be demonstrated:

- Basic training and graduate year
- Relevant further training
- Experience of project management:
    - A level: with several cooperation partners
    - B level: with external advisers
- Mapping of energy consumption and prioritization of action areas
- Drawn up descriptions of installations on the basis of energy saving considerations
- Carried out technical/economic assessments of energy efficiency opportunities
- Responsibility for establishing the subsequent savings-related technical changes
- Evaluation of various energy saving measures

[26] European Commission, Denmark's National Energy Efficiency Action Plan (2014).

- Design/commissioning of energy management systems
- For A level, the requirement is a total of three years' experience within the last six years (3 000 hours)
- For B level, the requirement is a total of five years' experience within the last ten years (5 000 hours)
- B consultants are required to have knowledge of energy/environmental management or quality control.

4.3.2 Evaluation of market preparedness – Identification of challenges

Some of the biggest challenges with improving the market for energy efficiency are:

1. Financing of energy efficiency projects in certain SMEs as well as households. There is a need for supplementary ESCO models targeted these segments.
2. Not only will there be a need for more craftsmen to meet the Danish targets of energy efficiency 2020, in addition there will be a lack of energy consultants with a long professional background as many current energy consultants are hitting the retirement age within the next few years. As a result the Danish Government are trying to set up a shorten education span to facilitate the amount of energy consultants needed in the near future.

4.4 Administrative preparedness

4.4.1 Description of Status quo

For a description of the administrative status quo please refer to the Part I: Evaluation of existing schemes.

4.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

There are no challenges in terms of the administrative preparedness in Denmark in terms of fulfilling the requirements in Article 7. This conclusion is based on the fact that an EEO has been in place for several years and the target for 2015 is twice of what is required in Article 7.

4.5 Legislative preparedness

4.5.1 Description of Status quo

The EEO is fully implemented in Danish law by Bekendtgørelse om energispareydelser i net- og distributionsvirksomheder, BEK nr 1452 af 16/12/2013.

4.5.2 Evaluation legislative preparedness – Identification of challenges

There haven't been any significant legal challenges in latest agreement period starting in 2013.

However a few challenges do exist and these will be discussed when the voluntary agreement is to be renegotiated in 2015:

- Division of responsibility and authority between the Energy Agency and the respective cooperation body in cases where DSOs do not interpret the rules in the agreement as the Energy Agency sees fit.
- The Energy Regulatory Authority interpret the Executive Order in a way that means that over fulfilment of the energy saving target does not fall within the full cost recovery scheme. DSOs interpret the rules in the agreement in a way that means over fulfilment of the target can also be financed under the full cost recovery scheme.

4.6 Social & Political acceptance/feasibility

4.6.1 Description of Status quo

There is a high degree of satisfaction among the end-users who have benefited from the Danish EEO. Furthermore according to a survey of Danish households in 2014 around 70% of households knew about the EEO.

Some end-users find it somewhat surprising that energy companies are involved in energy savings. This, however, does not result in lack of acceptance in the general public. The EEO is generally rarely debated in the media and only surface in the press when the target achievement is announced once annually and when a new evaluation of the EEO is published.

4.6.2 Evaluation of social acceptance/feasibility – Identification of challenges

No significant challenges for the social acceptance of the EEO are present in Denmark. The only potential challenge is a situation where the total cost of the EEO rise above € 200m. In such case politicians will re-evaluate the scheme. It is worth stressing even if such level of costs is reached there is no real threat to Denmark's fulfilment of Article 7 due to the fact that the target is already twice of what is needed according to the EEO.

REFERENCES

Borsen.dk. “Lav oliepris er årets overraskelse”. 22. December, 2014.

EA Energianalyse, Niras, RUC, 4-Fact En vej til flere og billigere energibesparelser. (2008). Danish Energy Agency.

European Commission. Denmark’s National Energy Efficiency Action Plan (NEEAP). (2014). Danish Energy Agency.

European Commission. Energy price statistics. (2014). Eurostat.

European Commission. Member State’s Energy Dependence: An Indicator-Based Assessment. (2014). DG ECFIN.

European Union. Member state information: Denmark. (2015). Europa.eu

Forsingdal, C. Status Quo for Danish energy policy, energy consumption, and vocational education for the construction sector. (2012). Danish Energy Agency.

Forsingdal, C. BUILD UP Skills Denmark National roadmap. (2013). Danish Energy Agency.

Jensen, P. The Danish export of green technology is blowing ahead. (2014). DR News.

Levring, P. Danish Central Bank cuts 2014 economic growth forecast to 0.8 percent. (2014). Bloomberg.

Marino, A., Bertoldi, P., Rezessy, S. Energy Service Companies Market in Europe - Status Report (2010). European Commission, JCR-IE.

OECD. OECD Economic surveys DENMARK. (2014). p. 5.

OECD. Financing SMEs and Entrepreneurs 2014 - An OECD Scoreboard. (2014). p. 124-125.

Rambøll. Experiences with ESCO contracting in Denmark and abroad MEMO. (2010). Danish Energy Agency.

Wittchen, K. Potentielle energibesparelser i det eksisterende byggeri. (2009). Aalborg University.

5 Estonia – SEI

5.1 Economic profile

Estonia, a member of the European Union and the Eurozone since 2004, has a modern market-based economy and one of the higher per capita income levels in Central Europe and the Baltic region. Estonia's successive governments have pursued a free market, pro-business economic agenda and have wavered little in their commitment to pro-market reforms. The current government has followed sound fiscal policies that have resulted in balanced budgets and low public debt. The economy benefits from strong electronics and telecommunications sectors and strong trade ties with Finland, Sweden, Russia, and Germany. Estonia's economy fell into recession in mid-2008, as a result of an investment and consumption slump following the bursting of the real estate market bubble and a decrease in export demand as result of economic slowdown in the rest of Europe, but the economy has recovered strongly in the last five years. Estonia adopted the euro on 1 January 2011, while growth was expected to top 2% in 2014, before the events in Ukraine (http://www.indexmundi.com/estonia/economy_profile.html).

In the energy sector, the Ministry of Economic Affairs and Communications (MEAC) has lead responsibility for the development of energy policy and the current National Development Plan of the Energy Sector until 2020, adopted by the Riigikogu (parliament) in June 2009, which co-ordinates the implementation of energy sector-specific acts and regulations. The government has also developed similar plans for the electricity sector, oil shale production, biomass and bioenergy, and energy conservation. At present, the ministry started reviewing this National Development Plan, with the intention of extending it until 2030 and adding an outlook to 2050 (Estonia, 2013).

Estonian energy sector context is quite unique among European Union Member States. Its energy sector relies on one primary source of energy, oil shale, indeed Estonia is one of the largest oil shale producers in world. Thus, thanks to oil shale can be self-sufficient energy wise and so meet their electricity and heat needs using domestic sources. The drawback is that energetic self-sufficiency shale is built on oil shale, a very carbon dioxide intense source, which raises many questions about its sustainability in the long term. This is why the government's policy priority is to reduce oil shale use and so diminish the carbon intensity of the energy sector.

In order to contextualize the indicators used to describe the status quo of the Estonian current economic situation we decided to add the EU -28 average in all the indicators we used in the analysis we conducted in this section.

The proposed set of indicators is as follows:

Annual GDP Growth

Estonian GDP experienced a pronounced growth until 2011, after which it gradually decreased. This is explained by the international financial crisis that affected all most of the European Economies during 2008 and 2009. After the crisis, Estonia had a strong rebound over the past two years and achieved one of the highest medium-term growth rates in the OECD, accompanied by rapid income convergence.

Having said that, the Estonian GDP grew in a higher percentage than the EU28 average between 2010 and 2013.

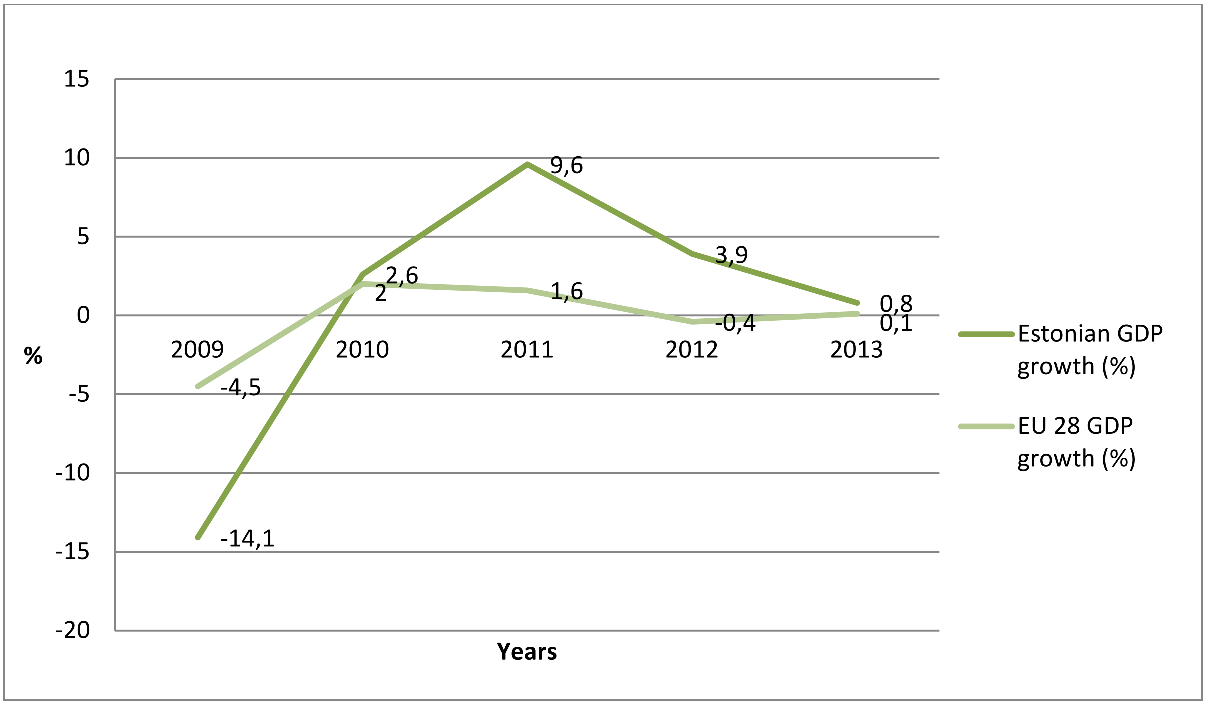


Figure 5.1: GPD growth in Estonia between 2009 and 2013.

Source: The World Bank

GDP per capita

The GDP per capita experienced constant and gradual growth between 2009 and 2013. However, it is still substantially lower than the EU GDP per capita average.

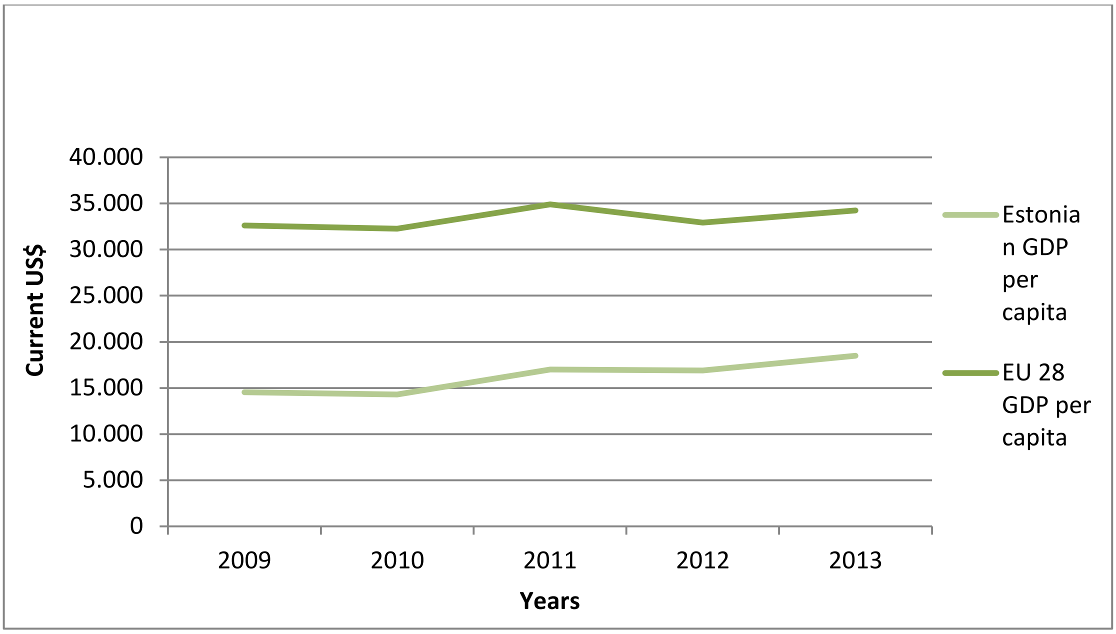


Figure 5.2: GDP per capita in Estonia between 2009 and 2013.

Source: The World Bank

Central government debt, total (% of GDP)

The central government debt stayed stable until 2011, from when it started to increase substantially (from 6.6% in 2011 to 10.5% in 2012). Even though this indicator experienced a significant increase in 2011, central government debt in Estonia remained significantly below the EU average between 2009 and 2012.

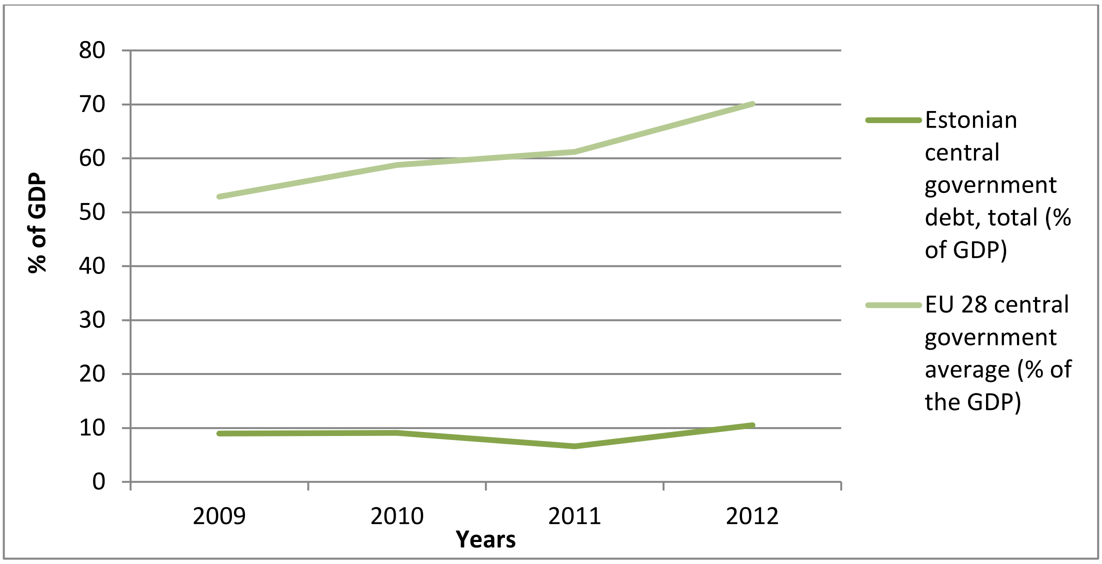


Figure 5.3: Central government debt in Estonia.

Source: The World Bank

Electricity prices (domestic users)

Electricity prices gradually increased in Estonia and the EU. In 2012 the difference between the EU average and the Estonian electricity prices decreased due to a significant increase of the former in 2009.

It is complicated to say to what extent electricity prices rise will affect the level of consumption within the country due to some important changes that took place recently in the electricity sector and might have an impact on its structure:

- The **liberalization of the electricity sector** took place in 2009. Estonia is now part of the Nord Pool wholesale market. In 2009, the three Baltic states of Latvia, Estonia and Lithuania committed to the development of an open and transparent Baltic electricity market and its integration into the Nordic electricity market in line with the relevant EU legislation.
- The Competition Authority, a strong independent regulator is now in place and the transmission system operator, Elering, is investing in new infrastructure to strengthen regional electricity supply and an emerging Nordic-Baltic regional market.
- The long term plan synchronizing Estonian electricity system with the Central European electricity system.

All these circumstances will have an impact on electricity prices and electricity consumption levels. However, it would too premature to state how they might vary.

According to the IEA, the electricity market is highly concentrated, Elering, the transmission system operator that used to be part of Eesti Energia group and now is a state-owned public limited company that provides the majority of generation and retains ownership of the vast majority of distribution networks. As the incumbent, it also maintains a dominant position in the recently liberalized electricity retail market. While retail market liberalization is expected to lead to price increases following the elimination of implicit subsidies, the IEA notes that further unbundling measures, such as the separation of the distribution activities from the retail and generation activities of Eesti Energia, could help stimulate retail competition and force downward pressure on prices.

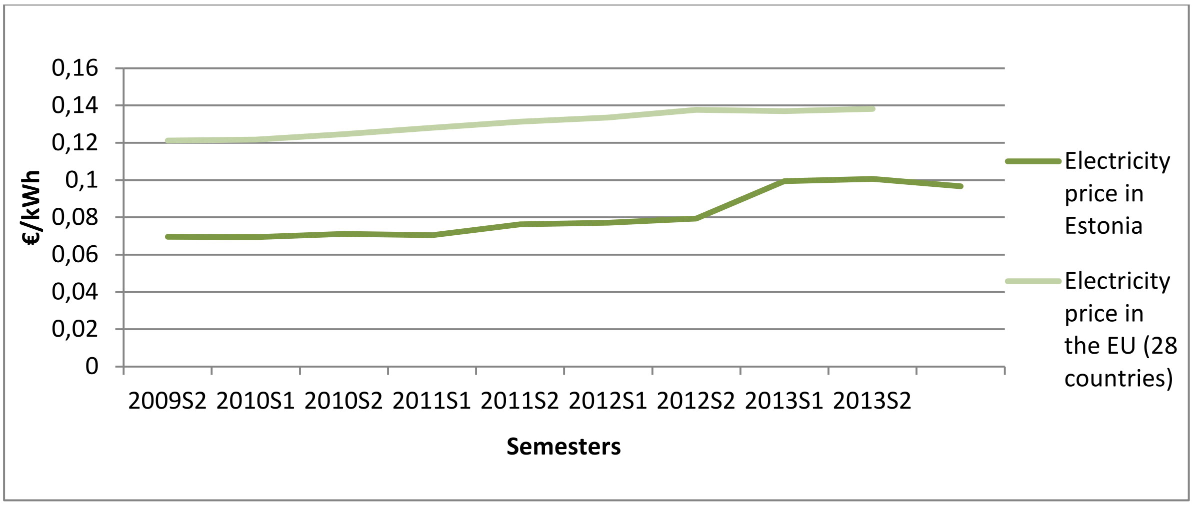


Figure 5.4: Electricity prices in Estonia between 2009 and 2013.

Note. Consumer retail prices including all taxes, levies and VAT

Source: Eurostat

In 2012, an Estonian household consuming between 2 500 kWh and 5 000 kWh paid an average of EUR 0.11/kWh compared to a European Union (EU) average of EUR 0.186/kWh[27]

Gas prices (domestic users)

Gas prices in Estonia followed a gradual increase between 2009 and the first semester of 2013, moment in which prices stabilized. In the EU gas prices not only are notably higher in comparison to the Estonian ones, but also they increase at a higher pace. The widest gap between both prices was achieved in the second semester of 2013.

Having said that and according to national statistics, natural gas consumption decreased from 966 million m³ to 678 million m³ during the years gas prices increased. In our opinion, it wouldn't be totally accurate to state that gas prices increment triggered a reduction of gas consumption between 2009-2013 since there were other important circumstances that could have been also responsible for it. For example, the natural gas market of the country remains isolated from most of the European Union, sharing connections with only nearby Latvia and Russia. The Estonian Parliament adopted a law, which requires ownership unbundling of transmission services from supply by 2015. At present, a single privately owned (the largest shareholder is Gazprom) company, Eesti Gaas, is in a dominant position providing gas transmission and distribution services. In 2011, its share of the retail market was 90% and all remaining volumes sold by others were purchased from Eesti Gaas. Estonia

[27] Electricity and natural gas price statistics, 2013

is 100% dependent on imported gas from a single supplier (Russia) while winter peak in gas demand is met by access to a storage facility in Latvia. The lack of a properly functioning gas market poses a significant risk in terms of security of supply.

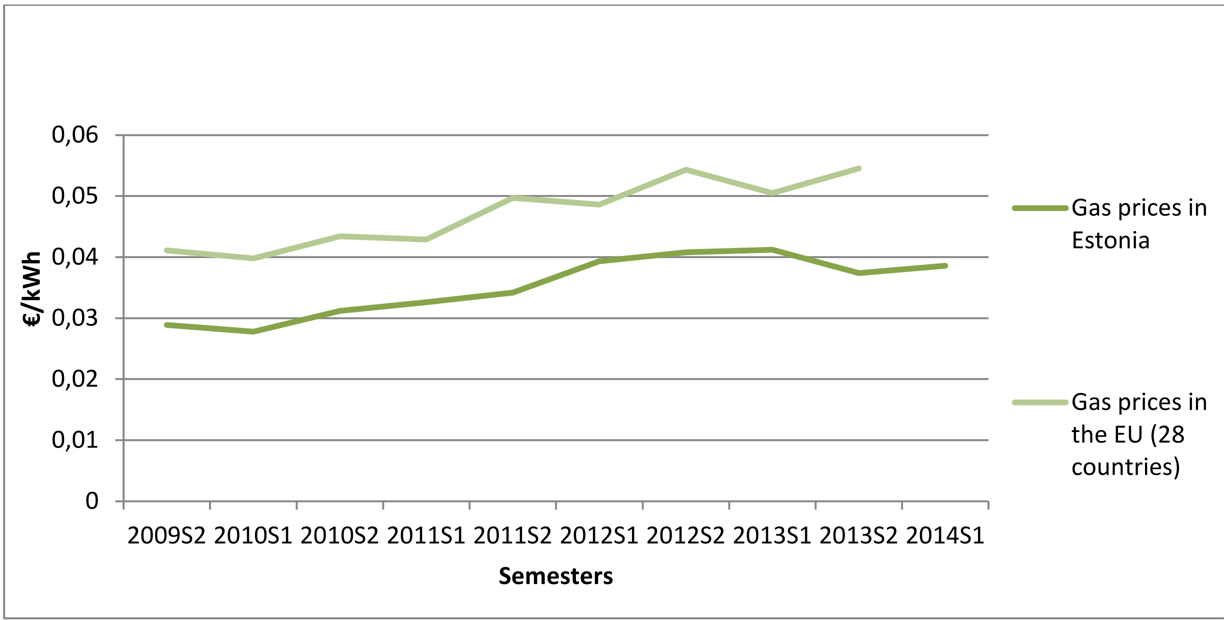


Figure 5.5: Gas prices in Estonia between 2009 and 2013.

Source: Eurostat

Note. Consumer retail prices including all taxes, levies and VAT

Vulnerability to energy supply

Energy dependence experienced a gradual decrease in Estonia until 2011, moment in which the tendency changed slightly and an increasing trend started. However, Estonia vulnerability to energy supply is been always very low with respect to the EU average. Indeed, the gap between both didn't stop growing since 2001. This tendency is due to the fact that Estonia is nearly energy independent. The country is one of the largest producers of oil shale in the world and its domestic energy sector relies heavily on this source. As result, Estonia is able to meet its electricity and heat needs with its domestic resources.

While natural gas instead forms a relatively small part of Estonia's energy mix, around 10% of total energy supply. A strategic objective of the government is to reduce the share of oil shale in the energy mix over the medium term. One means of doing so will be to replace carbon-intensive oil shale-fired power plants with more efficient biomass-fired capacity, which will also support the expansion of renewable energy by introducing more flexibility into the electricity system. A complementary measure might be the implementation of EEOs which will potentially have an impact on the amount of energy consumed and will help to make the transition from oil shale to gas or renewable energies smoothly.

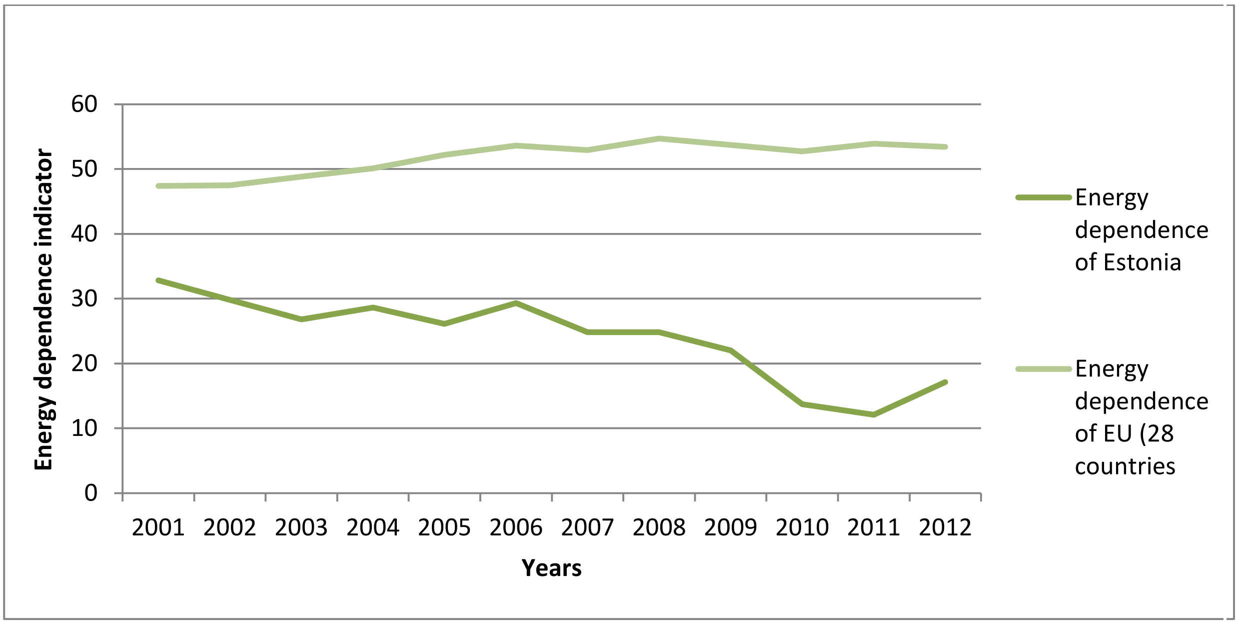


Figure 5.6: Energy dependence of Estonia between the years 2001 and 2012

Source: Eurostat

At present, the Estonian gas market is dependent on one source of gas and is isolated from the EU natural gas market. The small size and monopolistic structure of its gas market makes infrastructure development plans and the decision-making process rather challenging.

The following figure displays how the total primary energy supply is formed:

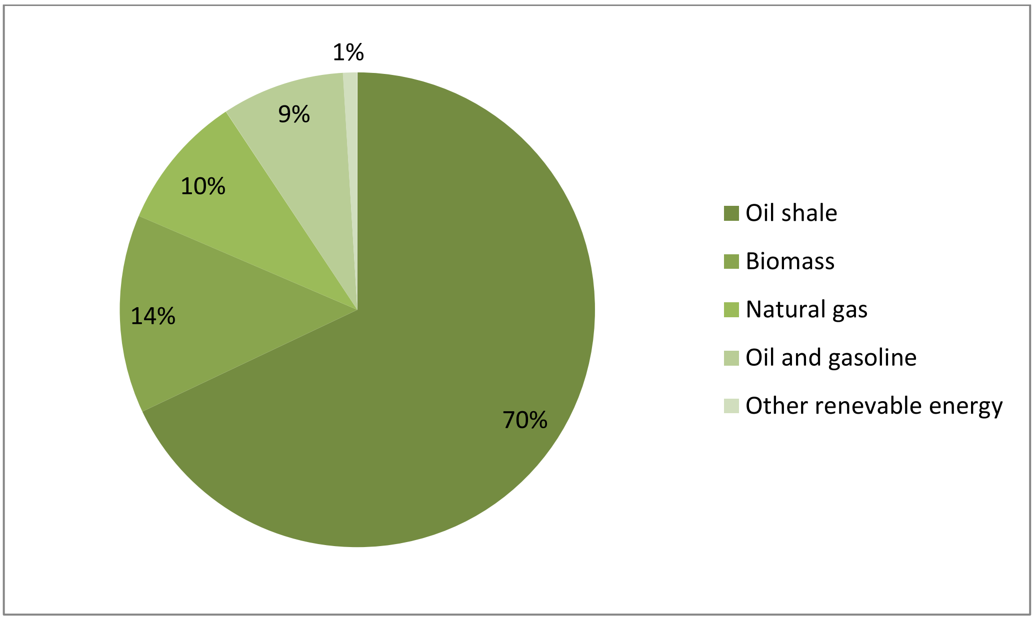


Figure 5.7: Total primary energy supply by source in 2012

Source: International Energy Agency

5.1.1 Evaluation of economic preparedness - Identification of financial challenges

Key economic indicators, such as real growth of GDP, GDP per capita, show that the Estonian economy is coming back to path of growth after the 2008 financial crisis. Central government debt remained stable, unlike strong increases happened in other EU countries.

However particular characteristics of the energy sector bring some uncertainty to the capacity of the Estonian economy to overcome them and continue on the path of growth.

The low vulnerability to energy supply is based on the fact that Estonia is largely self-sufficient in energy wise and thanks to the high production of oil shale; it is able to meet its electricity and heat needs from domestic sources. However, due to the high level of CO2 emissions of oil shale, the Estonian government is planning to reduce its use. In 15 years, oil shale production should account only for 30%. This will require an efficient energy diversification strategy which will require high investments from the government. As part of that strategy Estonia needs to integrate its national energy market into the European market and increase the interconnections with European suppliers.

Without oil shale, Estonia is very energy dependent. For instance, Estonia is 100% dependent on imported gas from a single supplier (Russia).

The good health of the Estonian economy might help final customers to deal with the moderate increase that electricity and gas prices experienced in the last 10 years. The liberalization of the electricity market that eventually might result in a decrease in prices have been offset by the big investments[28] required to reduce dependence on oil shale and its substitution for more renewable sources.

[28] In its NEEAP, Estonia called for an investment of EUR 96 million by the end of 2013 to be able to focus on the more efficient use of fuels.

5.2 Energy and Climate Change (Energy Savings' Potential)

This section aims to provide a description of Estonia's status in terms of Energy Savings' potential by looking into its current evolution of energy consumption trends as well as in relation to the official national targets set by 2020.

The set of indicators used in this analysis were grouped using two criteria: energy climate change and energy savings potential.

Primary energy consumption

Primary energy consumption in Estonia kept close to the 6 million TOE since 1993. A substantial decrease happened between 1990 and 1993. After that it remained stable until 2014.

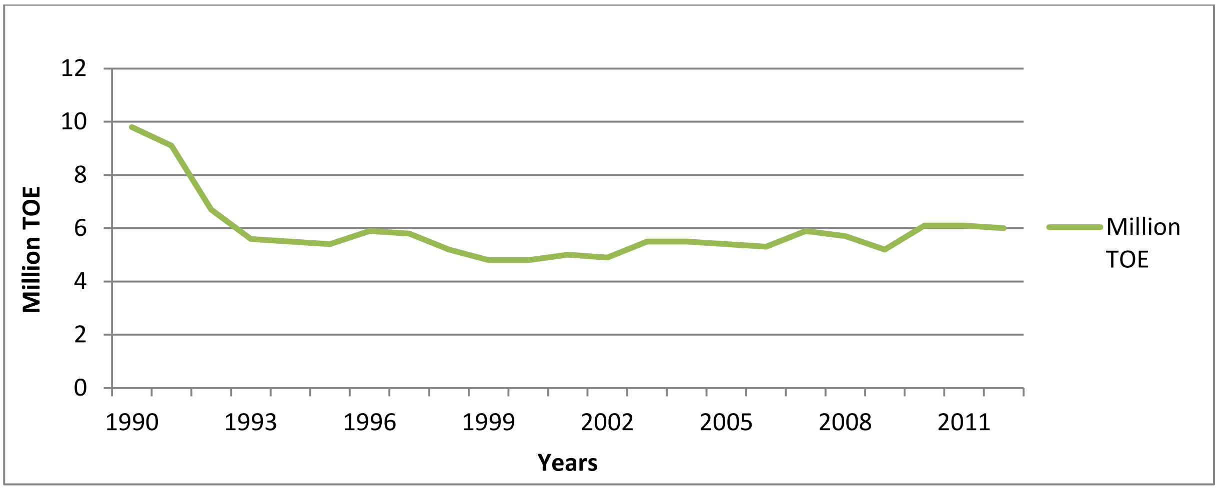


Figure 5.8: Primary energy consumption (in million TOE) in Estonia between 1990 and 2012.

Source: Eurostat

Energy intensity of the economy

Although the energy intensity of the Estonian economy decreased in the last ten years, it is still very high (481 kg of TOE/1000 Euro) in comparison with the European average (143.2). This is because the 70% of the primary energy supply in Estonia is still provided by oil shale. Because of the efforts made by the Estonian government in reducing the use of oil shale, the energy intensity of the Estonian economy is expected to keep on decreasing.

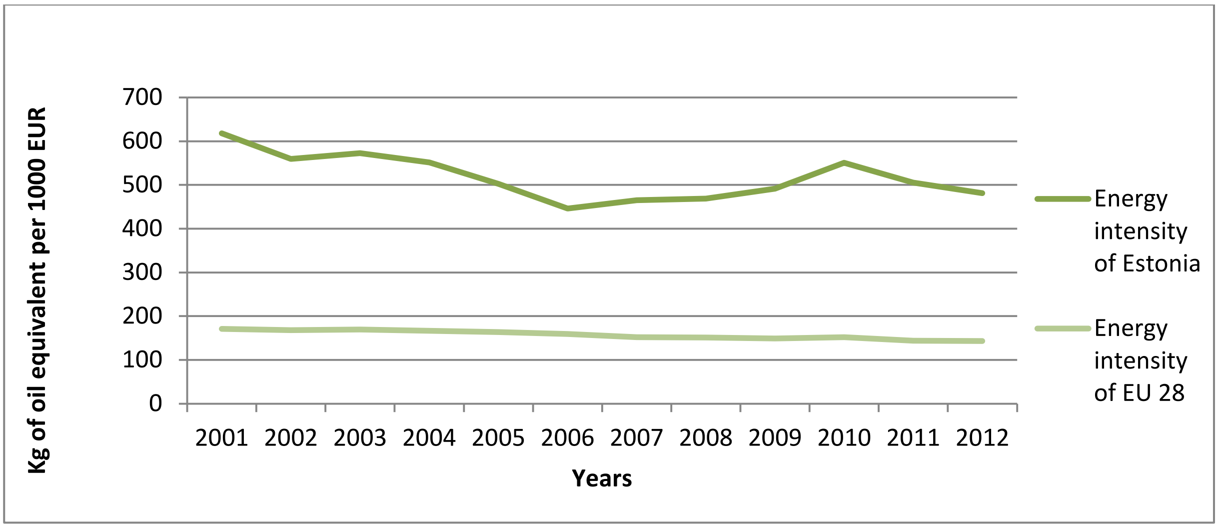


Figure 5.9: Energy intensity of the economy in Estonia between 1990 and 2012.

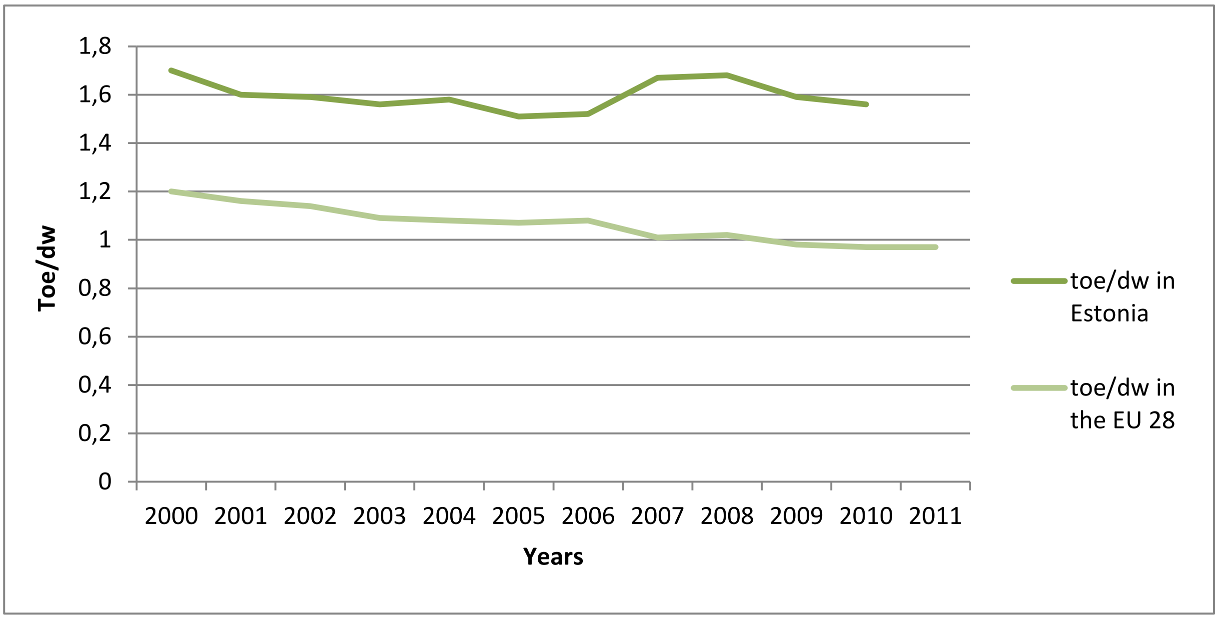
Source: Eurostat

Final consumption of residential dwellings

The final consumption per residential dwelling is notably higher compared with the European average. It has been decreasing since 2000 at the same pace as the European average. As of today the gap between them is around 0.5 TOE/dw. As a result of its cold climate, demand for heat in Estonia is strong and 70% of heating is provided as DH. The country has a comprehensive, but ageing DH pipeline system over 1 400 kilometers long. There are 230 DH zones in Estonia and delivered heat energy ranges from 0.25 GWh to 1 585 GWh in Tallinn. Most networks are old and inefficient. The government has set a goal to minimize heat losses from 22% at the moment to 15% in 2017 and there are plans to draw up heat development plans for DH regions with less than 50 GWh of consumption by 2015.

This low efficiency translates into a high energy consumption that families require to heat their houses. Although this problem might be directly related to the issue of fuel poverty, according to Thomson (2013), Estonia would be way below the European fuel poverty average if we look at the percentage of households unable to pay to keep their homes adequately warm (one of the indicators he considers to define fuel poverty). Only Luxembourg has a lower percentage of households enable of paying their bills to keep their home adequately warm. Thus, fuel poverty it doesn’t seem to be an issue that EEOs might face in Estonia in case they are implemented.

Figure 5.10: Final consumption of residential dwellings.



Source: Odysee-Mure

Final energy consumption

Final consumption is the sum of the energy supplied to the final consumer's door for all energy uses. It is the sum of final energy consumption in industry, transport, households, services, agriculture, etc.,

This indicator experienced a drastic decrease between 1990 and 1991 in Estonia. Since 1992 and as of today, it stayed around 3 million TOE. The reason that explains the sharp fall that figure 5.11 shows it was the decline of oil demand that happened in Estonia from 1990 to the end of the decade, as the consumption of heavy fuel oil, which accounted for over 50% of demand, decreased significantly. Since then, oil demand has remained relatively stable averaging 25 thousand barrels per day (kb/d) 23 since 1997. In 2000, Estonian oil demand sank to its lowest level in the last 15 years, recording 21 kb/d. Conversely, in 2007, before the start of the financial crisis, consumption of oil products reached 29 kb/d, its highest level. In 2011, oil demand stood at 26 kb/d and is likely to increase moderately in the coming years.

The largest potential in an EEO exists in reducing the use of shale oil consumed by the household sector.

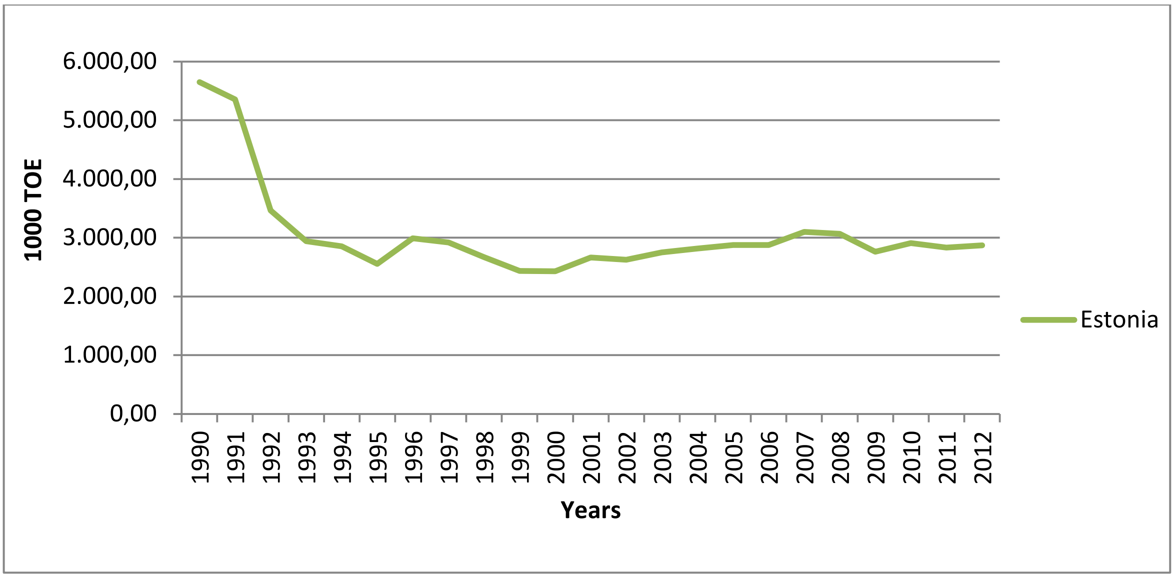


Figure 5.11: Final energy consumption.

Source: Eurostat

Energy efficiency gains in households

Energy efficiency gains in households were higher in Estonia than European average between 2001 and 2006. After this, Estonian efficiency gains consistently lagged behind the EU average. This justifies the current priority of the Estonian NEEAP in regard to the building sector. Improving the energy efficiency of the Estonian building stock might can generate important energy savings since residential sector was in 2011 the largest consumer of energy, accounting for 32.8% of the total final consumption of energy.

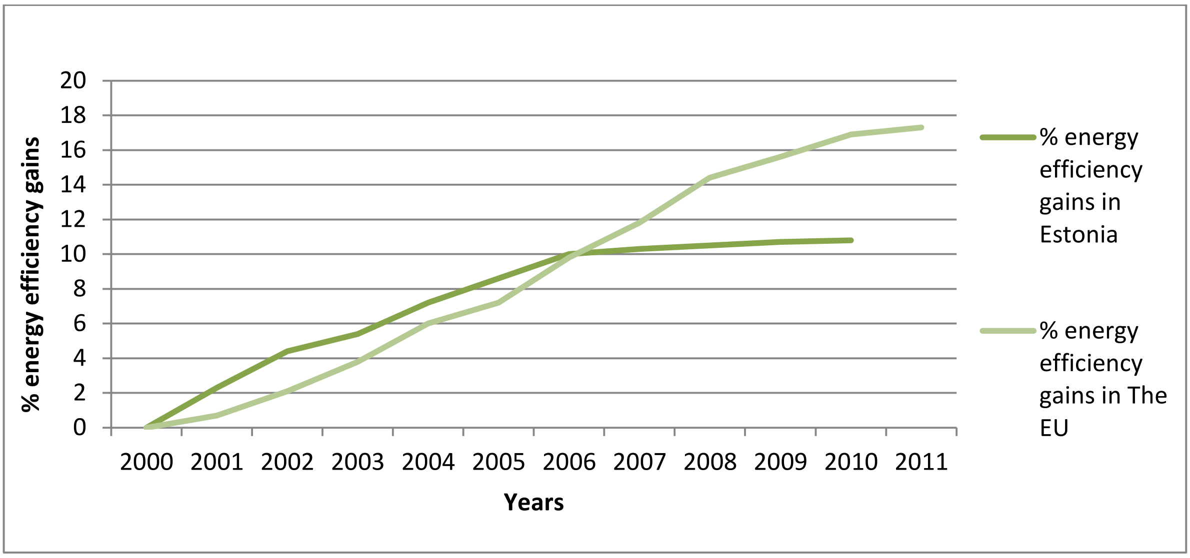


Figure 5.12: % energy efficiency gains in households.

Source: Odysee-Mure

Energy efficiency gains in industry

Estonian industry shows higher energy efficiency gains rates in comparison to the European average. This rate shows a fast pace of Estonian industry in contributing to the reduction of energy intensity of the Estonian Economy. The main reasons behind the shift towards higher efficiency are structural changes in production towards less resource and energy consuming products and assembling of pre-produced products, as well as the replacement of old technologies with modern and less energy consuming technology.

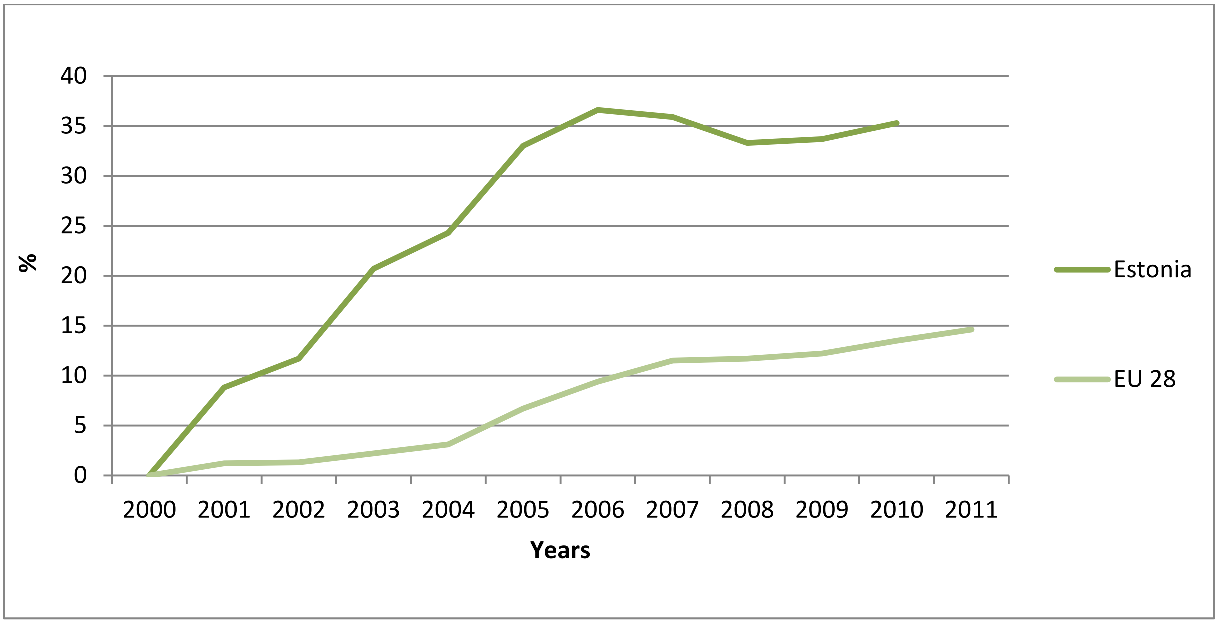


Figure 5.13: % energy efficiency gains in households.

Source Odysee-Mure

Primary and final energy consumption

Figure 5.14 shows the evolution of primary and final energy consumption in Estonia. Considering that the targets for 2020 are 6.5 Mtoe[29] for primary energy consumption and 2.8 Mtoe for final energy consumption, Estonia will clearly meet the targets set by 2020

[29] Final and primary energy consumption targets are been taken from http://ec.europa.eu/europe2020/pdf/themes/16_energy_and_ghg.pdf

However, the EU states that the scale of the challenge in energy efficiency requires that the policy effort is intensified in all Member States, particularly in countries like Estonia, which remain among the most energy intensive countries in the EU.

Estonia has made a limited progress in reducing energy consumption so far. Further improvements are necessary, in energy efficiency policy implementation as well as in policy package development. On the other hand, Estonia is currently working hard to implement measures to reduce both primary and final consumption by maximizing the saving in sectors such as building, where the potential for energy savings is the highest.

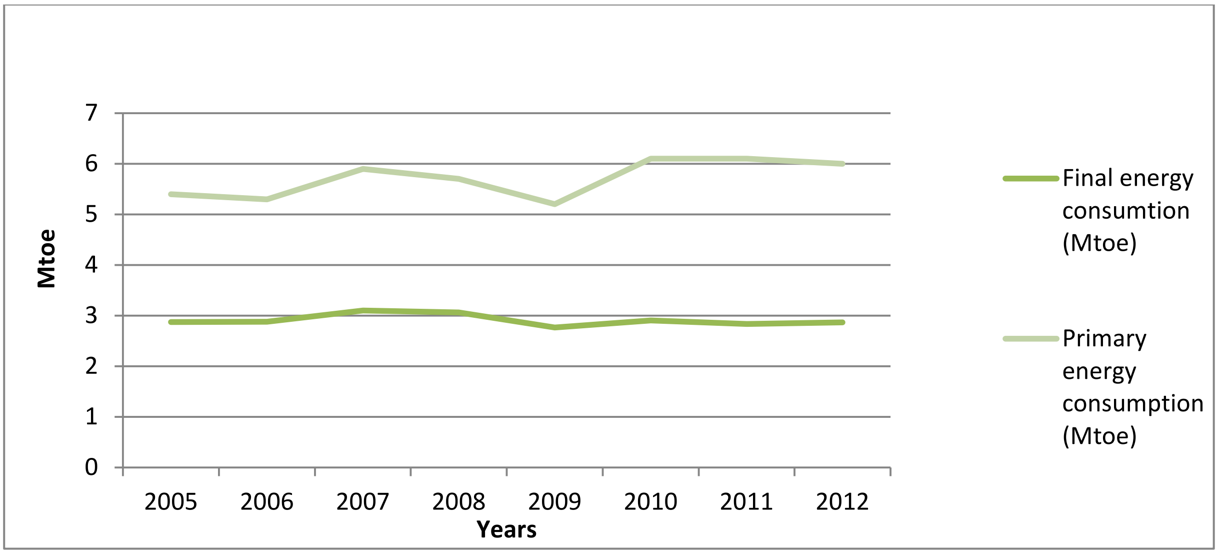


Figure 5.14: Primary and final energy consumption in Estonia between 2005- 2012

Source: Eurostat

5.2.1 Evaluation of energy savings' capacity - Identification of challenges

Primary and final energy consumption didn't decrease in Estonia between 2000 and 2011. Indeed primary energy consumption shows increasing trends for the next few years. This is backed up by a high-energy intensity ratio (3 times higher than the EU average) and a high final energy consumption of residential dwellings (0.5 Toe/dw higher than the EU average).

Most of the energy potential in Estonia can be achieved within the building sector. The percentage on energy efficiency gains in households improved substantially between 2000 and 2006, but at a much slower pace than the EU average. The trends in the percentage on energy efficiency gains in industry shows a different scenario, since this indicator shows an increasing trend since 2000 at a much faster pace than the EU average.

Given the potential to increase energy efficiency gains in the household sector and the final consumption of residential dwelling, Estonian government is right at considering the building sector as a priority to improve the energy efficiency of the country. On the other hand, and given the high dependency of the dwelling sector on shale oil, the transition to more sustainable fuels will be very challenging for Estonia, because it will increase its energy dependence (see vulnerability to energy supply in 5.1.1) in the long term, but it will reduce the energy intensity of its economy.

5.3 Market preparedness

This section aims to provide a description of Estonian market in terms of energy efficiency performance, the structure of the energy market, the technical capacity in terms of expertise, certification/training procedures for energy operators as well as the ease of access to finance for beneficiaries (either individuals or enterprises, SME's).

SME Access to Finance

Figure 5.15 shows an increasing access of SMEs to finance between 2007 and 2012. According to the SBA fact sheet made in 2014, Estonia offers better than average conditions for SMEs to access various types of finance.

Industry in Estonia is diffuse and, apart from a few large plants, mainly consists of small and medium sized enterprises (SMEs).

Although energy consumption of industries is made more rational thanks to measures related to the wider energy policy (e.g. the opening of the electricity market; a renewable energy charge; fuel and electricity excise duties; and reducing differences in excise duty rates), the issue of energy efficiency in industry has been raised by the authorities in order to work out better financing opportunities for energy conservation measures in industries and small enterprises. For example, policy makers are proposing a support scheme for carrying out energy audits and putting in place energy surveillance databases for companies from EU Structural Funds for the next period (2014-20). However, it should be noted that this scheme was in anticipation of the new Energy Efficiency Directive, which would propose concrete measures.

Investment support schemes have been implemented as planned, with allocations made to improve District Heating systems and to increase the use of combined heat and power generation. In May 2012, the European Commission accepted Estonia's application, pursuant to Article 10c (5) of Directive 2003/87/EC of the European Parliament and of the Council, to give transitional free allocations for the modernization of electricity generation.

This means that SMEs could have access to more energy efficient technologies, contributing therefore to reduce final energy consumption of Estonia.

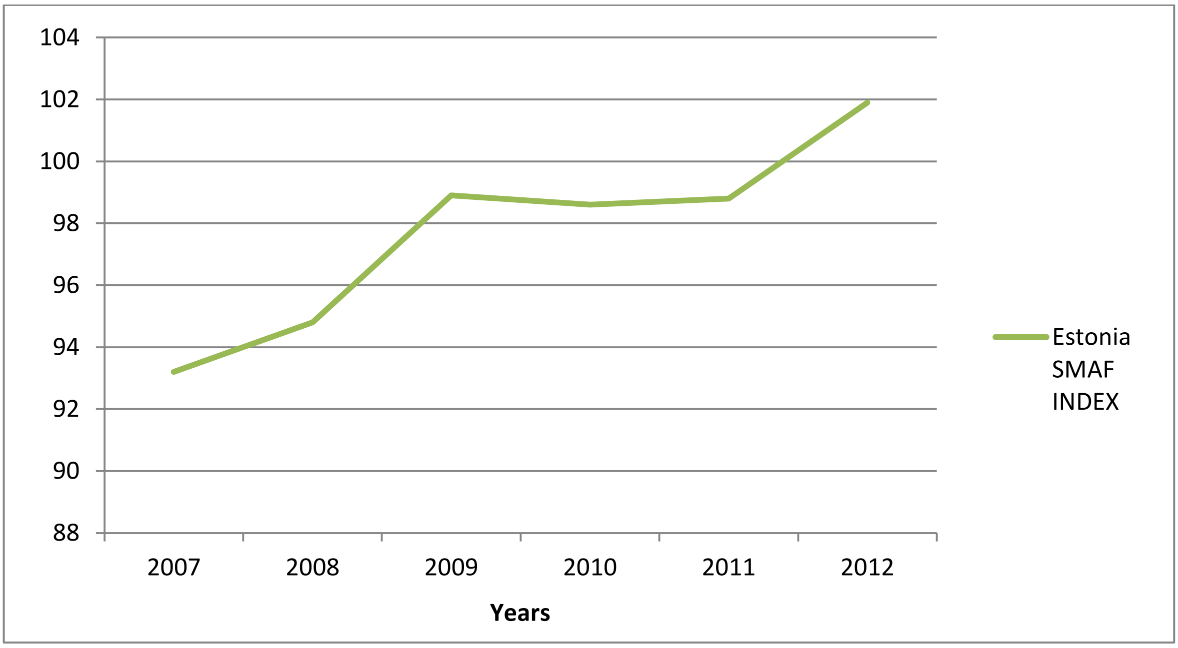


Figure 5.15: SMAF index in Estonia between 2007 and 2012.

Source: European Commission website: http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/index_en.htm

ESCO's market development

Information about the Estonian ESCO market is scarce and as of 2009 the market had not yet taken off. No ESCO activity was registered in 2009 and there is no common understanding of the nature of Energy Efficiency Services and contracts (Labanca 2010).

Until 2006, only two companies offered ESCO-type contracts supplementary to their core business, and the market was limited to few transactions with the public sector involving public lighting, control and automation systems (EC DG JRC 2007).

The high level of governmental support and the low interest rate loans available for households limit the market for ESCOs by removing the incentive to look for ESCO services that have a financing element. Municipalities use structural funds for energy system improvements while the industrial sector has internally the technical and financial capacity to implement energy efficiency measures (EC DG JRC 2007).

Support (via structural funds) is given to the local authorities for the refurbishment of the district heating systems and public buildings (Tepp 2010).

Identified barriers for the establishment of ESCOs and long term contractual agreements include election cycle-based thinking and attitudes and changing regulatory framework (EC DG JRC 2007).

Table 5.1 shows a summary of basic data of the Estonian ESCO Market

Table 5.1: Estonian ESCO market

Number of ESCOs	There are currently 2 (if we only consider companies able of financing themselves). If we consider companies that can provide the type of services ESCOs do but need external financing, we need to talk about 50-60 companies.
Size of the market	Information not available
ESCO Association	Currently no
Type of ESCOs	Most of the companies need to be financed by banks which are open to support the development of energy market in Estonia.
Market development	Information not available
Sector ESCO Projects & main EE measures	Public sector involving public lighting, control and automation systems (2007)

Source: Energy Service Companies Market in Europe

Market share of the largest generator in the electricity market

Figure 5.16 shows that the market share of the largest generator was greater than 90% until 2009, and still remained above 85% in 2012.

When Estonia's treaty of accession to the EU was signed, it was agreed that Estonia would open its electricity market partially in 2009, and completely in 2013. This explains the fall in market share we observed in figure 5.17 from 2009 onwards. Although 2012 is the last year for which figure 5.17 contains data, this trend is presumed to continue since in 2013 the opening of the Estonian electricity market was completed.

The production of electricity in Estonia is highly concentrated and greatly reliant on a single fuel. As of September of 2012, Estonia's net installed generating capacity was 2 652 megawatts (MW), of which 2 275 MW of output were available to be used during peak consumption. Since September 2011, 152 MW of capacity was added to the electrical system. The majority of installed generating capacity, approximately 2 000 MW, is oil shale-fired capacity followed by wind power with 247 MW.

Almost all electricity production is controlled by the biggest energy undertaking, Eesti Energia AS, which owns 87.7% of the installed capacity and that more than 80% of the total amount of electricity in 2011. In addition to 95% of the generation market, Elektrilevi OÜ, with a share of 86% of the distribution market, belongs to the Eesti Energia AS group. In the retail market, Eesti Energia AS has again the biggest market share, 76.2% in 2011.

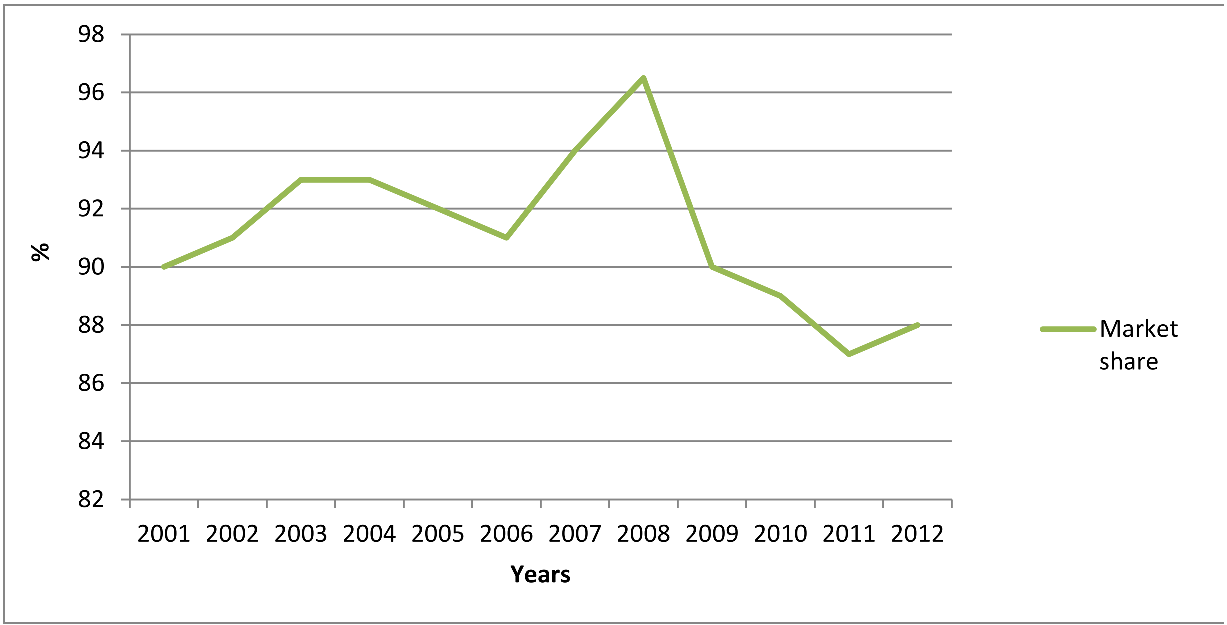


Figure 5.16: Market share of the largest generator in the electricity market.

Source: Eurostat.

Experience in technology

According to the interviewed stakeholder who works at the Estonian Ministry of Economic Affairs and Communications, the qualification /certification of energy operators in Estonia is very good because Estonia counts with sufficient technical expertise regarding the energy sector.

The Estonian Energy Technology Programme (ETP) is a national R&D programme within the energy sector. It is a co-operation programme involving research, business and the state to develop technology in three focus areas: oil shale, renewable energy, and other new energy technology.

Oil shale[30]

Oil shale has long dominated energy and electricity production in Estonia and it is also offering bright prospects for oil production. In the same vein, it has been the focus of energy R&D efforts. The National Development Plan in 2008 for the Utilization of Oil Shale had as a main objective the development of oil shale technologies, such as activities for the development and growth in efficiency of the entire oil shale production cycle, including the further increase in value of oil shale. R&D programs on oil shale generally focus on increasing oil production and reducing the carbon intensity of power generation of oil shale.

Renewable and other energy technologies

R&D on renewable and other new energy technologies not only includes wind power and biomass based energy, but also a long list of other technologies, such as fuel cells and electrolysers, solar energy, power storage and power grid development, plus ICT-based energy management technologies in buildings. Estonia's Development Plan 2007-2013 for Enhancing the Use of Biomass and Bioenergy, issued in 2007, supports related R&D as part of efforts to reach its overall objective of reducing the country's dependence on imported resources and fossil fuels.

Technical capacity

There is a certification procedure established in Estonia to become an energy auditors/constructor. It has been in effect since 5-6 years.

There is an Act in Estonia that defines the requirements for the auditors/constructors as follows:

- Auditor/contractor services can be only provided by a company registered in the National register of companies.
- The company must hire a person (expert) having relevant technical qualification to provide the service.

Relevant technical qualification can be proven with a University degree or certificate from an organization that will issue the qualification after a relevant exam is passed.

There is available data on registered and/or certified energy auditors. This information is stored on the Estonian Association of Heating and Ventilation Engineers Registry.

[30] Oil shale is different from shale oil.

Furthermore, Estonia has a workforce education and training program for energy auditor that is being financed by the EU since 2003. The training program is held on a demand basis from time to time. It does not have links to EEOs.

5.3.1 Evaluation of market preparedness – Identification of challenges

The market preparedness of the Estonian Energy market seems to be following the right path. Access of SMEs to finance is increasing according to the SMAF index. This is happening at the same time as the electricity market is going through an opening and unbundling stage. This might contribute to the establishment of new ESCOs. As table 5.1 showed, the ESCOs market is still not well developed in Estonia.

Beyond the indicators analyzed, the opinion of relevant stakeholders regarding the qualification of energy operators in Estonia is very good. Estonia requires specific certifications for prospect energy auditors and has also a registry where the type of energy certifications mentioned above can be stored.

Furthermore, Estonia has a workforce and training programme that is being financed by the European Union since 2013.

To sum up, the Estonian energy market has the right foundations to increase its preparedness for the implementation of EEOs. However, the Estonian government will need to act cautiously due to the recent liberalization of the electricity market.

5.4 Administrative preparedness

This section presents a range of indicators evaluating the national administrative preparedness (e.g. **institutional structures**, **adequately stuffed services, competence and experience, monitoring system**) with respect to eventually introducing EEO schemes.

Government effectiveness

Government effectiveness, among other aspects, reflects the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies. Between 2000 and 2012 the index stayed stable and below 1 (being 2.5 the maximum value and -2.5 the minimum). Estonia shows as a country limited strength to effectively implement energy efficiency policies.

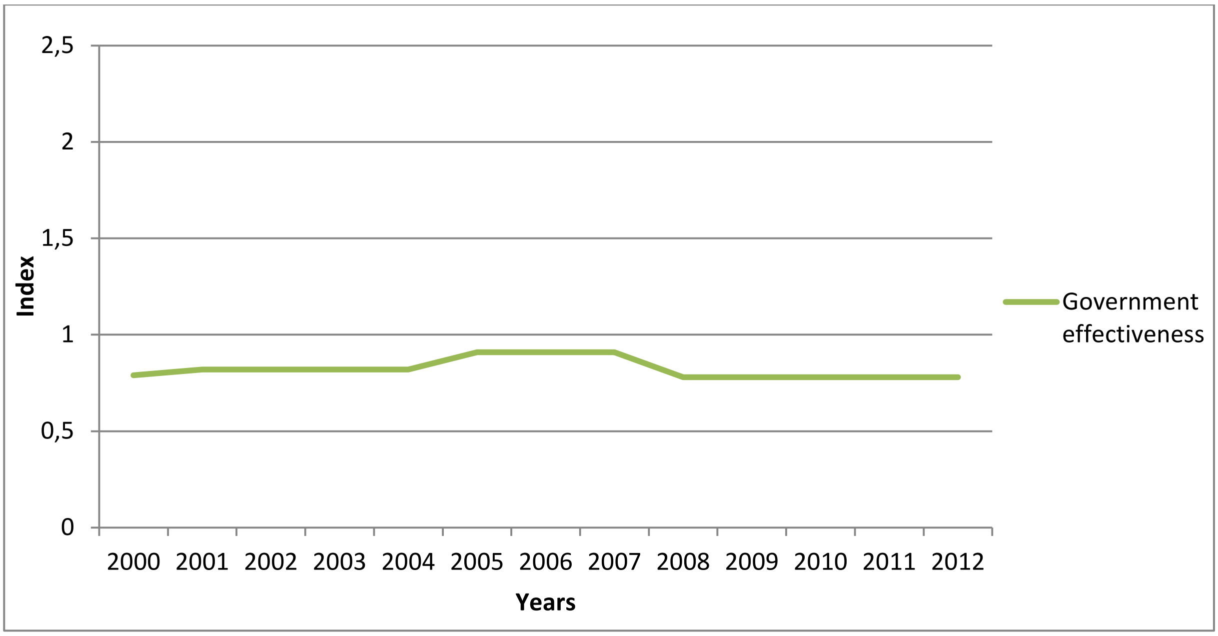


Figure 5.17: Government effectiveness in Estonia during 2000-2012.

Source: The World Bank

Regulatory Quality

The regulatory quality index in Estonia shows a poor performance as far regulatory index is concerned. The index has never gone over 1, being 2.5 the maximum value.

The regulatory framework of electricity and gas markets has gone recently through an opening phase due to the required unbundling of transmission activities of the existing operators to facilitate the development of functional gas and electricity markets.

Regarding the gas sector, the existing system operator and the transmission network owner were given a three-year transitional period to minimize the risk of infringement of their rights and to allow for organizing full compliance with this law. Full ownership unbundling of the natural gas market is due by January 2015.

As far as the electricity sector is concerned; the market opening was finalized in 2013. Both markets are going through an adjustment process; this is not the ideal regulatory context for the implementation of EEOs or alternative schemes, making so very difficult to assess the potential impact of their implementation.

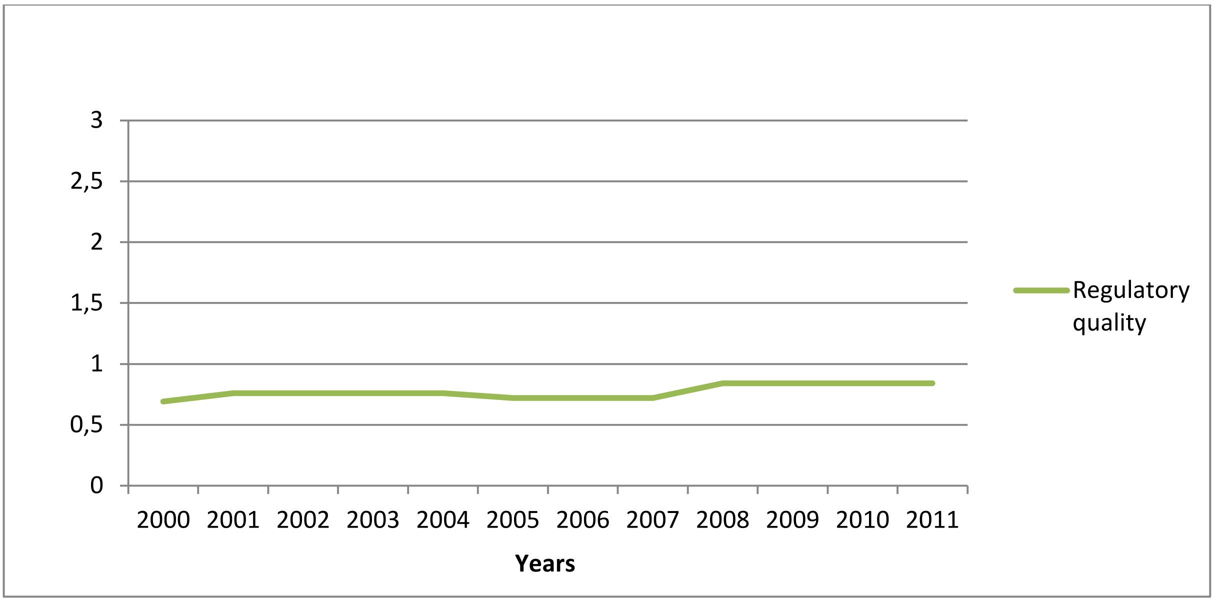


Figure 5.18: Regulatory quality index I Estonia during 2000-2010.

Source: The World Bank.

Experience (measures) against free-rider

Estonia doesn't have any specific methodology for minimizing or accounting for free riders since they consider there is no need to address this issue in a serious manner.

5.4.1 Evaluation of administrative preparedness in relation to the EEO scheme

Estonia showed in both indexes; government effectiveness and regulatory quality very modest results between 2000 and 2010. Furthermore, Estonian electricity and gas markets are going through an opening and unbundling phase that make very difficult to assess the convenience for the implementation of either EEOs or alternative measures. It would be advisable to have greater certainty to start to think about their implementation

Furthermore, it doesn't have any specific methodology for minimizing free riders. Therefore, Estonian government should pay special attention to its administrative limitations for the successful implementation of EEOs.

5.5 Legislative preparedness

5.5.1 Description of Status quo

Legal Authority

According to the conducted interview, the legislative capacity of the Estonian government to implement /adapt the EEO schemes is between poor and good. The implementation of EEOs is very new to Estonia.

The legislative preparation the Estonian government has established to operate the EEOs responds to a combination of legislation and Ministerial Decrees, such as the District Heating Act (DHA), designed to regulate activities to the production, distribution and sale of heat by way of district heating networks and connection to networks.

5.5.2 Evaluation legislative preparedness – Identification of challenges

The evaluation of the legislative preparedness of Estonia is based on the interviews we conducted during the analysis. In the opinion stakeholders we interviewed, the capacity of the Estonian government to implement/adapt the EEOs is between poor and good. This is in part due to the novelty of EEOs' implementation and limited previous experience with such a scheme from the Estonian government side.

5.6 Social & Political acceptance/feasibility

Consumers' trust in their energy supplier

Since 2010, the EU have conducted an annual market monitoring survey which measures consumer experiences and perceived conditions in 21 goods and 30 services markets accounting for around 60% of the household expenditure.

Consumer conditions in each market are assessed on the basis of six main criteria: comparability, trust, problems and complaints, satisfaction, choice and switching. The survey covers 27 EU Member States, plus Iceland and Norway. The score obtained in each of the 6 criteria formerly mentioned, are used to obtain the Market Performance Indicator (MPI) index.

Table 5.2 shows the MPI for electricity and gas services in Estonia. Out of the 30 services taken into account by the survey, electricity and cars services occupy the 25th and 20th place respectively. The table below shows how the MPI has decreased in comparison to 2010. It shows as well that the MPI is slightly under the European average for electricity services and faintly over for gas services.

The former indicator needs to be understood in conjunction with gas and electricity market situation. The recent opening of both of them and the unbundling process they recently went through makes difficult to assess the consumer trust in their energy suppliers when the mere possibility of choosing an electricity supplier is possible since 2013.

Table 5.2: consumer trust in their energy suppliers.

	2012 MPI	Diff 2012 2011	Diff 2011 2010	Diff. EE EU27
Electricity services	94.8	1.3	-5.8	-0.4
Gas services	99.6	0.0	-1.8	0.2

Source: Office for Official Publications of the EU

Level of Fuel poverty in Estonia

Estonia doesn't have any special measure to address fuel poverty. There are measures to support the needs of vulnerable groups, but these fall without the scope of our analysis.

Moreover, as we saw in 5.2.1, the percentage of households that are unable of paying their energy bills is very low (Thomson, 2013) only surpassed by Luxemburg.

Social stance

EEOs awareness among general public is very limited, this makes difficult for people to have an informed opinion about them. Estonian government have tried to involve general public and consumer organizations in the debate about EEOs , but these organizations usually don't have sufficient capacity to follow such conversations.

According to the conducted interviews, social acceptance will play a significant role in the implementation of EEO schemes.

View of the industry[31]

According to the interview we conducted, the industry, generally, is not eager to implement EEOs schemes. They don't see how EEOs will be beneficial for them in the future.

5.6.1 Evaluation of social acceptance/feasibility – Identification of challenges

The MPI index showed that electricity and gas markets obtained one of the lowest scores out of the 30 services analyzed in Estonia in 2012. This is however a general tendency in Europe. Considering that trust is one of the key aspects used to calculate the MPI index, this limited trust in both markets might be an initial challenge for the implementation of EEOS and alternatives measures. Furthermore, the recent opening of electricity and gas market and the unbundling process they recently went through, makes it almost impossible to assess consumers' trust.

As reported by interviewees, the general public is unaware of the EEOs at this point and the industry doesn't seem to favor the introduction of the scheme.

To overcome this situation, the Estonian government needs to decide first whether EEOs will be chosen to meet the energy saving targets set by the EED. Only then specific dissemination policies could be implemented to inform the general public and industry.

Limited public awareness and still high market concentration in electricity and gas markets might be an important barrier for the implementation of EEOS or alternative measures.

[31] (i.e. energy intensive sectors such as the power sector, construction sector etc.)

REFERENCES

Analysis of the options for Implementing Energy Efficiency Directive 2012/27/EU. (2013). Report conducted by AF-Consulting-AS.

Energy Efficiency in Europe (2013). Assessment of Energy Efficiency Action plans and Policy in EU members States.

Estonia's efficiency obligation measures to meet the energy. Estonia's notification to the European Commission under article 7(9) and point 4 of annex V of Directive 2012/27/EU.

Estonia 2013 (2013). International Energy Agency.

Full Opening of the Estonian electricity market. (2012). Elering.

National Energy Efficiency Action Plan. Estonia's Communication to the European Commission under article 24(2) of Directive 2012/27/EU.

Resource Efficiency Gains and Green Growth Perspective in Estonia (2012). Available at: http://library.fes.de/pdf-files/id-moe/09351.pdf. Accessed 02 February 215

Schneider T., (2013) Energy Policy in Estonia. A comparative view of party positions. Konrad Adenauer Stiftung.

SBA factsheet, 2014. Enterprise and Industry. European Commission Available at: http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2014/estonia_en.pdf (accessed 02 February 2015)

Understanding the Energy Efficiency Directive (2013) European Council for an Energy Efficient Economy.

6 France – ADEME

6.1 Economic profile

A founding member of the European Economic Community and the euro zone, France is now the world's sixth and EU's third largest economy.

The economic structure of this large Member State, both in size and population (over 66 million habitants in January 2015, population increasing by over 0.4% per year), is mainly based on the service sector, which employs around 70% of the working population.

Industrial key sectors include food processing industry, railway, car manufacturing, construction, chemical, aeronautics and aerospace, energy, pharmaceutical and cosmetics industries.

France maintains an important agriculture activity, being EU's first agricultural producing country and the world largest producer of wine and spirits.

The transport sector can rely on efficient road and rail networks.

France is also renowned for its luxury sector. Finally, with over 80 million of foreign tourists arriving at its borders every year, it remains the most popular tourist destination in the world, tourism generating over €55 billion revenue.

According to the IMF, France is in 2013 the world's 20th country by GDP per capita with $44,099 per inhabitant. Still, the country struggles to recover from the economic crisis. It suffers from a stagnating economic growth (below 1%), resulting on moderate job creations, a high unemployment rate that keeps increasing, and public deficit and debt above EU's requirements.

6.1.1 Description of Status quo

GDP per capita and growth evolutions

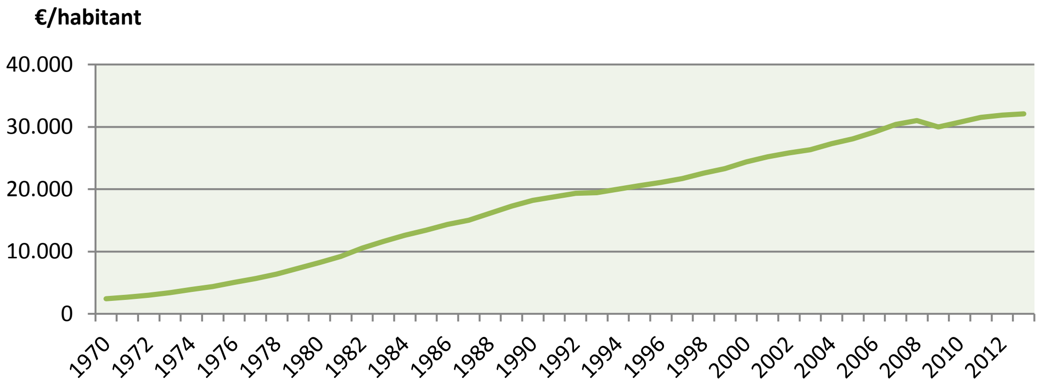


Figure 6.1: Evolution of GDP per capita in France between 1970 and 2013 (€/habitant)

Source: INSEE - 2014

Over the last 40 years, France saw its GDP per capita progressing less rapidly than the average of OECD countries, in particular with regard to Germany and the Northern Europe countries. Though higher than the average of OECD countries in 1975, France's GDP per capita is now below most developed countries' one.

The underlying factors of this slowdown simultaneously results from its smaller working age population, a low rate of activity and productivity and a high unemployment rate.

Source: TRÉSOR-ÉCO – n° 131 – Juin 2014

Recently, the economic downturn resulting from the aggravation of the sovereign debt crisis, triggered new job losses, while the active population kept growing, mainly due to the pension reforms introducing later retirement ages. As a result, the unemployment rate increased sharply from March 2011. It stood at 10.4% of the active population at the end of 2014 (including overseas territory).

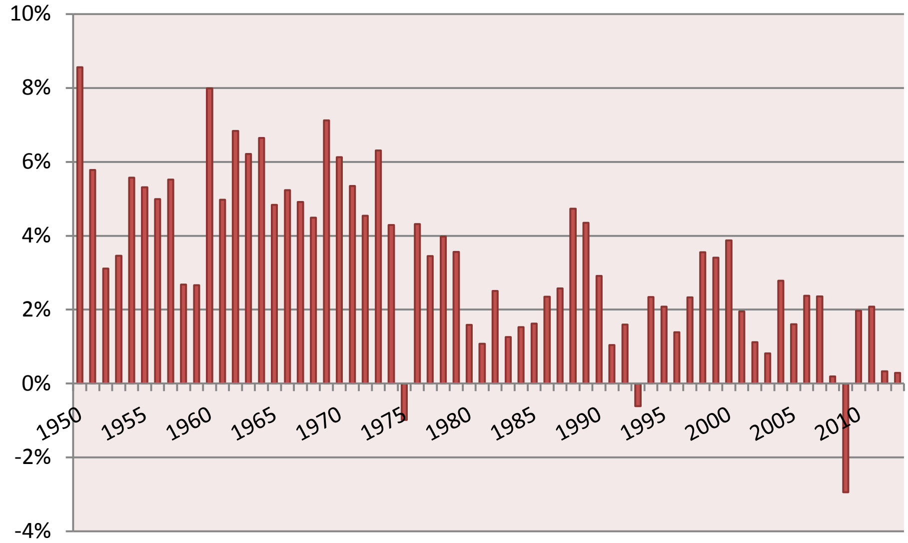


Figure 6.2: Growth evolution in France between 1970 and 2013 (%)

Source: INSEE - 2014

France is still recovering from the financial and economic crisis. Although it entered the crisis slightly later than the rest of comparable economies, and unlike the rest of the euro zone, there is still no real sign of a turnaround in the French economy.

In 2012, French GDP stagnated (+ 0.3 %). Businesses scaled back both their investment and inventory. Household consumption fell for the first time since 1993, their purchasing power declining due to the slowdown in income and the sharp rise in taxes.

In 2013, the French GDP grew by 0.3 % again. The industrial production in volume went down again but less strongly than in 2012. Except for the food-processing industry, all the big industrial branches did better in 2013 than in 2012. On the other hand, the production of the tertiary sector slowed down slightly and production in the construction sector decreased again.

Source: INSEE, 2014

Central government debt as a % of GDP

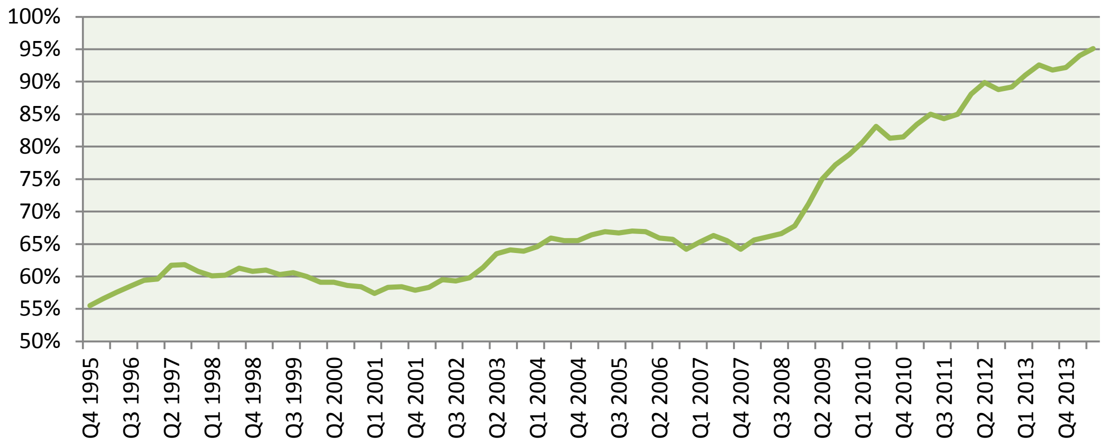


Figure 6.3: Central government debt as a percentage of GDP in France between 1995 and 2013 (%)

Source: INSEE - 2014

The national debt was estimated at the end of 2013 at 1,925 billion euros, representing 93.5 % of the country's GDP. It exceeded officially 2,000 billion in the second quarter of 2014. It represented 663.5 billion euros at the end of 1995 (55.5 % of the GDP) and had reached 1 211.6 billion euros (64.2 % of the GDP) at the end of 2007.

Energy prices (domestic use)

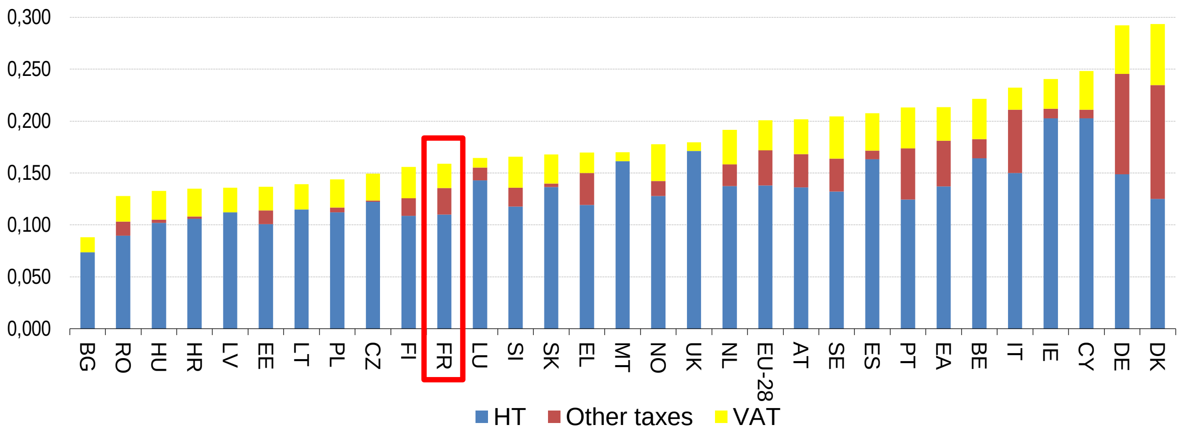


Figure 6.4: Electricity prices in France and the EU for households (2013, €/kWh)

Source: EUROSTAT

Electricity prices for households are 25% lower in France than the EU average.

This data might imply that French households do not spend a lot on their electricity bill. This is globally true, except for one third of the French housing market, heated with electric heating systems, which generate very high electricity consumption.

Over the past 20 years, electricity prices have increased slower than the inflation, representing a 16.5% increase between 2000 and 2012.

Source: MEDDE, SOeS

Regarding tariffs, at the end of 2014, over 90% of French households are still paying their electricity consumption at the regulated tariff.

Source: Commission de Regulation de l'Energie

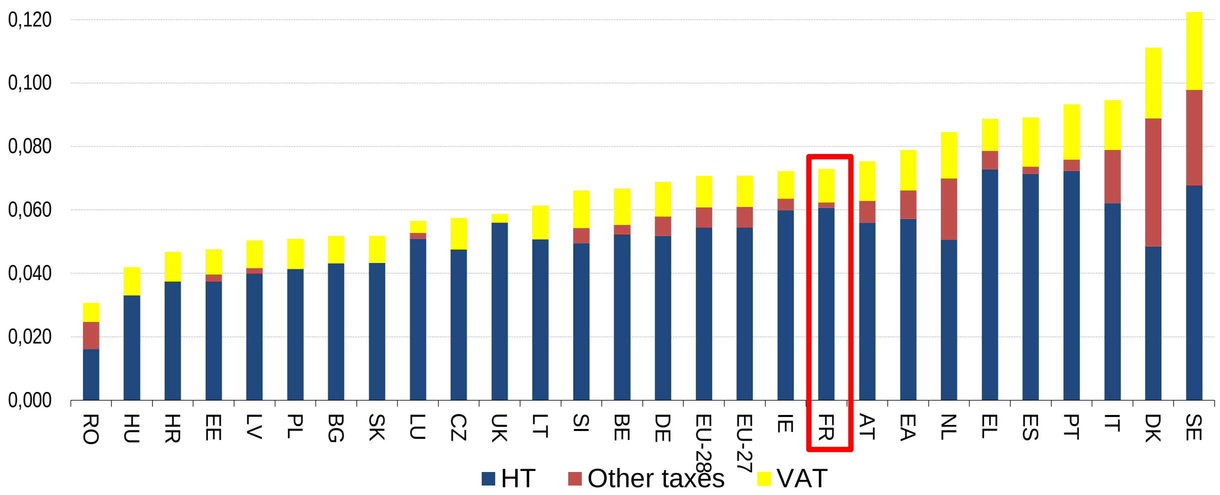


Figure 6.5: Natural gas prices in France and the EU for households (2013, €/kWh)

Source: EUROSTAT

Natural gas prices for households are quite similar in France to those encountered in neighboring countries and a little above the EU average. These prices strongly increased over the past years: they more than doubled between 2000 and 2012!

Regarding tariffs, at the end of 2014, over 67% of French households are still paying their gas consumption at the regulated tariff.

Source: Commission de Regulation de l'Energie

Energy dependence

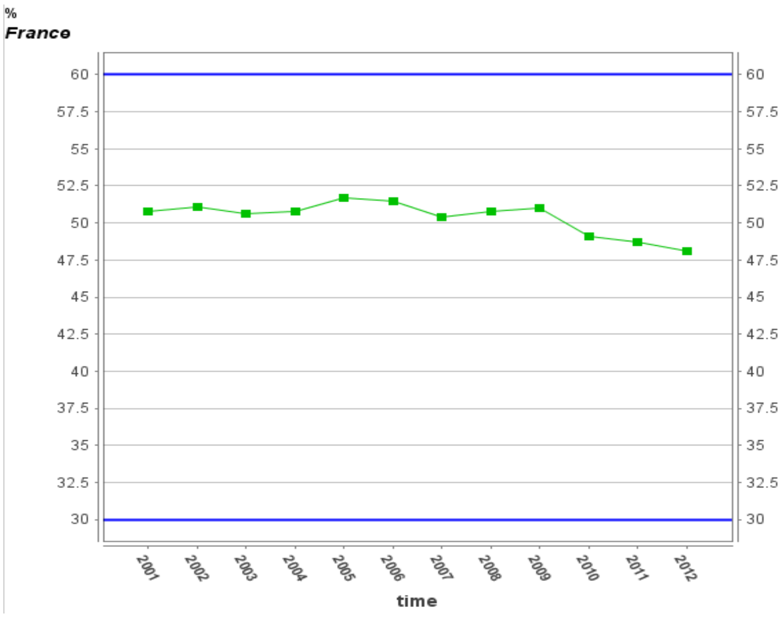


Figure 6.6: Evolution of energy dependence in France between 2001 and 2012 (%)

Source: EUROSTAT

France's energy independence keeps improving since 2009, benefitting among others from a good electricity production from nuclear and hydroelectric plants.

While France exports a share of the electricity it produces, it imports most of the fossil fuels it needs. In 2012, its energy bill reached a new record, at €66 billion euros.

6.1.2 Evaluation of economic preparedness - Identification of financial challenges

Energy prices for French households are rather low in the case of electricity (1/3 of the sector consumption) and average in the case of natural gas (also 1/3 of the sector consumption) compared to EU averages. So far, these prices were not in favor of important behavioral changes or heavy investments in energy efficiency since payback time remained quite long (for wall insulation for instance).

However, these prices have been increasing over recent years while the general economic context has been going down (increase of the unemployment rate, sharp rise in taxes, recession, and inability to reduce the debt), making households more and more sensitive to the price they pay for their energy and to the means to reduce their energy costs.

The tax on energy product consumption (TICPE) has been modified in 2014 to take into account the CO2 content of energy products used for heating or automotive fuel. This has already increased the level of taxation on natural gas and will have an effect on all automotive and heating fuels (e.g. an increase of 4 euro cents is expected on diesel fuel in 2016 due to this tax). This new energy-climate contribution will increase with time.

A recent study from the National Observatory on Fuel Poverty states that 4 million French households currently spend over 10% of their income for their energy bills, and a lot more could be in a situation of fuel poverty if you take into account other indicators.

The introduction of new energy policies and the reinforcement of the actual French EEO scheme to comply with the EED happen in a difficult time for France from both an economic and social point of view. Both households and enterprises are tired of the increased fiscal pressure they support in a lingering economic malaise. These policies will have to prove their efficiency while generating limited extra costs for consumers.

6.2 Energy & Climate Change profile (Energy Savings' Potential)

Within the frame of the successive thermal regulations implemented in France, the country was divided into three climatic zones, to take into account the significant differences encountered in the country regarding temperatures, rainfalls, humidity, sunlight that impacts the needs for heating, cooling and lighting.

Figure 6.7: Climatic zones in France

Source: EUROSTAT

- H1: Coldest zone, located on the North-East
- H2: Temperate zone, benefiting from a climate regulation from the Atlantic Ocean and the close Mediterranean Sea

- H3: Warmest zone, on the Mediterranean Sea and including Corsica.

The country also knows a varied topography, from its lowest point, behind the sea level (Rhone delta) to its highest, the Mont Blanc, at 4.808 m.

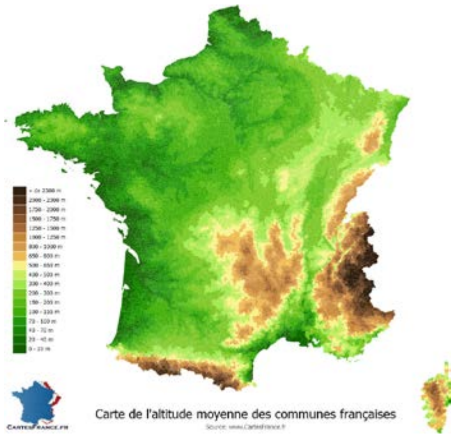


Figure 6.8: Topography in France

Source: Carte de France

As a consequence of this diversity, energy efficiency policies in buildings have to be adapted both to the geographical location and to the altitude.

Finally, the French territories go from the subarctic and Antarctic zones up to the rain and equatorial forests over both hemispheres. Gathered under the name overseas, these territories group regions with very different climates and activities.

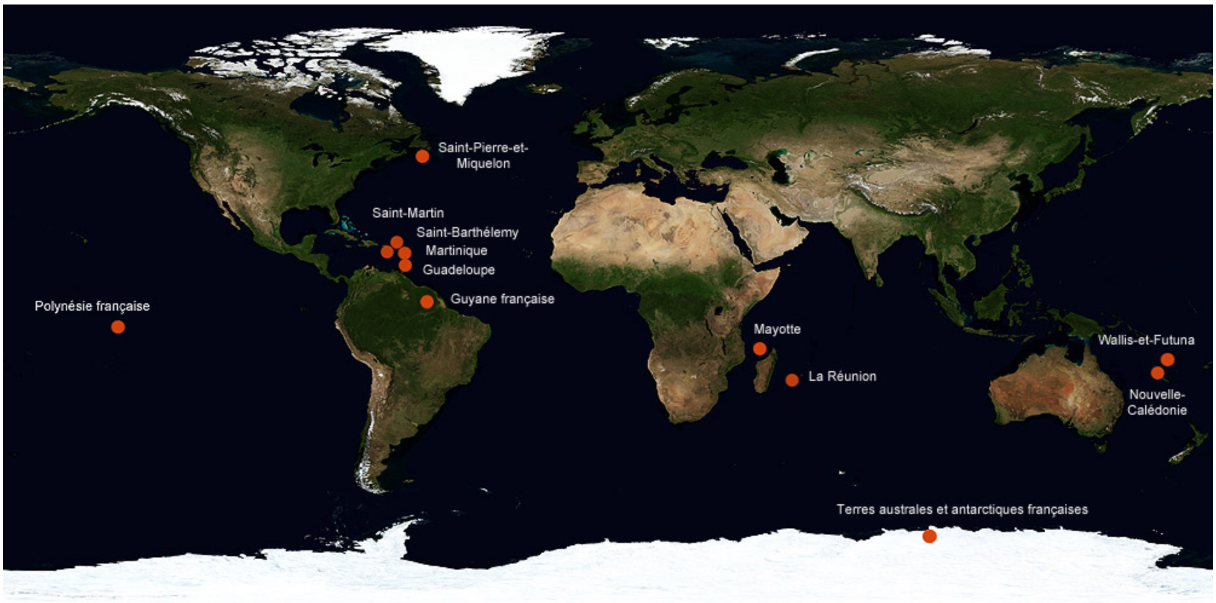


Figure 6.9: French overseas territories

Source: Muséum national d'Histoire naturelle

The energy policies designed for Continental France cannot apply for most overseas territories. Specific regulations are designed to take into account their characteristics.

6.2.1 Description of Status quo

Primary energy consumption (Mtoe)

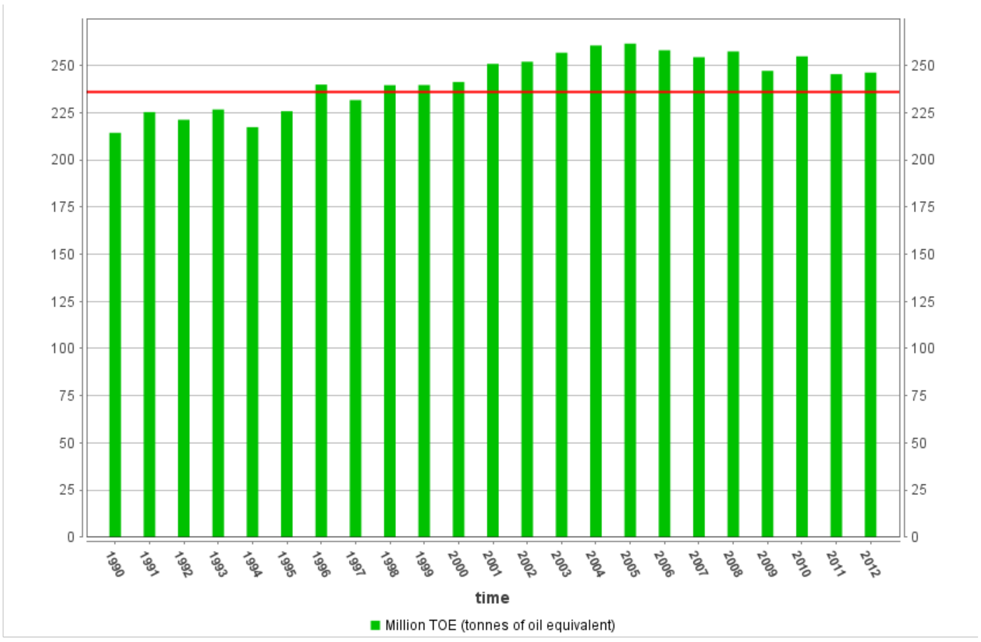


Figure 6.10: Evolution of primary energy consumption in France between 1990 and 2012 (Mtoe)

Source: EUROSTAT

France's primary energy consumption reached a peak in 2005 and has been slowly decreasing ever since. In 2012, its energy consumption amounted to 246.4 Mtoe, 4.2% above its 2020 target.

Energy intensity of the economy

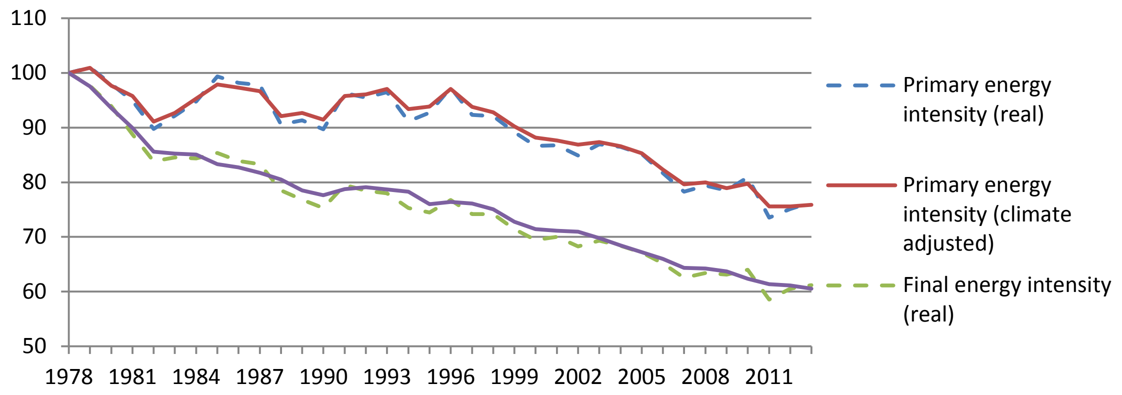


Figure 6.11: Evolution of the energy intensity of the economy (base 100 = 1978)

Source: ADEME based on data from INSEE and SOeS

Over the past 5 years, final energy intensity decreased by 1.2%/year (climate adjusted), when the POPE Law introduced in 2005 an objective of 2% per year.

Final energy consumption per sectors

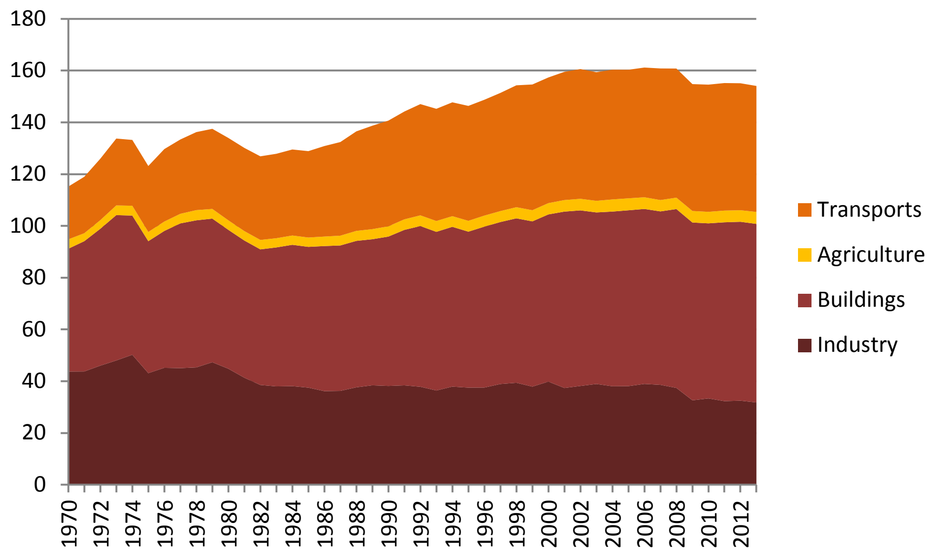


Figure 6.12: Evolution of France's final energy consumption per sector (Mtoe, climate adjusted)

Source: MEDDE, SOeS

France's final energy consumption (climate adjusted) increased until 2003, and then stabilized around 160 Mtoe until the drop in consumption caused by the financial crisis in 2009. It is now slightly decreasing below 155 Mtoe.

Buildings represent the 1st consuming sector with 44.5% of France's final energy consumption, roughly distributed between residential buildings for 2/3 of buildings final consumption and tertiary building for the remaining third.

Transports come next with 32% of France's final energy consumption, followed by industry (20%).

Over the past 40 years, the energy consumption of the industrial sector has steadily decreased while the buildings and transports consumption increased until the beginning of the year 2000.

Final consumption of residential dwellings per energy

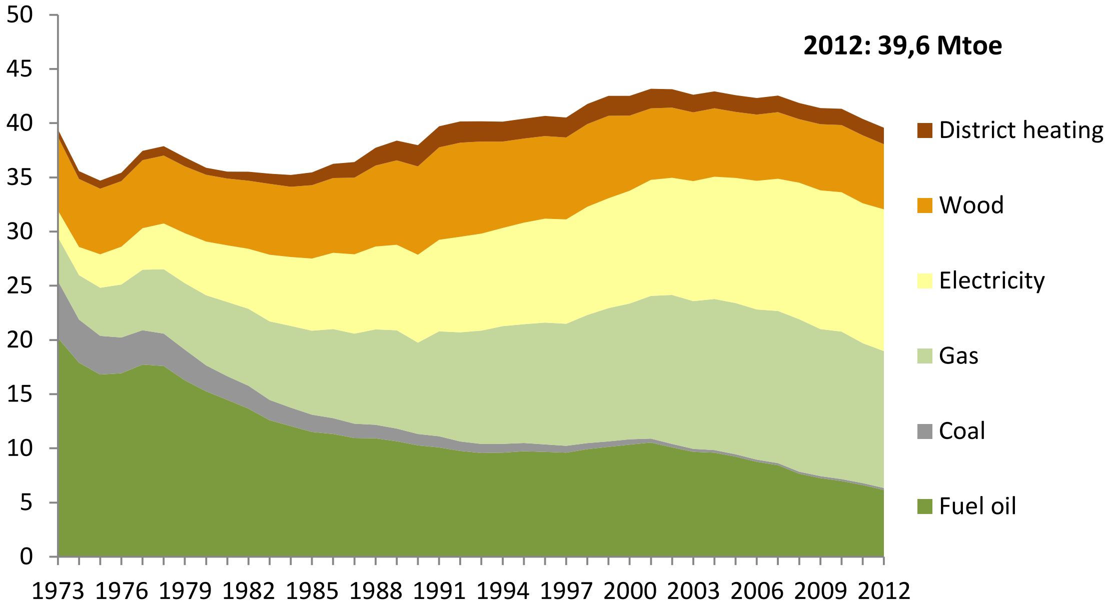


Figure 6.13: Evolution of final energy consumption of residential dwellings per energy (Mtoe, climate adjusted)

Source: CEREN - December2013

The residential dwelling consumption leveled out in 2001-2002 around 42 Mtoe and has been slowly decreasing ever since. In 2012, the housing stock in continental France counts 33 million dwellings.

The main energies consumed in residential dwellings are gas and electricity for one third of the consumption each, followed by oil fuel and wood for 15% each.

Coal has almost disappeared from residential building energy consumption while fuel oil consumption is quickly decreasing.

Energy efficiency gains (%)

In households:

According to the ODYSSEE project calculations, French households' energy efficiency improved by 21.6% between 2000 and 2012, a little over the EU average improvement of 18.7%.

In industry:

The French industry improved by 7.3% in energy efficiency between 2000 and 2012, much below the EU average improvement of 14.2%.

Sources: http://www.indicators.odyssee-mure.eu/online-indicators.html

6.2.2 Evaluation of energy savings' capacity - Identification of challenges

The building sector is the biggest sector in terms of energy consumption (44% of national energy consumption). It is then at the center of French energy saving policies and is strongly targeted by the existing ESC scheme.

At the same time, the transport sector represents a significant part of the energy consumption (32%), mainly fuel that France has to import, and is also the first sector in terms of GHG emissions (36% of national emissions). It is then a key sector for tackling climate change while improving energy independence.

Finally, the industry sector represents 20% of the national energy consumption and GHG emissions, the balance being made by the agriculture sector.

These four sectors are targeted by the current ESC scheme, which is one of the key policies for France to meet its national and European energy efficiency goals.

In order to reach its 2020 target, France needs to accelerate the pace of the energy savings achieved annually. This should be done partly by increasing the ambition and the efficiency of the ESC scheme.

6.3 Market preparedness

6.3.1 Description of Status quo

SME Access to Finance:

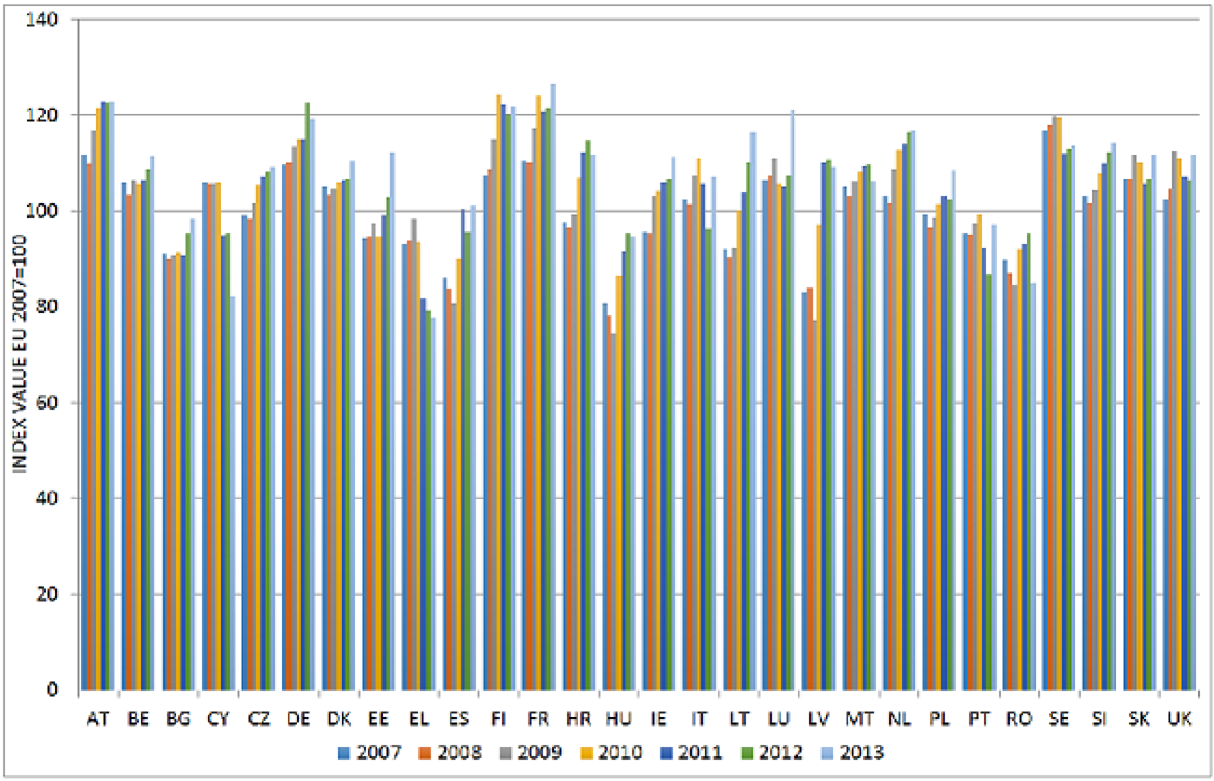


Figure 6.14: SME access to finance in France and the EU (base 100=2007 EU)

Source: http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/sme-access-to-finance-index/index_en.htm

In 2013, France is the highest performing country in the EU in terms of access to finance for SMEs. Except for 2010, its index has been constantly improving over the past years.

ESCO's market development

The JRC "Energy Service Companies Market in Europe - Status Report 2010" indicated that France's ESCO market relied on 10 big ESCOs (plus 100 smaller ones) for a market comprised between 4 and 5 billion euros.

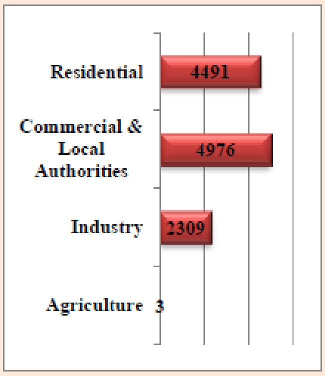
In 2013, ADEME led a new study on the ESCO market development, providing the following data: a market over 7 billion euros in 2013 (excluding energy supply), pulled by the service and residential sectors (40% each), and mainly focused on services linked to maintenance and operation activities (see Figure below).

The Energy Service market (2013)

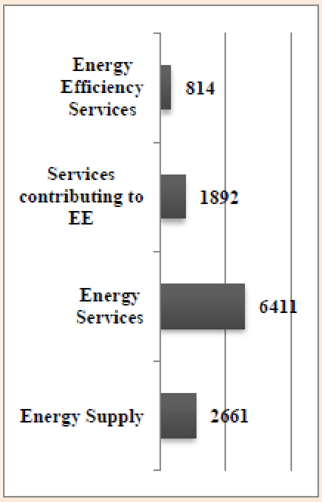
Per market and stage of the industry (M€)

Services	Energy category	2013 Value (M€)
Real estate analysis		**362**
Energy performance diagnostics	SCEE	130
Energy consulting	SCEE	40
Pre-diagnostics and audits	SCEE	183
of which industry		*40*
of which commercial		*80*
ofwhich residential		*60*
of which agriculture		*3*
Certification assistance (HQE, BREEAM...)	SCEE	9
Engineering studies	SCEE	**1 530**
Thermal audits and energy efficiency oriented engineering		1 450
Technical controls		74
Commissionning		6
Exploitation		**9 887**
Operation of heating plants: collective, commercial, industrial		**3 990**
Energy procurement (p1)	EP	979
Energy services	ES	2 582
Of which means contracts		*1551*
Of which results-based contracts without profit sharing		*1031*
Energy efficiency services	EES	429
Heat network operation		**1 875**
Cost of primary energy (Natural Gas, Biomass...)	EP	1 000
Network and heating equipment operation costs	ES	875
Operation of industrial CHP		917
Cost of fuel supply	EP	682
Added value on fuel supply	ES	235
Energy performance contracts	EES	133
Individual heating maintenance	ES	1 088
Maintenance and operation of BMS	EES	50
Operation of public lighting systems (excluding PPP - EPC)		461
Maintenance services (excluding PPP - EPC)	ES	405
PPP - EPC Public Lighting	EES	56
Maintenance of electrical installations with an energy impact	ES	1 200
Operation assistance	ES	25
EMS implementation assistance	ES	2
Metering, site supervision, coaching		
Residential metering	EES	105
Commercial and industrial metering	EES	39
Coaching	EES	2
TOTAL		**11 779**

Per user segment (M€)



Per service category (M€)



SCEE: Services Contributing to Energy Efficiency
EES: Energy Efficiency Services
ES: Energy Services EP: Energy Procurement

Source: CODA Stratégies, according to official statistics and interviews

Figure 6.15: The Energy Service market in France in 2013

Source: ADEME, Overview and analysis of the French energy service market, June 2014

The French energy service market shows a genuine dynamic, supported by public authorities' incentives, the increased awareness of contracting authorities and the emergence of new and innovative offers. However, although the context is generally favorable, certain barriers remain, mainly around the perceived low-profitability of these services, the need to improve the quality of the service provision and the lack of juridical and technical skills among contracting authorities.

Accompanying the evolution of the demand implies simplifying certain contracts and making their contents in terms of expected energy efficiency improvements immediately intelligible to the consumer. Experience sharing, especially between contracting authorities, as well as the promotion of best practices could also facilitate the development of EES. Improving the negotiating positions of consumers, especially in a context of strong asymmetries of information and competencies with regards to service providers, should also be a priority. This could be done through training mechanism for contracting authorities or through the development of trusted third parties. Finally, public authorities should also give a thought to the conditions needed for the development of EES in sectors not well covered so far (housing equipped with individual heating, small commercial buildings, etc.).

Improving the service provision environment should also be an objective. In several sectors, public authorities have already taken actions aimed at improving the quality of the service provision ("new EPD"). This precedent must help optimizing the conditions of development of certain markets connected to regulatory evolutions (mandatory audits…). At the same time, the level of competition on the market must be particularly looked into, in the current context in which historical energy suppliers are occupying dominant positions on the markets of both heating equipment operation and related energy services, through the control of market leaders.

A dialogue involving the market professionals could be opened, with the stated objective of envisioning the conditions of an evolution of their contract portfolios towards better performing arrangements, which would include binding energy consumption reduction targets.

Finally, recognizing the possible plurality of the service provision is without a doubt an important factor in allowing SMEs to access the market. Other contractual agreements, apart from EPCs, are indeed possible (for example direct management of the performance by contractors assisted by an engineering consulting company).

Adjusting the regulatory mechanisms will guarantee the compliance with existing provisions, stimulate quality improvement, but also push the market players towards the most virtuous forms of service provision (for example, in making compulsory for all service providers to systematically offer consumption reduction guarantees when extending existing contracts).

Market share of the largest generator and suppliers in the energy markets

Electricity:

France is one of the few Member States where the largest generator in the electricity market still holds over 80% of the electricity generation market. However, this share is slowly decreasing, from 90% in 2004 to 86% in 2012.

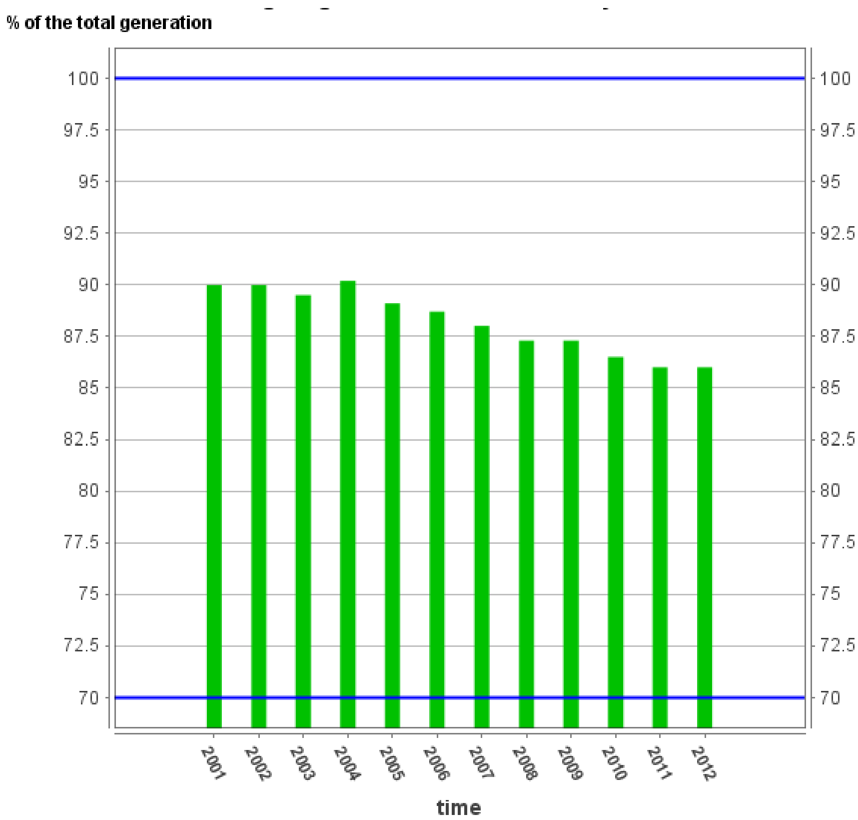


Figure 6.16: Market share of the largest generator in the electricity market in France (2012, % of the total generation)

Source: http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=ten00119&plugin=1

In the meantime, 7 years after the liberalization of the energy market, historical suppliers still supply over 90% of households in electricity and over 83% of households in gas.

In order to help households make an inform choice regarding their energy suppliers and contracts, the government launched a website providing information on the offers available according to one household place of living. More information here (in French): http://www.energie-info.fr/Fiches-pratiques/Je-change-de-fournisseur/Comment-comparer-les-offres

According to the 2007 legislation, households switching from the regulated tariff to another tariff could not go back to the regulated one. This probably prevented some households to switch and the rule was changed to allow a complete reversibility.

Technology and technical capacity on the supply side:

Recent work on the subject within the Concerted Action EED project showed that both the

French Ministry for the Environment and ADEME estimates that the technical competence, objectivity and reliability of the following categories of energy professionals are sufficient: providers of energy performance contracting, energy auditors, energy managers, energy advisers/counsellors, installers of energy related building elements, maintenance and support, and providers of energy statistics support.

The RGE scheme is a quality label introduced recently and that addresses several types of professionals:

- RGE "Works" addresses all professionals working in the fields of building refurbishment and the installation of renewable energy sources.
- RGE "Study" addresses all professionals involved in studies, consulting …related to EE.

It is based on a few days (3 to 5) training, depending on the type of complementary training modules required, concluded by either a theory or a practical evaluation (practical for training related to renewables for instance), and on a control of some achieved works following the training.

This scheme was first created as a voluntary initiative.

However, the "RGE Works" certification is now mandatory to benefit from the soft loans (from 01/09/14) and the tax credits (from 01/01/15) granted by the State. It will also become compulsory for obtaining Energy Saving Certificates in July 2015.

Since January 2015, "RGE Study" certification is also mandatory to benefit from ADEME's subsidies for decision-making studies (preliminary study, feasibility study, audits).

Some other schemes (mandatory) are also available for the following activities:

- Periodical control and inspection of cooling systems (Decree n° 2010-349)
- Mandatory annual maintenance of boilers by a qualified professional (Decree n° 2009-649)
- Mandatory air permeability test within all new buildings under Thermal Regulation 2012.
- Certified auditors realizing Energy Performance Certificates ("DPE" in French)
- Auditors for energy audits (article 8 of the EED): this scheme's criteria are aligned with the RGE "Study" scheme criteria.
- Geothermal drilling.

Technology and technical capacity on the demand side:

Households:

To make consumers aware of the availability of the RGE label, awareness raising campaigns have been launched by ADEME.

An information website managed by ADEME also helps consumers to choose the right professional for their refurbishment works: http://ecocitoyens.ademe.fr/mon-habitation/opter-pour-la-qualite/choisir-des-professionnels-rge-pour-les-travaux.

(Also available on the website dedicated to the refurbishment plan for housing (PREH): http://www.renovation-info-service.gouv.fr/trouvez-un-professionnel).

Finally, ADEME has published a national list of RGE professionals that is available on this second website.

Enterprises and local authorities:

Regarding energy services, contracting authorities and investors remain confronted with the complexity of certain markets or contracts. For instance, the development of the EPC market is negatively impacted by the difficulty that public authorities encounter in dealing with the juridical terms of such contracts, as well as by the general asymmetry of information and technical competencies existing between contractors and services providers, making the contracted performance agreements difficult to control.

6.3.2 Evaluation of market preparedness – Identification of challenges

Access to finance remains an important barrier in France for the uptake of energy efficiency measures even if more and more measures are taken to remove this barrier in all sectors: green loans for SMEs, guarantee fund for households' projects.

The French energy service market shows a genuine dynamic, supported by public authorities' incentives, the increased awareness of contracting authorities and the emergence of new and innovative offers. The Energy Saving Certificates mechanism has had an important impact in structuring and multiplying the energy service offers as well as in improving the profitability of such services for consumers by introducing a monetary value to energy efficiency in addition to the sole energy savings.

However, although the context is generally favorable, certain barriers remain, mainly around the perceived low-profitability of these energy services, the need to improve the quality of the service provision and the lack of legal and technical skills among contracting authorities.

Finally, the energy market remains very concentrated since only a small part of energy consumers have so far chosen to leave historical suppliers of electricity and gas.

6.4 Administrative preparedness

6.4.1 Description of Status quo

Government effectiveness:

Perceptions of the quality of public services, the degree of its independence from political pressures, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies have been quite stable over the last 20 years, around 90%.

Regulatory quality:

Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations have also been quite stable for the past 10 years, around 85%.

Sources: http://info.worldbank.org/governance/wgi/index.aspx#home

Experience (measures) against free-riders

So far, no methodology have been implemented or prepared for accounting for free drivers, except for the fact that the ESC scheme only values actions that goes beyond business as usual.

6.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

The ESC scheme is implemented and overseen by the Directorate General for Energy and Climate (DGEC) within the French Ministry of Ecology, Sustainable Development, and Energy. To oversee scheme operations, the DGEC created a National Pole on October 1, 2011 which leaves the DGEC to manage the high level policy aspects of the scheme. In its role managing the scheme, the PNCEE also elicits assistance from ADEME (on technical issues e.g. saving calculations and the validation of specific operation declarations) as well as a group known as the Energy & Environment Technical Association (ATEE) (for general issues e.g. for the proposal of new standard measures and development of the technical sheets). The ATEE is a stakeholder group that includes energy suppliers, energy service companies, equipment manufacturers, engineering and technical consulting firms, local authorities and district heating networks.

The National Pole is maintained by 14 members of staff, while at ADEME, 3 full time equivalent employees ensure the leadership and expertize required by the ESC scheme.

This set-up has been running fruitfully since the beginning of the scheme in 2006, though the initial rules of the scheme, with a large number of obligated and eligible parties and complex administrative procedures to apply for ESCs generated long delays in the instruction of application for ESCs. The experience and feedback from the first two periods of the scheme allowed the French government to simplify it drastically in order to improve its management, reduce delays of instruction and optimize control and sanctions.

Within the frame of the French EEO 3rd period, a national steering committee gathering representatives of the scheme main stakeholders was also introduced in 2014. The committee is to meet at least twice a year and discuss the scheme modalities, governance and results.

6.5 Legislative preparedness

6.5.1 Description of Status quo

The French EEO scheme is based on a Combination of legislation and Ministerial decrees and orders:

- The scheme existence and continuation is written in the following documents:
    - Law POPE of 13 July 2005 for the launching of the ESC scheme 1st period,
    - Law ENE of July 2010 for the implementation of a 2nd period of the ESC scheme,
    - Decree no 2014-1668 of 29th December 2014 for the 3rd period obligation target.
- Ministerial decrees specify the operational aspects of the scheme such as the modalities of attribution of ESCs, the controls and sanctions, etc.
- Ministerial orders provide technical information such as the characteristics of standard actions eligible to ESCs.

In order to prepare for the launching of the ESC scheme 3rd period, the Ministry relied both on a series of evaluations (from ADEME on the scheme potential, from the Cour des Comptes and the General Inspectorate of Finance on the scheme impacts…) and on a 6 month dialogue with the scheme stakeholders.

In order for the scheme to comply with the EED and eco-design requirements, a certain number of adjustments had to be done, including the entire revision of the standard action catalog, which at the end of 2014 included 304 measures.

This revision was led by ATEE, within 12 working groups meeting every two weeks for the past 15 months. 150 experts were involved in this revision, from the Ministry, ADEME, obligated and eligible parties, industrials…

112 measures were revised by the end of 2014 representing 90% of the ECS attributed so far. The rest of the catalog will be revised by the end of the year, all non-revised measures being no longer eligible from January 1st 2015.

All regulatory texts were published by the end of 2014 in order for the new scheme to start on January 1st 2015. They are available here (in French): http://www.developpement-durable.gouv.fr/Modalites-de-la-troisieme-periode.html

6.5.2 Evaluation legislative preparedness – Identification of challenges

The French ESC history shows that redesigning an EEO scheme from one period to another can be extremely time-consuming, regarding the need for careful evaluation of both past achievements and future potentials, and sometimes requires transition period to allow for decision to be taken and legislation to be finalized.

For complying with its obligation regarding article 7 of the Energy Efficiency Directive, France might have to deal with the challenge of such redesign even faster than previously when approaching the beginning of the 4th period (2016-2018).

6.6 Social & Political acceptance/feasibility

6.6.1 Description of Status quo

Consumers' trust in their energy supplier

In 2013, the energy mediator received 15,041 claims, among which 24% were admissible (Source: *Rapport d'activité 2013, médiateur national de l'énergie)*. These claims mainly deal with energy bills that do not correspond to the actual consumption, to catching-up bill that consumers cannot pay (if meters have not been read for a long time and the difference between assessed consumption and actual consumption is very important) or to the quality of electricity supply.

This may seem a relatively small number of complaints compared to the 27 million households connected to the electricity and gas network.

However, a study published in August 2013 by Accenture concludes that consumers 'trust in their energy supplier is going down all around the world, and especially in France, where trust went from 39% to 22% of customers between 2012 and 2013 and satisfaction dropped from 59 to 47%.

This drop in trust can be explained by several factors such as the increasing number of taxes on the energy bill and the resulting lack of transparency (several taxes, with various uses and perimeters).

Dissatisfaction is mainly due to the quality of electricity supply and the regular increase in energy prices.

Level of Fuel poverty within country

Depending on the definition used for characterizing "fuel poverty", the number of households considered may vary a lot.

Since April 2012, the National Observatory of Fuel Poverty works on defining, better understanding and proposing solutions to tackle fuel poverty.

The observatory looked at 3 indicators regarding fuel poverty:

- Households spending over 10% of their income for energy.
- Households restricting their energy consumption for financial reasons.
- Households feeling cold during the winter.

According to these indicators, up to 14.8% of the population would be in a situation of fuel poverty, representing 9 million people. When only considering the first three income deciles, between 4 and 5 million people would be fuel poor (10-11% of the population).

Coverage/ Horizontal efficiency:

All fuel poor households are potential beneficiaries of the ESC scheme. Since these households can't afford the co-financing required to implement energy efficiency measures, a dedicated program was introduced during the scheme's 2nd period for obligated parties to bring funds into rehabilitation programs for fuel poor housing. This program will be extended for the 3rd period. The government also thinks about introducing a minimum amount of the scheme obligation to be realized to the benefit of fuel poor households.

Finally, since the 2nd period, social landlords are eligible parties of the scheme, providing them with a new funding source for their energy efficiency investments in social dwellings.

Leakage/ vertical efficiency

So far, most of the ESC support goes to not fuel poor households, since the scheme relies on an important personal financing of the actions (only 2% of ESCs delivered so far were used for programs, knowing that fighting fuel poverty is only one program among several others).

Social landlords are eligible parties of the scheme and can then receive ESCs for the actions they take on the dwellings they rent to low-income households. So far, a little less than 3% of the ESCs attributed were for social landlords. However, landlords may choose not to claim ESCs for themselves and establish partnerships with obligated parties that will claim and receive ESCs for actions implemented on social dwellings in exchange for financial and/or technical support. We have no knowledge at all on the share of ESCs claimed by obligated parties for such actions.

Social stance:

View of households

Until recently, the majority of the public was quite unaware of the existence of the ESC scheme, since little communication had been directed towards them. The economic and political context has made the scheme more and more visible in the press, first through consumer associations and then more broadly.

So far, the public does not really express a view against the ESC scheme, probably because people do not feel they support its cost since the increase on energy bills resulting from the scheme is drowned among other sources of increase (taxes, prices fluctuation of fossil fuels…).

On the other hand, people that did benefit from the scheme expressed their satisfaction during a qualitative study led by ADEME[32] in 2013: 95% of surveyed people estimated they did reduce their energy consumption. 75% of them reckoned the ESC prime was an incentive for starting works earlier, choosing more efficient actions or have the work done by professionals.

View of the industry[33]

The industrial sector is one of the main beneficiaries of the ESC scheme. Through the ESC scheme, enterprises that implement energy efficiency measures can receive advising and financial support from obligated parties.

At the same time, some enterprises such as thermal and electrical equipment manufacturers are directly impacted by the ESC scheme, since it supports efficient technologies and hastens the end of those that are not efficient enough anymore.

The construction sector is also very much affected by the scheme which encourage recourse to professionals (and soon to qualified professionals), provide trainings to energy refurbishment for professionals (through the FEEBAT program)…

All these industrial sectors are very active regarding the ESC scheme development, depending on their interests.

So far, industrials such as utilities have had a significant role in the redesign and development of the ESC scheme, for instance by actively participating to the production and evolution of standard action factsheets under which most ESCs are delivered.

6.6.2 Evaluation of social acceptance/feasibility – Identification of challenges

According to a report released by Cour des Comptes (the French Chamber of Commerce) using data from the CRE (the French Energy Regulatory Commission), the direct cost of current EEO scheme to obligated parties under the 2nd period is €300 million per year. Using the costs reported by EDF, which are higher than those typically reported by other ESC generators, the impact on their regulated electricity price according to CRE remains slight

[32] ADEME, Evaluation qualitative du dispositif CEE, 2ème période 2011-2013 (2013)

[33] (i.e. energy intensive sectors such as the power sector, construction sector etc)

representing a mere 1% of the price charged to customers. For gas from GDF, this is even smaller, at 0.5% according to the CRE[34].

Transportation fuel wholesalers are free to pass their costs on to prices but their obligation under the 2nd period was minimal, which would suggest that the impact of ESC generation under the 2nd period should also be negligent. Under the 3rd period, where they will be held accountable for a share of the obligation that truly represents their contribution to French energy supplies – this cost could be more significant. According to Jean-Louis Schilansky of UFIP (the French Petroleum Trade Association)[35], ESCs should represent 2.7 cents per liter of diesel purchased at the pump in 2016 (diesel fuel being the main transportation fuel consumed in France) to be compared to a current price of 1.10€/l of diesel (2.5% increase compared to current price). Such an increase remains quite small compared to the oil price fluctuation we have been experimenting over the past years (from 1.19€ to 1.34€/l for 2014).

[34] http://www.lemoniteur.fr/137-energie/article/actualite/22599457-certificats-d-economie-d-energie-utiles-pour-la-renovation-energetique-pas-une-fin-en-soi

[35] http://www.lefigaro.fr/flash-eco/2014/02/05/97002-20140205FILWWW00194-carburantles-prix-vont-fortement-augmenter.php

7 Hungary - ABEA

7.1 Economic profile

7.1.1 Description of Status Quo

Hungary has made the transition from a centrally planned to a market economy, with a per capita income nearly two-thirds that of the EU-28 average. In late 2008, Hungary's impending inability to service its short-term debt - brought on by the global financial crisis - led Budapest to obtain an IMF/EU/World Bank-arranged financial assistance package worth over $25 billion. The global economic downturn, declining exports, and low domestic consumption and fixed asset accumulation, dampened by government austerity measures, resulted in a severe economic contraction in 2009.

In 2010 the new government implemented a number of changes including cutting business and personal income taxes, but imposed "crisis taxes" on financial institutions, energy and telecom companies, and retailers. The IMF/EU bail-out program lapsed at the end of the year and was replaced by Post Program Monitoring and Article IV Consultations on overall economic and fiscal processes. At the end of 2011 the government turned to the IMF and the EU to obtain financial backstop to support its efforts to refinance foreign currency debt and bond obligations in 2012 and beyond, but Budapest's rejection of EU and IMF economic policy recommendations led to a breakdown in talks with the lenders in late 2012.

Global demand for high yield has since helped Hungary to obtain funds on international markets. Hungary's progress reducing its deficit to under 3% of GDP led the European Commission in 2013 to permit Hungary for the first time since joining the EU in 2004 to exit the Excessive Deficit Procedure.

Since the beginning of the last financial crisis in October 2008, Hungary has struggled to complete the transition from a centrally planned to a market economy with a per capita income of about two third of EU-28 average. Although the $25 billion financial assistance package obtained by IMF, EU, and WB, the combination of economic downturn, export and internal consumption contraction, worsened by inappropriate governmental measures, led to a further economic deterioration in 2009.

In the aftermath of the Ukrainian-Russian gas crises, Hungary has developed strategic oil and gas reserves under government control for the equivalent of some 111 days of net imports.

For this reason, regional cooperation is a vital element of Hungary's energy market and energy security policy. Geographically located in a historically strategic position, Hungary is well placed to improve regional energy security, playing a crucial role in the development of closely integrated regional markets for electricity and natural gas.

Hungary, as well as several other countries, launched, during the past few years, a large-scale economic incentive package, also known as *Szechenyi Plan* (2011). This multi-year programme, financed with some EUR 2.5 billion budget is aiming to improve country's economic competitiveness in the following strategic sectors: green economy and home building programme (which also includes funding for energy efficiency), SMEs' energy efficiency improvement in order to boost market competitiveness.

Despite the 2010 governmental attempts to reduce the impact of the financial slide through the implementation of fiscal measures in order to sustain the domestic economy, Hungary had to turn again to international institutions in 2011 in order to support its financial system. But its persistence in ignoring recommendations led to a failure of the talking in 2012.

In 2013, due to the persistent economic stagnation, the Commission allowed Hungary to exit the EDP (Excessive Debt Procedure).

Hungarian energy profile has always been complex and dominated by external factors affecting both domestic policies (in order to ensure a safe supply) and market prices. In 1991 Hungarian government liberalized Hungarian Oil market with no stockpiling law implemented and with the obligation on Crude and oil products importers to hold stocks.

The Hungarian Hydrocarbon Stockpiling Association (MSZKSZ or HUSA), was established as a non-profit organization with a registered capital of 0 HUF in 1993 by Act No. XLIX of 1993 ("Oil Stockpiling Act") in order to ensure sufficient strategic oil stocks in Hungary in case of supply disruption. In February 2006 the Hungarian Parliament, approving Act. XXVI of 2006, appointed HUSA to establish and operate also as strategic natural gas reserve through underground gas storage facilities.

In 2012 HUSA is appointed with marking and monitoring powers and is operating under the supervision of the Minister of National Development which may cancel unlawful actions of the association and take control of it. The application of Directive 2009/119/EC (imposing obligation on MS to maintain minimum stocks of crude oil/petroleum product) led to a revision of HUSA structure, duties and responsibilities.

The analysis conducted in this report demonstrates that Hungarian institutions must adopt regulatory improvements as well as enforcement actions to enable the implementation of an EEO scheme.

Hungary has a limited domestic oil and gas production and relies mostly on imports from the Russian federation which, starting from natural gas embargo against Ukraine in 2009 to the most recent and tragic political development (also involving trade and commercial prohibitions on Russia) has being jeopardizing (but not yet affecting) energy supply security and market prices. As the increase in competitiveness, security of supply and sustainability in the energy sector, are considered the main goals of the EE policies adopted by European Union institutions, due to its economic, legal and internal profile, Hungary is facing important challenges in the achievement of the EEOs. Reduction of energy bills, external energy dependence, CO2 emissions and environmental degradation, as well as R&D, energy trade balance and energy market openness and an improved energy savings enhancement are the main targets in the Hungarian environmental agenda.

Annual GDP Growth

Hungary's GDP composition by sector accounts the service industry as major contributor, followed by industry and agriculture.

The GDP maintained a constant growth until 2004, year in which Hungary joined the EU. Since 2004 Hungarian GDP begins to slide until 2006 when it suddenly dropped during the following year. After this decrease, Hungary's GDP slightly recovered between 2007 and 2008 when it dramatically dropped again, this time to negative growth. As a consequence of the crisis, Hungary experienced a severe economic contraction: its GDP decreased more than 7% in 2009. During the same year it rose back stabilizing at 1.3% growth in 2010 and 2011, after dropping again in 2012, followed by an upward trend during the same year, without attaining pre-crisis levels yet.

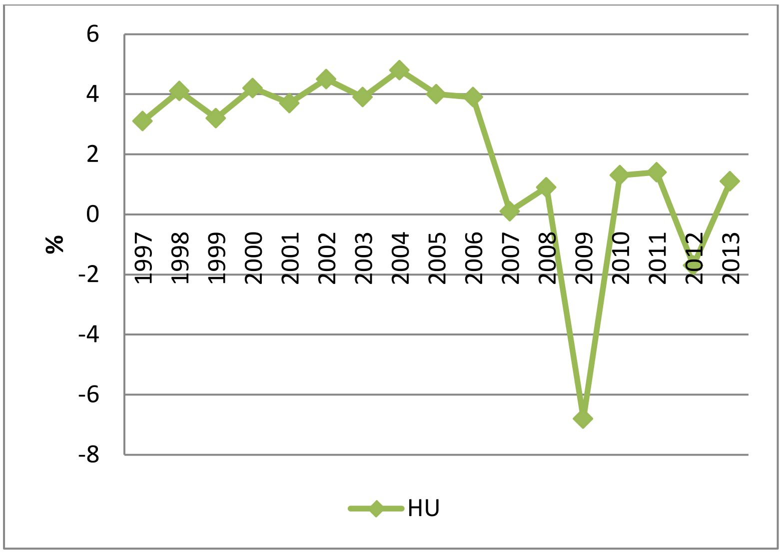


Figure 7.1: GDP growth (%) in Hungary between 1997 and 2013

Source: The World Bank

GDP per capita

Per capita GDP dropped due to the 2008 financial crisis, keeping a fluctuating trend until 2013 without completely recovering to the pre-crisis levels. It increased suddenly during the period 2001-2005 reaching the peak of about 16.000 USD. It subsequently dropped in 2008 and it stabilized in an average of about 13000 USD.

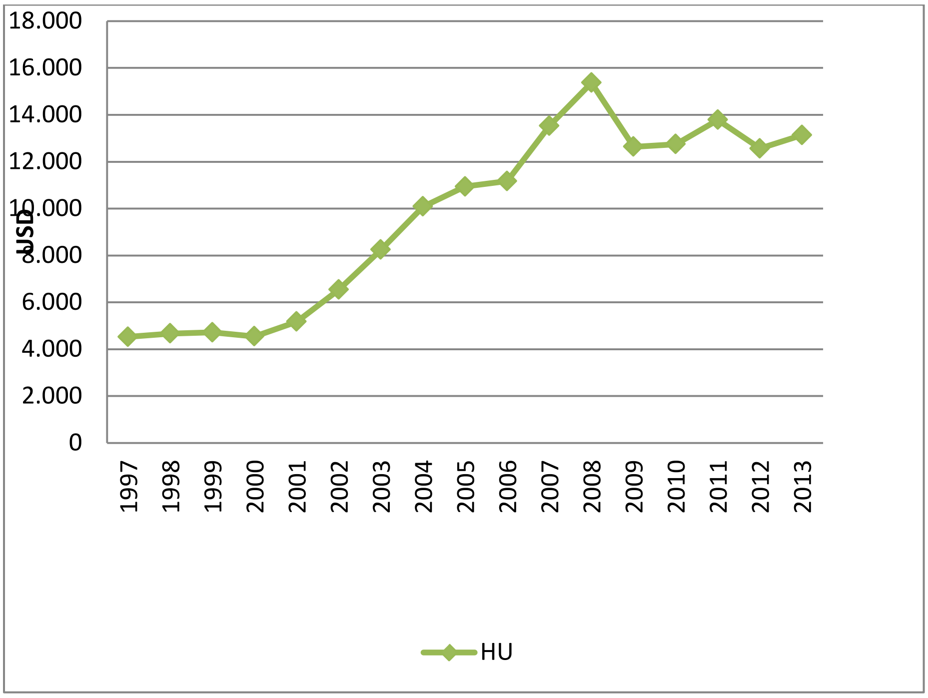


Figure 7.2: GDP per capita (USD) in Hungary between 1997 and 2013

Source: The World Bank

Central government debt

After more than 10 years of stability, Hungary's Central Government debt slightly increased since 2009 not exceeding the 90% of the GDP.

Hungary's central government debt kept stable until 2007, year when it started to increase. The central government debt increased from 82.4% (of the GDP) in 2011 to 86.2% in 2012 due to the instability of the expansive fiscal policy, turning into a fiscal balance improvement policy on the one hand, and on the other due to households' incentives package. The central government debt as % of GDP is above the European Union average between years 2009 and 2012.

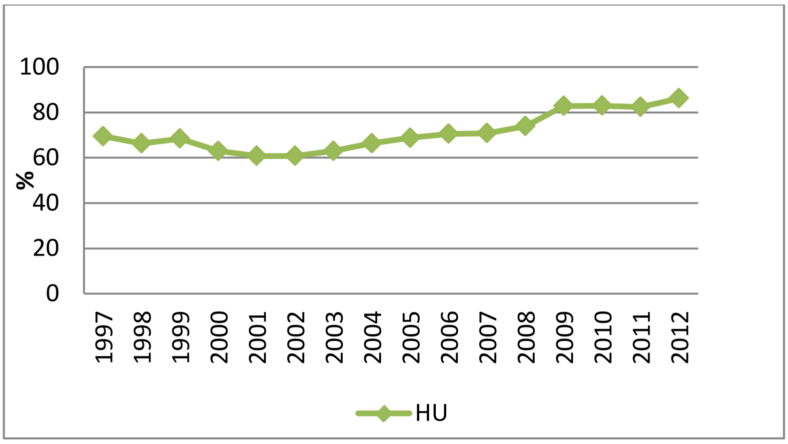


Figure 7.3: Central government debt in Hungary (% of GDP)

Source: The World Bank

Electricity prices in Hungary 2007-2013

After almost 5 years of fluctuating stability, Hungarian electricity price marked a decreasing trend compared to EU average. The Hungarian electricity price started to decrease below 0.1500€/kWh since the second semester of 2012.

This notable decrease was largely driven by a price reduction approved by the government (and based on the Hungarian PM policy aiming to "transform household energy into a non-profit activity") which has risen several concerns on the side of the foreign owned electricity providers.

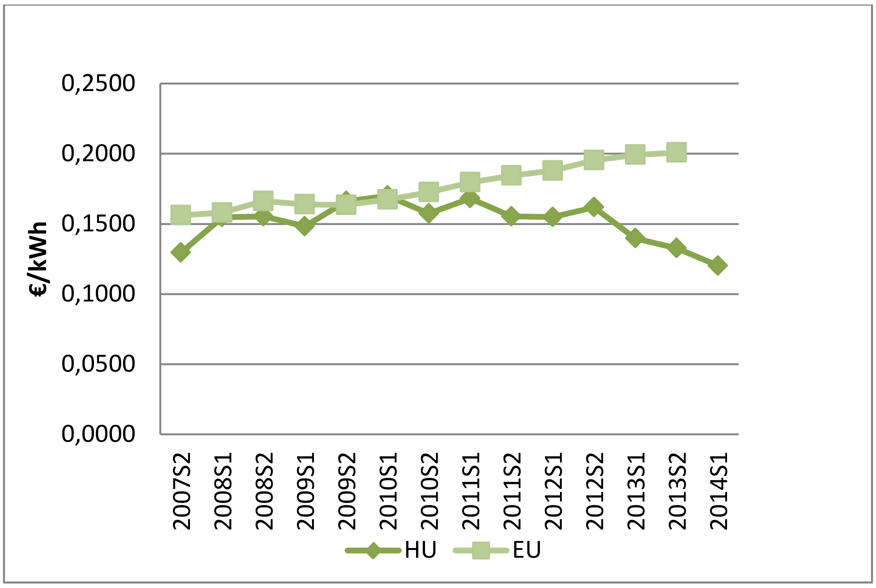


Figure 7.4: Electricity prices in Hungary for domestic use 2007-2013€/kWh

Source: Eurostat

Electricity prices in Hungary 2007-2013 €/kWh – PPP

The ratio of Hungarian household expenditure on energy to their purchasing power (electricity price for domestic use €/kWh-PPP) compared to the EU average recorded opposite trends during the period 2007-2012. While the Hungarian ratio had been considerably above EU average since 2007 until the end of 2011, indicating a considerably high cost of electric energy for Hungarian households compared to their purchasing power; in 2012 this trend started to decrease towards EU average which contrarily, started to increase since the end of 2009.

In this framework, as electricity price reduction is not coming from an actual improvement of the supply system or from direct investments in the sector, EEO scheme's implementation may be affected in terms of market and legislative preparedness.

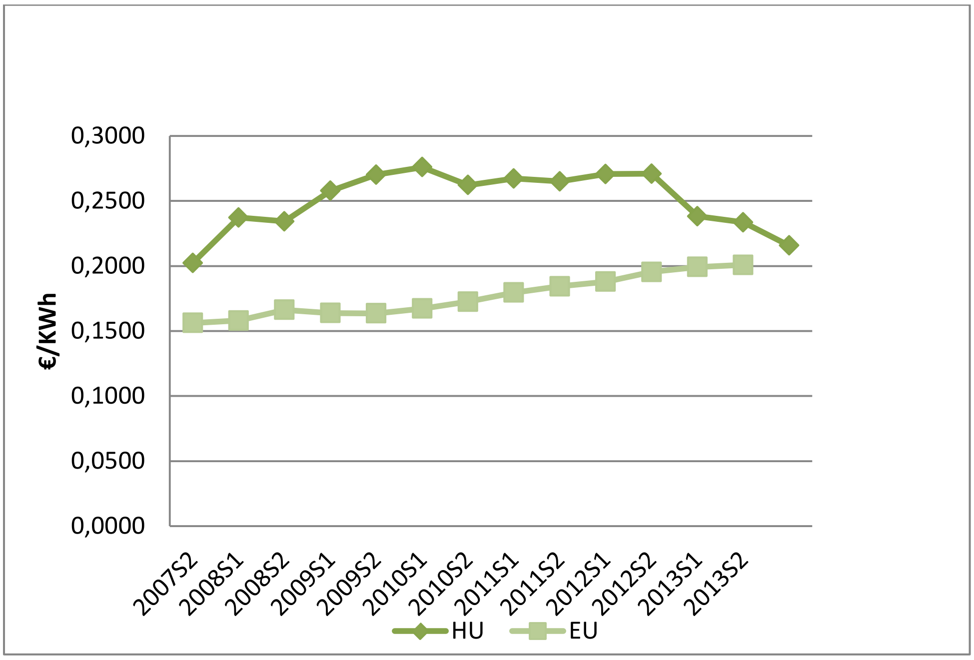


Figure 7.5: Electricity prices in Hungary 2007-2013 €/kWh – PPP

Source: Eurostat

Natural gas prices in Hungary, domestic use, 2007-2013, €/MWh

While Hungarian gas (for domestic use, €/MWh) price increased slightly until 2010 simultaneously with the EU average, after stabilized in the end of 2010 , the two prices trends respectively collapsed and rose since 2011. Natural gas price also benefitted of the governmental incentives aiming to reduce its cost for households during the last trimester of 2012. Natural gas demand in Hungary has been declining since 2005 and consistently dropped again in 2010 but it remains the fossil fuel with the largest share of Hungary's total primary energy supply.

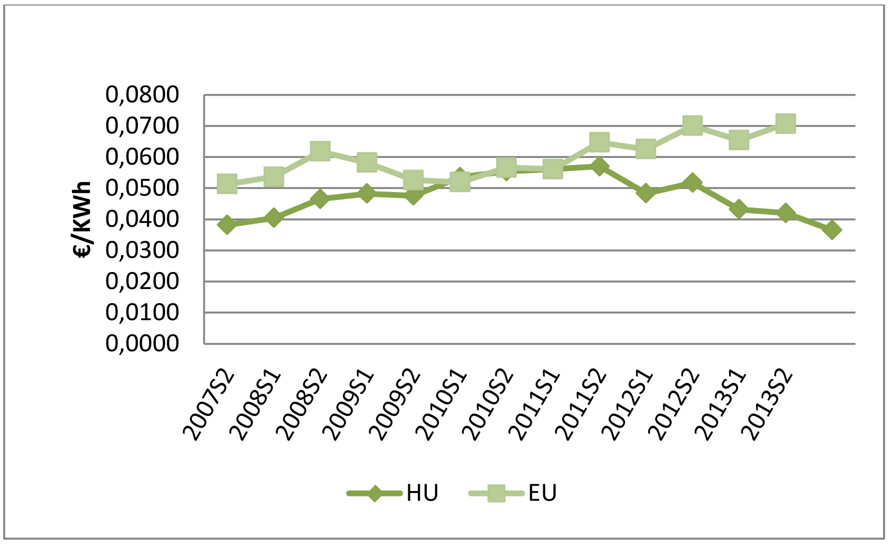


Figure 7.6: Natural gas prices in Hungary for domestic use, 2007-2013, €/MWh

Source: Eurostat

Natural gas prices in Hungary 2007-2013 thought PPP

The ratio of the Hungarian Natural gas price (for domestic use €/kWh) to people's purchasing power gradually increased until the end of 2011 when it started to decrease reaching a low 2008 level. Contrarily, the EU average trend, after a slight decreasing trend between 2008 and 2009, has risen gradually since 2010 until 2013.

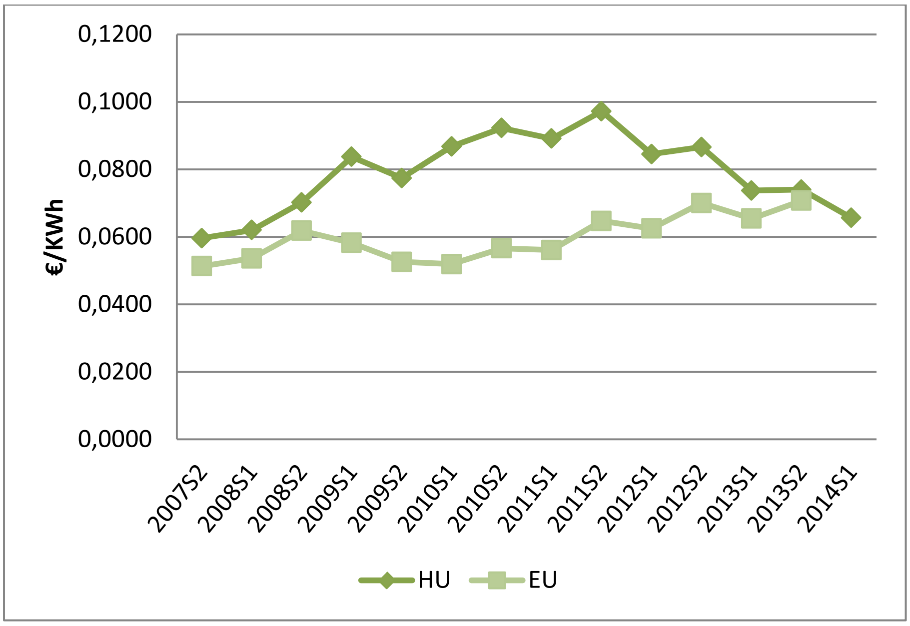


Figure 7.7: Natural gas prices in Hungary 2007-2013, €/KWh-PPP

Source: Eurostat

Vulnerability to energy supply – Energy Dependence on imports of energy resources - %

The energy dependency's chart below shows the extent to which an economy relies upon imports in order to meet its energy needs. The indicator is calculated as net imports divided by the sum of gross inland energy consumption plus bunkers. Since 2001, Hungary's dependence on imports of energy resources has always been slightly above the EU's average. Hungary's dependence slightly had been increasing since 2001. It progressed more steadily until 2008, when it started to decrease matching EU's average in 2012.

According to IEA data, oil represents about one quarter of Hungary's total primary energy supply (TPES) and this is expected to remain at the same level until 2020 with a further decrease in domestic oil production and increase in imports.

The Hungarian Energy and Public Utility Regulatory Authority report (on the activities of the Hungarian Energy Office in 2012 and on the regulated energy and public utility sector released in December 2013), has reported the same market shares of domestic power generation companies. It points out that in terms of installed capacities and production, electric energy net import accounts for 18.8% of the market against an 81.2% of electric energy generated by domestic power plant.

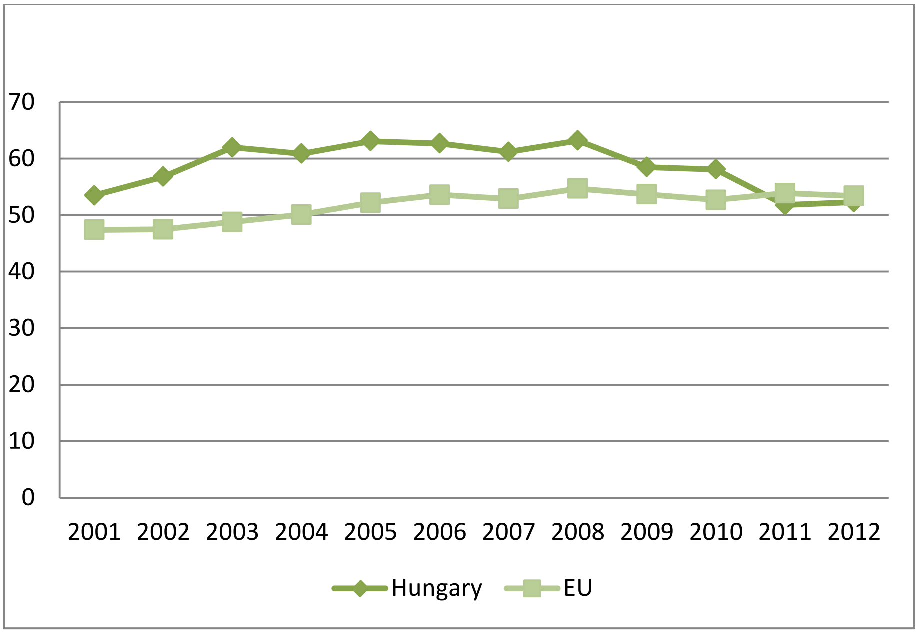


Figure 7.8: Dependence on imports of energy resources - %

Source: Eurostat

7.1.2 Evaluation of economic preparedness - Identification of financial challenges

Hungary's transition from a centrally planned to a market economy has seen the country experiencing a per capita income considerably above the EU-28 average at the time it joined EU in 2004.

As the treat of power failures might increase the percentage of imported energy, in order to solve this problem Hungarian Government is closely collaborating with Swedish, state of the art, electricity distributions organization.

7.2 Energy & Climate Change Profile (Energy Saving Potential)

7.2.1 Description of Status quo

Primary Energy Consumption

Although Hungary's Primary Energy Consumption maintained a regular trend after a slight decrease between 1990 and 1992 and between 2008 and 2009, the chart shows a consumption level considerably below EU average of about 50%. After slightly decreasing between 1997 and 2000, primary energy consumption in Hungary rose between 2000 and 2005 reaching the peak of more than 25 Mtoe. Between 2005 and 2006 it started decreasing dramatically reaching the level of 21.5 Mtoe in 2012.

It could be due to high prices, which led in 2012 to the government decision to cut household energy price by 10%.

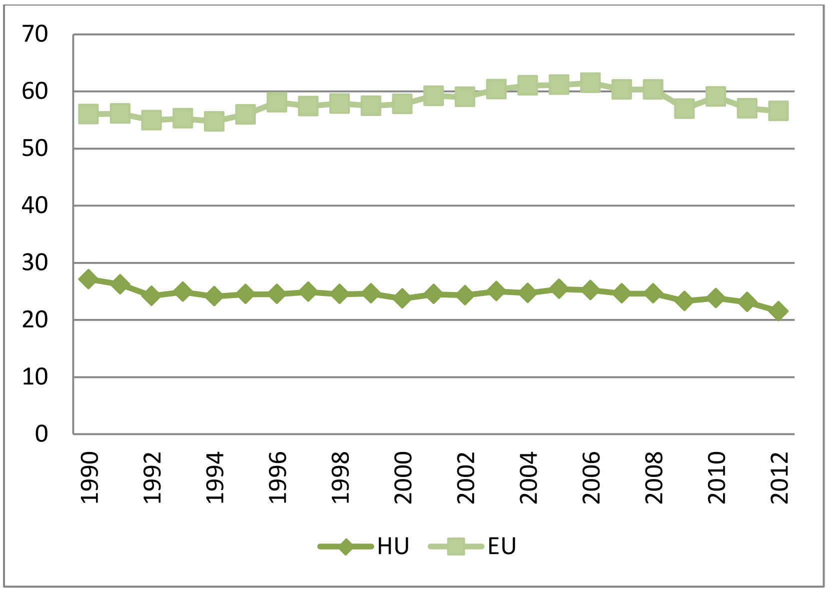


Figure 7.9: Primary Energy Consumption (Mtoe)

Source: Eurostat

Energy intensity of the economy

The chart shows the gross inland consumption of energy divided by GDP (kg of oil equivalent per 1 000 EUR). Hungary's energy intensity of economy is yearly calculated as the gross inland consumption of energy and the gross domestic product (GDP). It measures the energy consumption of an economy and its overall energy efficiency. In spite its gradual and constant decrease, Hungary's trend, starting from 2001, was consistently above EU average, decreasing of about 100 point in the period between 2001-2012. Although the energy intensity of the Hungarian economy decreased, it is still higher (268.7 kgoe/1000 EUR) in comparison with the European one (143.2 kgoe/1000 EUR). Hungary's energy intensity improved by 1.4% in 2009 extending a long-term trend in energy intensity average reduction adjusted for PPP of 2.3% between the 10 years period 1990 and 2009.

The first National Efficiency Action Plan (NEEAP) set the target of energy consumption reduction by 1% annually in the period 2008-2016 (for a total energy saving amount of around 16 GWh). The support scheme is primary based on investment subsidies for energy efficiency projects, also including voluntary agreements with large companies and information campaigns.

The biggest savings are expected to be in the residential sector such as energy performance improvement of housing estates and also in the industry and transport sectors. The second NEEAP states that the interim target for 2010 was reached and that the overall target for 2016 can be met with the planned actions.

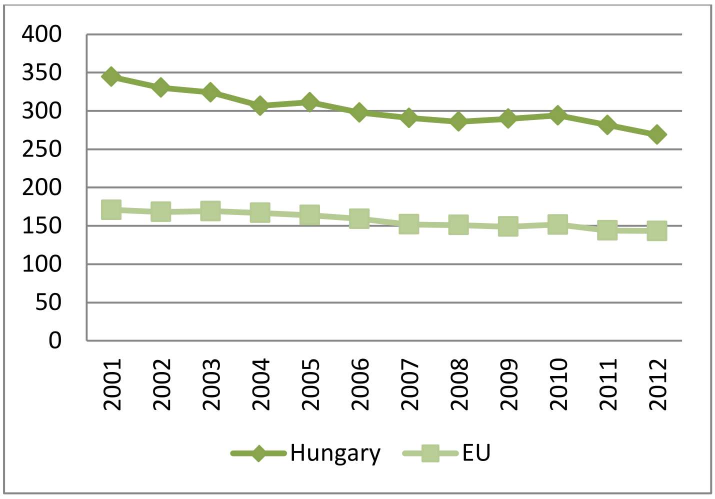


Figure 7.10: Energy intensity of the economy 2001-2012 (kgoe/1000€)

Source: Eurostat

Final energy consumption of all sectors in Hungary

While generating capacity is ageing, electricity demand within Hungary is expected to grow. All of it makes grid and generating capacity improvements as well as ageing plants replacements necessary investments in order to enhance Hungary's energy efficiency targets. It would also contribute to the creation of an attractive framework for investments in energy infrastructures.

The overall final energy consumption of all sectors (as the sum of final energy consumption in industry, transport, households, services, agriculture) experienced a drastic decrease between 1990 and 1991. Since 1992 and until nowadays, it fluctuates slightly between 16,000 and 18,000 ktoe.

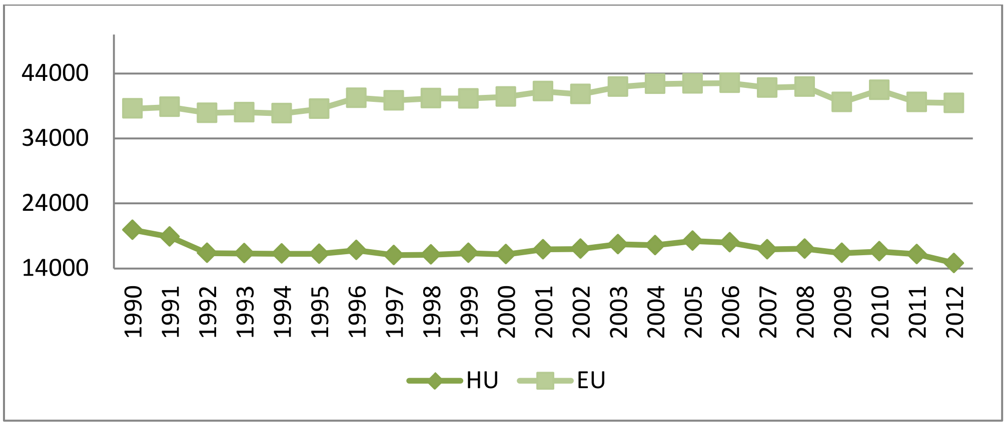


Figure 7.11: Final energy consumption of all sectors in Hungary (ktoe)

Source: Eurostat

Final energy consumption by sector - Residential dwellings Mtoe (with climatic corrections)

Although Hungary's final consumption in residential dwellings (measured in Mtoe) recorded the same trends as the EU average, with a slight and coincident peak in consumption during 2006, it has always been considerably minor amounting of about the 50% compared to EU average. While the EU final consumption per residential dwelling average trend is considerably lower than the Hungarian one and it stabilizes at 1toe/dw since 2008, the Hungarian consumption trend fluctuated between 1.5 and 1.7 toe/dw until 2006, when it finally decreased slightly to stabilize at 1.5 toe/dw since 2007. The Hungarian final consumption per residential dwelling is higher than with the European average. The gap between them is around 0.5 toe/dw.

The stabilising trend is due to a massive fuel switching that took place between 1990 and 1998, when the majority of the households replaced tile stoves, coal and oil fuelled boilers with high efficient gas fuelled boilers.

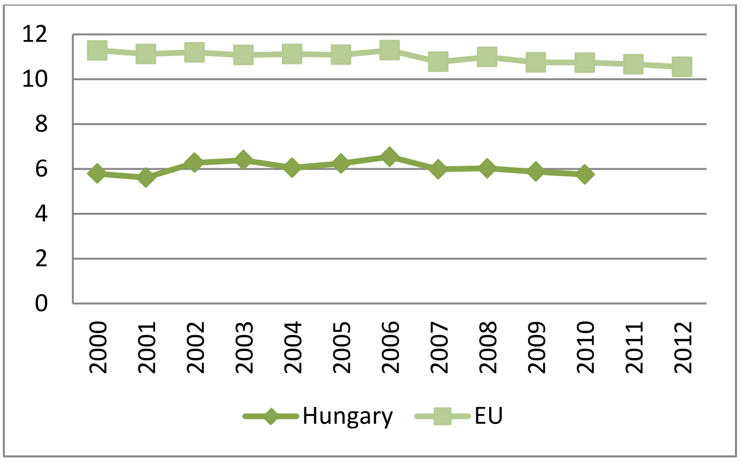


Figure 7.12: Final energy consumption by sector - Residential Dwellings Mtoe (with climatic corrections)

Source: Odysee-Mure

Final energy consumption by sector – Industry (ktoe)

This indicator expresses the sum of energy supplied to the final consumer's door for industry sector. Hungary's final energy consumption in industry, after a sudden decrease during 1990-1992, stabilized its trend slightly decreasing in comparison to the EU's one, which, at the contrary, maintained as stable. Both trends experienced the same dramatic decreasing during 2009. Hungarian final consumption in industry is overall valued as 50 to 60% minor compared to the EU's average. Hungarian Final Energy Consumption in Industry sector dropped dramatically of about 2500 ktoe between 1990 and 1992, decreasing in this period from 6500 to 4000 ktoe. From this level, in 1993 Hungarian FEC in industry sector experienced a further, slight but steady decrease which led, between 2010 - 2012, to stabilize in about 2700 ktoe.

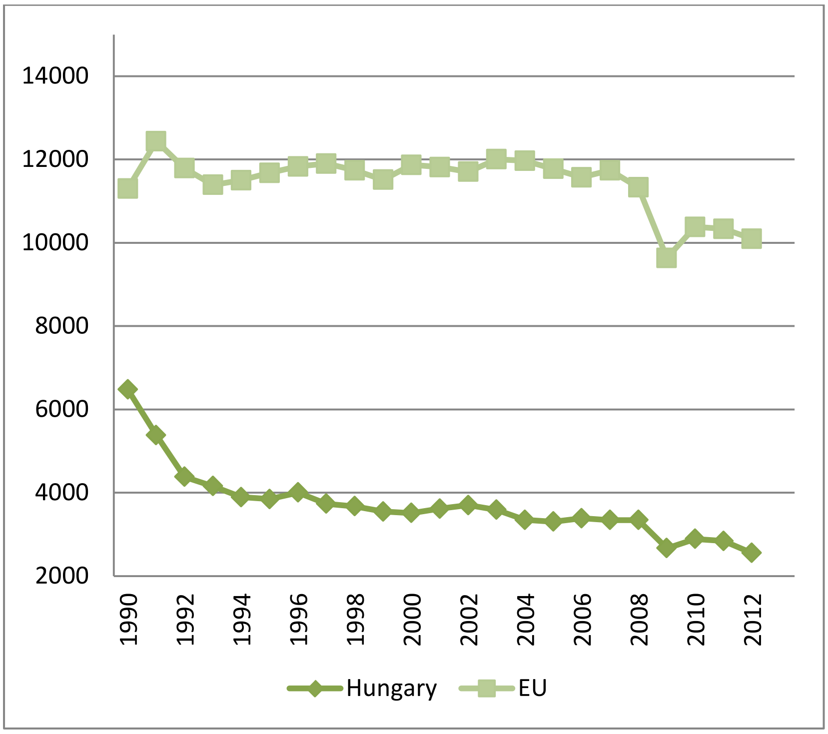


Figure 7.13: Final energy consumption by sector – Industry (ktoe)

Source: Eurostat

Final energy consumption by sector – Services (ktoe)

Final energy consumption in services covers energy quantities consumed by services. Hungarian Final Energy Consumption in Services gradually increased since 1992 until 2004 reaching the peak of 3500 ktoe. During 2005 it started to slightly decrease recording a fluctuating trend until 2012. Hungarian Final energy consumption in services has always maintained a minor volume compared to the EU's average. Both trends rose since 1990, slightly decreasing during the period 2001-2003. Hungary's consumption started decreasing in 2005 with a subsequent fluctuant trend until 2012. It is possible in this case to notice a difference in the trends between the residential dwellings and the service sector.

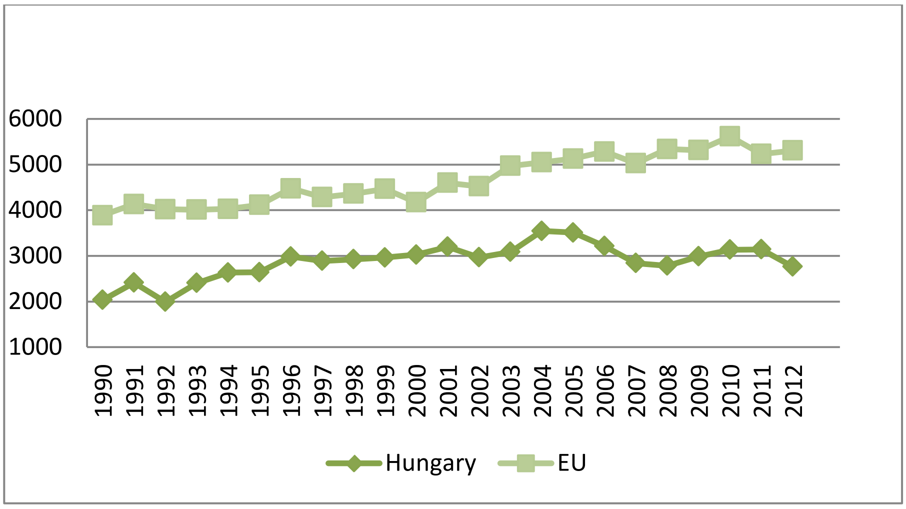


Figure 7.14: Final energy consumption by sector – Services (ktoe)

Source: Eurostat

Final energy consumption by sector – Transport (ktoe)

Hungarian Final Energy Consumption in transport sector increased regularly since 1996 until 2007 of about 2000 ktoe reaching the peak of 4900 ktoe. In 2009 it started decreasing slightly until 2012.

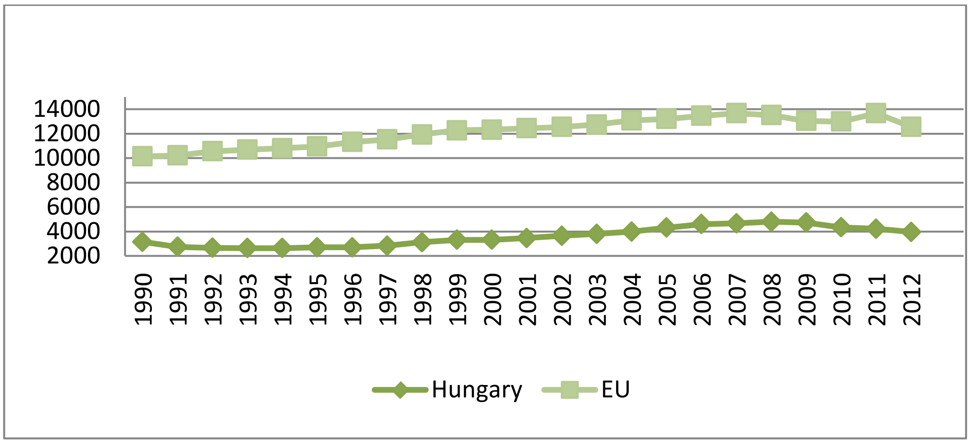


Figure 7.15: Final energy consumption by sector – Transport (ktoe)

Source: Eurostat

Final energy consumption by sector – Agriculture/Forestry (ktoe)

Agricultural sector (including horticulture, forestry and fisheries) has been the least popular for the implementation of energy efficiency actions. Hungarian Final Energy Consumption in agro-forest sector decreased dramatically of 40% of its amount between 1990 and 1993 going from 1100 ktoe to 650 ktoe. After the trend stabilized temporarily between 1995 and 1998 it bottom out during the following 12years-period reaching the level of 400 ktoe.

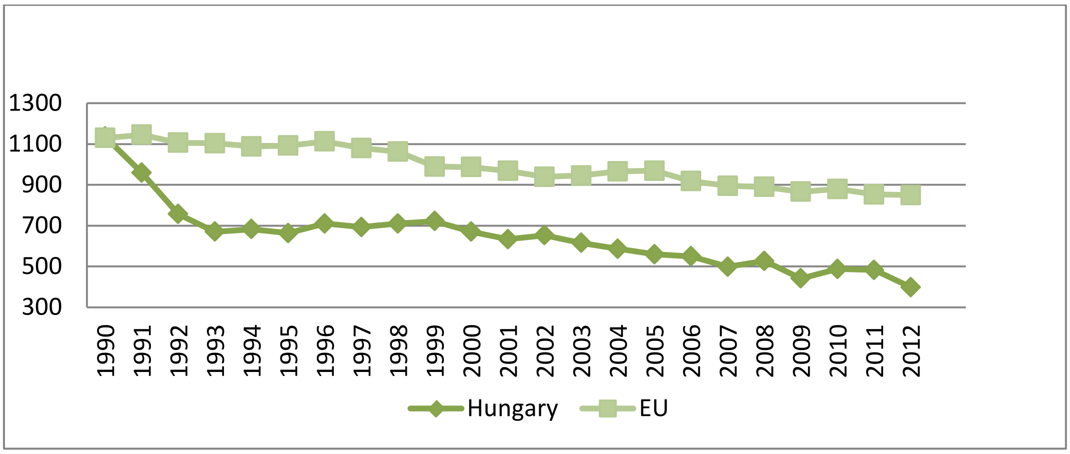


Figure 7.16: Final energy consumption by Agriculture/Forestry sector, (ktoe)

Source: Eurostat

Energy efficiency gains in households

Energy efficiency gains are calculated from ODEX (a value of ODEX equal to 90 means a 10% energy efficiency gain) and reflected efficiency gains since 2000. Measured in percentage, Hungary's gains in household started to increase slightly increasing in 2006. Contrarily, EU's average trend rose dramatically since 2000 until 2012.

European Energy Efficiency Gains in Households' trend increased constantly since 2001 reaching the peak of the 18% in 2012. Hungarian trend increased slightly between 2006 and 2010 of about 3%.

The constant increasing trend is due to a massive fuel switching that took place between 1990 and 1998, when the majority of the households replaced tile stoves, coal and oil fuelled boilers with high efficient gas fuelled boilers.

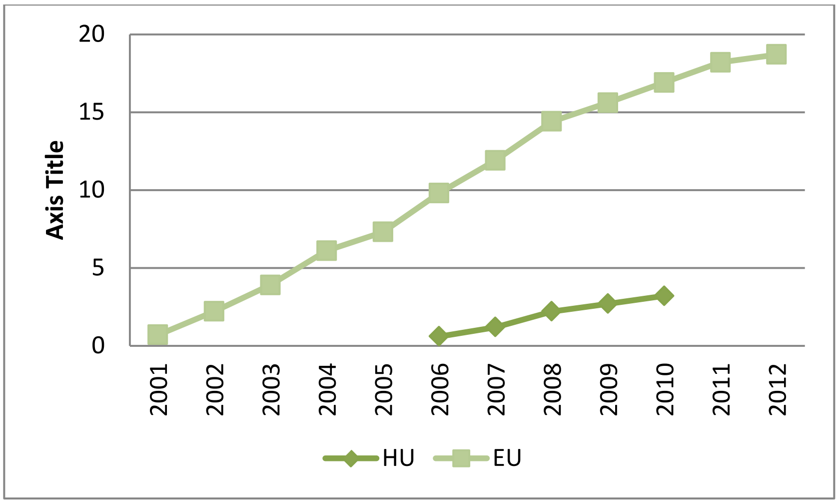


Figure 7.17: % energy efficiency gains in households (%)

Source: Odysee-Mure

Energy efficiency gains in industry (%).

Hungarian Energy Efficiency Gains in industry rose suddenly between 2002 and 2006 reaching the peak of 25% in 2007 and fell of 10% in the following two years. Contrarily, EU average trends increased regularly at some 1% yearly since 2001 until 2012.

The ODEX index measures the energy efficiency progress by main sector. The ODEX index in industry measures from unit consumption trends by branches, by aggregation of unit consumption indices by branch in one index for the sector on the bases of the current weight of each branch in the sector's energy consumption. Hungary's energy efficiency gains in industry's trend recorded a constant growth until 2005 when it dramatically increased of about 200% to reach the peak in 2008. Since this year it started a negative trend of decrease which led to a fall during the following two years. On the contrary, EU's trend increased constantly since 2000 until 2012.

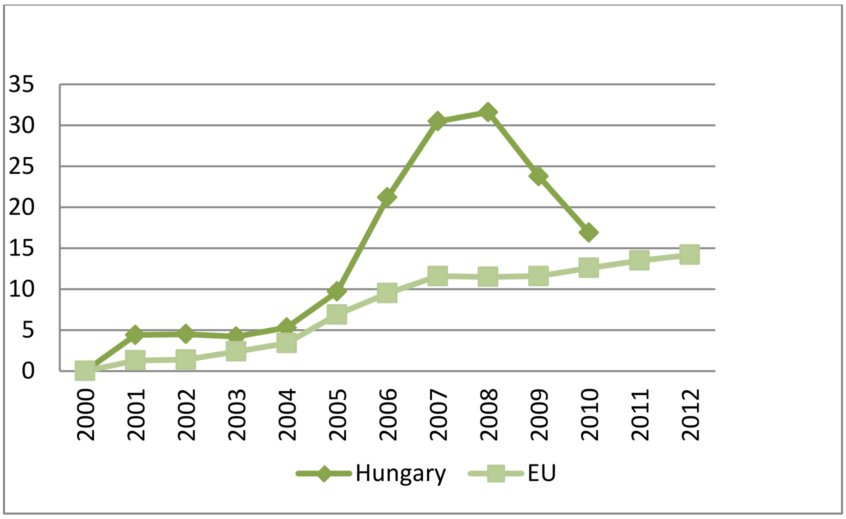


Figure 7.18: Energy efficiency gains in industry (%)

Source: Odysee-Mure

Distance to target (2012 versus 2020 target): primary and final energy.

After fiscal loosening in 2010 and 2011, the government made considerable consolidation efforts and reached a deficit of 1.9% of GDP in 2012, well below the target of 2.5%. While the Commission 2013 Spring Forecast projects a renewed breach of the 3% of GDP by 2014, consolidation steps announced on 13 May for 2013 and 2014 should sustainably correct the excessive deficit.

Hungary faces serious challenges in the short-to medium term related to business, legal environment and economic growth potential, which could also undermine the success of fiscal consolidation. Long-delayed reforms in the energy and transport sectors are having a detrimental effect on public finances and growth in Hungary. Energy prices for a part of the population are still heavily regulated and should be gradually phased out, whilst protecting the economically vulnerable. Public transport should be made more cost efficient to improve sustainability. According to Figure 7.8, Hungary's vulnerability to energy supply dependence in terms of dependence on imports of energy resources, recorded an average of 52,3%, in the EU's average.

Buildings account for about 40% of the final energy consumption in the EU, mostly for space heating, cooling and domestic hot water. They are therefore a priority target for all MS, as they also hold the largest share of the energy savings potential in the EU on the medium and long term (2020 and beyond).

Transport accounts today for over 30% of final energy consumption in the EU. In a context of growing demand for transport, final energy consumption by transport is projected to increase by 5% by 2030 rising further marginally by 2050. Transport growing demand is driven mainly by aviation and road freight transport. Acco usual scenario of the Energy Roadmap 2050 , the EU transport system would remain extremely dependent on the use of fossil fuels. Oil products would still represent 88% of EU transport sector needs in 2030 and 2050.

Even though, more Member States report on measures targeting modal shifts in their second EEAP, the number of action plans with a clear and consistent strategy towards more environmentally friendly and energy saving modes of transport remains modest.

7.2.2 Evaluation of Energy Savings' Capacity – Identification of Challenges

With a 3.5 billion multi-year budget programme, Hungary is planning to boost energy efficiency investments, developing at the same time a cross-sectoral implementation of energy efficiency improvements in the following sectors: buildings, appliances, lighting, transport and industry.

Hungary's energy saving potential and capacity has been compromised by a persistent mismanagement, during the period of centrally oriented economy.

7.3 Market preparedness

7.3.1 Description of Status Quo

SME access to finance Index (SMAF)

The European Commission developed the SME Access to Finance (SMAF) index to monitor developments in Small and Medium-sized Enterprises (SMEs) access to financial resources and to analyse differences between Member States. The index comprises two main elements or sub-indices: *access to debt finance* and *access to equity finance.* The reference point in the index corresponds to the EU average in 2007 (100 = EU 2007).

Low values in the overall indicate poor performance against the access to finance indicators relative to the EU level in 2007, and vice versa for high values. Year-on-year increases indicate a relative improvement over time.

Although In 2007 Hungarian Small and Medium enterprise Access to Finance index was already under European average, a decrease trend between 2007 and 2009 further distanced Hungary from the EU average. Since 2009 until 2012, Hungary's SMAF index rose of about 20 points to stabilize between 2012 and 2013 slightly below the EU average, which contrarily maintained a constant trend since 2009.

Although being dominated by long-term purchasing agreement, according to EU observers, Hungary has a well-functioning and interconnected gas market with competitive and market-based prices, able to provide correct incentives for further investments, persuading, at the same time, consumers for an efficient and sustainable use of resources.

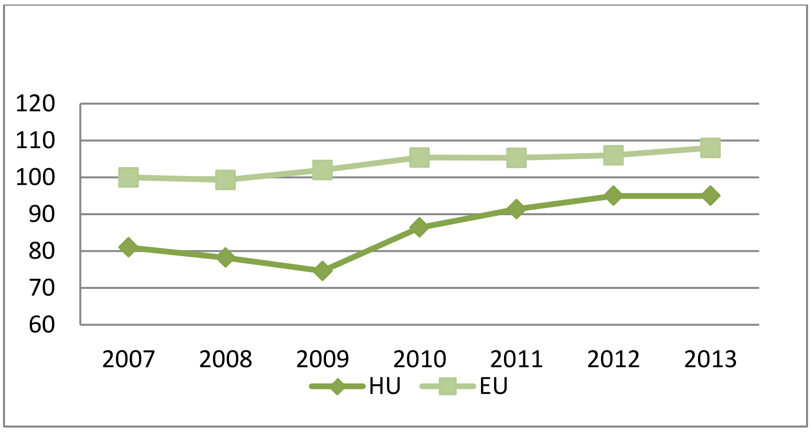


Figure 7.19: Hungarian Small and Medium Size enterprises' access to finance index (SMAF)

Source: Eurostat

ESCO's market development (stakeholders input)

There are around 20-30 companies in the ESCO registries. Numerous companies were forced out of the energy services business, while a few others got hold of new segments and extended their business offers or combined energy service provision with their existing portfolio. The current market value and the market potential have not been evaluated lately. The 1990s saw 'cream-skimming' of easy projects with short payback time (3-5 years), mainly focused on public lighting upgrades, boiler house reconstruction, district heating system improvements, fuel switching projects, etc. The financing of these projects was based on ESCOs' own capital and the access to funds from international financing institutions (IMF, WB).

International programmes were prioritizing ESCO activity in the municipal environment. In the last decade, project developers have implemented a more diverse scope of projects, including projects with longer payback time (over 5-7 years or longer) (Rodics 2005), because the easier ones were slowly drying up. IFIs were backing out from the market, and 2008 saw the end of the long standing UNDP/GEF (United Nation Development Program/Global Environment Facility. GES is a 183 countries partnership program involving international institutions, civil society organizations and the private sector to address global environmental issues and to sustain development initiatives. http://web.undp.org/gef/)

municipal programme, a sizable grant scheme for the support of energy audits in municipalities. Between 2001 and 2008, energy audits of about 1200 buildings were carried out under this programme. The changes in IFIs' attitudes were matched by the growing involvement of private financial institutions, because additional financing mechanisms were necessary due to the elongated payback time. The ratio of ESCO activity became approximately equal in the following three sectors: industry, district heating retrofits/development and the municipal buildings sector. In parallel, certain companies also started ESCO projects in "new" market segments, such as RES and CHP. Complex refurbishment of residential blockhouses also became a fast emerging market area mainly due to state and municipal grants available for panel blockhouse refurbishment. Most of the ESCO clients still come from the municipal sector, while projects also take place in the residential (mainly block houses) and the industrial sectors. Typical projects are therefore related to lighting (street and indoor), boiler upgrades, and modernization in industries, fuel switching, and district heating systems. Both local and international ESCOs have been common in the Hungarian ESCO market, as well as daughter companies of energy suppliers.

Market share of the largest generator in the electricity market

The indicator shows the market share of the largest electricity generator in each country. Hungary's market share of largest generator in the electricity market index recorded a decrease in 2003 after which rose dramatically until 2012. The chart shows a very large participation and growth of the largest generator in the market share.

Hungary is a significant importer of electricity. In 2010 net importers accounted for 15% of final energy consumption of electricity. Nuclear power is the largest contributor to the electricity generation mix with a share of 42% in 2010 (one of the highest share in the EU. Natural gas had a share of 31% in 2010 (higher than the EU average). Solid fuels are considered the third and most important source of electricity in Hungary with a 17% share.

Hungary's electricity generation mix is considered relatively well diversified in an EU comparison but the high combined share of nuclear and cogeneration reduces the flexibility of the system.

Good electricity interconnections and adequate domestic infrastructure capacity are important in sheltering the country from supply shocks, enabling a proper absorption of renewables. In this framework, a competitive and dynamic electricity market should cater the necessary investment incentives and provide the right price signals to consumers.

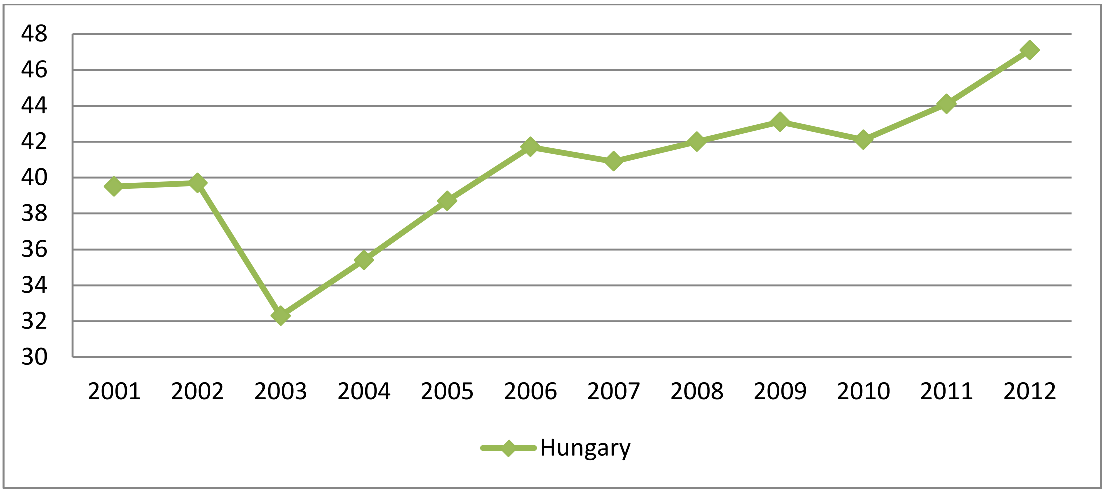


Figure 7.20: Market share of the largest generator in the electricity market (% percentage of total generation)

Source: Eurostat

Technical capacity (stakeholder input)

Summary of basic data of the Hungarian ESCO Market

Table 7.1: Summary of basic data of the Hungarian ESCO Market

Number of ESCOs	31 (2009)
Size of the market	
ESCO Association	NO
Type of ESCOs	Local and international Daughter companies of energy suppliers
Market development	RES, CHP Complex refurbishment of residential block houses
Sector ESCO Projects & main EE measures	Public sector involving public buildings, and lighting

Source: Energy Service Companies Market in Europe

7.3.2 Evaluation of Market Preparedness –Identification of Challenges

Due to the significant waste of energy, as a consequence of previous political and economic systems, the lack of financial resources for end-users as well as the lack of professional expertise able to develop and eventually preserve energy efficiency achievements, Hungarian Energy Efficiency market faces important challenges related to Energy Efficiency Obligation scheme implementation.

Projects focusing in public lights upgrading, house boilers substitution, district heating system improvements and fuel switching have been undertaken during the past years mostly through the contribution of international financial institutions.

Hungarian Energy and Public Utility Regulatory Authority (HEA) describe actual Hungarian energy market:

- 15 large power plants (installed capacity>50MW) with 8 581,6 MW and 381 power plant units of 281 companies in different industry sectors with 1 512,2 MW (data refer to 2012)
- 164 trading companies (71 are only wholesalers)
- 4 universal supplier companies owned by RWE, EON, EdF
- 6 main regional distribution companies owned by RWE, EON, EdF
- Liberalized market model with universal supplier services
- Generation prices under obligatory off-take regime (RES), general system usage charges and universal supplier tariffs are regulated
- 1 TSO (indirectly state-owned)

7.4 Administrative preparedness

7.4.1 Description of Status quo

Government effectiveness

According to World Bank government effectiveness corresponds to the perceptions of the quality of public and civil services and the decree of their independence from political pressure. The quality of policy formulation and implementation as well as the credibility of the government in its commitment in implementing such policies also account in the creation of the index.

While EU governmental effectiveness average in the period 2000-2013 maintains a regular trend of about 1.2 points, Hungarian governmental effectiveness started to constantly decrease since 2002, losing an average of about 0.5 yearly until 2005, when it suddenly and shortly rose, turning to slightly decrease until 2013.

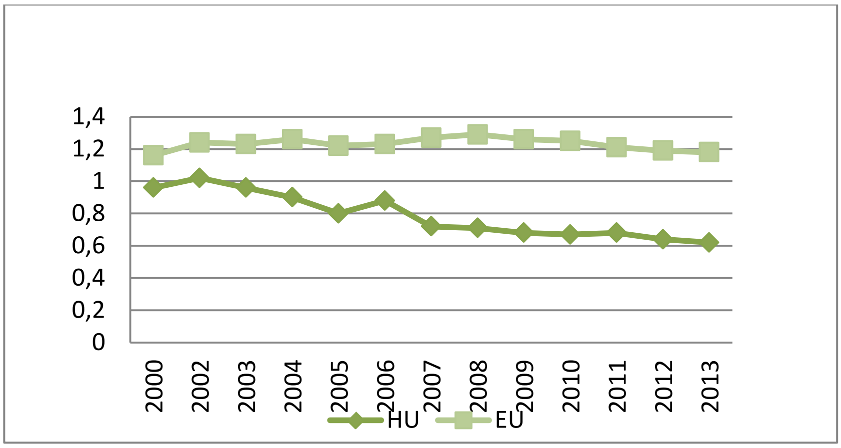


Figure 7.21: Government effectiveness in Hungary 2009 – 2013

Source: WorldBank

Regulatory Quality

The chart shows a substantial similarity between Hungarian and EU's average regulatory quality. Hungary counts on a weak country growth potential related to a worsening business environment, which is mainly driven by the lack of predictability and distortive effects of government policies. These measures have contributed to a quick pace of banking sector deleveraging and declining investment demand, resulting in a historically low investment rate and reduced lending. Finally, according to the Commission, in 2013 Hungary has experienced macroeconomic imbalances.

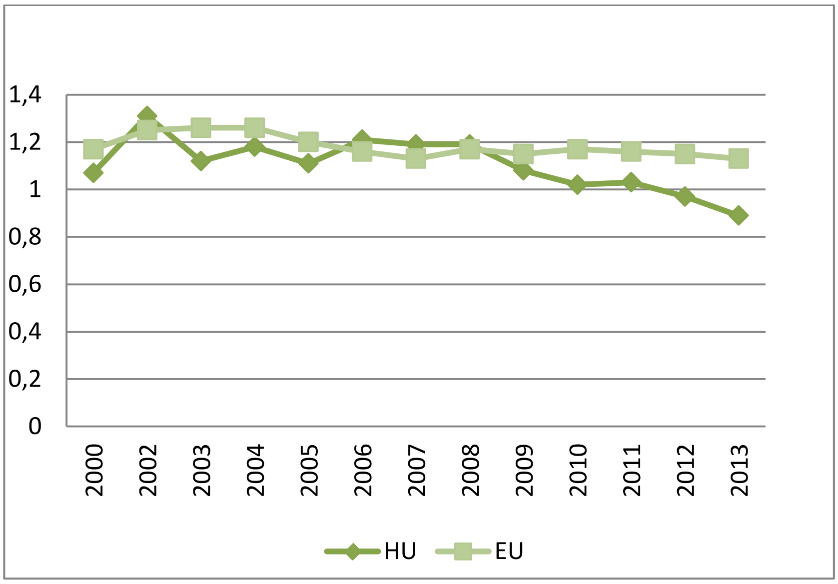


Figure 7.22: Regulatory quality in Hungary 2000 - 2013.

Source World Bank

7.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

According to the latest official report Hungary is still examining which governmental authority will perform inspectional and operational duties in the framework of the obligation scheme.

According to Hungarian law, the Hungarian Energy and Public Utility Regulatory Authority (which under Act LXXXXVI of 2007 on electricity, Act XL of 2008 on natural gas supply and Act XVIII of 2005 on district heating issues trade/distribution licences) and the Ministry for National Development, (as bodies responsible for energy policies) are in charge for control and compliance tasks.

7.5 Legislative Preparedness

7.5.1 Description of Status Quo

According to Energy Regulators Regional Association, Hungarian Energy and Public Utility Regulatory Authority (HEA is a legal entity with separate and independent budget and shall report on an annual basis to the Parliament on its activities) domestic energy legal basis is identified as follows:

- Act 22 of 2013 on the Hungarian Energy and Public Utility Regulatory Authority
- Act 86 of 2007 on Electricity
- Act 40 of 2008 on Natural Gas Supply
- Act 18 of 2005 on District Heating
- Act 209 of 2011 on Water Public Utility Service
- Act 185 of 2012 on Waste management

7.6 Social & Political acceptance/feasibility

7.6.1 Description of Status quo

Consumers' trust in their energy supplier

As far as social acceptance and feasibility are concerned, is important to highlight the general lack of relevant and reliable sources and data about Hungary. In fact, very little information and qualitative data seem to be available.

Considering the indicators provided in this methodology as:

- Consumers' trust in their energy supplier;
- Level of fuel poverty within the country;
- Coverage (or horizontal efficiency) as the percentage of fuel poor households covered by the policy, EEO;
- Leakage (or vertical efficiency) as the proportion of support going to households that are not fuel poor;
- Social stance;
- View of the industry.

On the base of the Consumer Market Scoreboard 2012, which through the Market Performance Indicator (MPI), evaluates consumers' expectations and concerns, identifying areas of priority in order to improve their conditions, it is possible to laid down a general overview of the social acceptance and feasibility of EEO scheme's implementation status. (Market Performance Indicator or MPI, is a composite index taking into account four key aspects of consumer experience: ease of comparing goods or services on offer, consumers' trust in retailers/suppliers to comply with consumer protection rules, problems experienced and the degree to which they have led to complaints, consumer's satisfaction or the extent to which the market lives up to what consumers expect).

In this framework, it is possible to describe Hungary's market profile as above EU27 average with a country overall rank 12th. In the contest of Consumers' trust in their energy supplier as proposed indicator of the social and political acceptance and feasibility, in 2012 electricity services are 11th ranks behind their 2011 position following a 6.2point decrease from 2011. The 2012 assessments for water supply is also below 2011 MPI scores but describing in any case a general acceptance and reliability of the consumers in the service provider.

Level of Fuel poverty within country

Empirical or qualitative data or evidence about the level of fuel poverty in Hungary are not available, for that reason the unit/measurement scale may be considered very low.

Coverage: The percentage of fuel poor households covered by the policy, EEO. (also called horizontal efficiency). According to Eurostat data 2012 about the alleviation of fuel poverty in the EU, fuel poverty has severe health impacts like winter deaths, mental disability, respiratory and circulatory problems. In order to describe the current situation of fuel poverty in Europe and to measure the fuel poverty of a member state (evaluating at the same time the extent of the problem) the source (Eurostat) considers indicators referring to the inability of people to keep their home warm, to pay their utility bills and to live in a dwelling without defects.

On the base of those indicators is possible to describe Hungary's status as follows:

- Arrears on utility bills: 58,8%
- Inability to keep home adequately warm: 33,9%
- Dwelling with leakages and damp walls: 53%.

The data show that the risk of fuel poverty is higher in Central, Eastern and Mediterranean EU countries, especially Bulgaria, Hungary, Greece and Cyprus.

Although energy efficiency improvements and EE obligation scheme's commitments might be considered as very important measures in order to fight fuel poverty, some country is experiencing difficulties in implementing such programs. In this contest, Hungary (together with Bulgaria, Croatia, Lithuania, Slovakia and Romania), accounting for about the 80% of people at risk of Energy poverty, on the base of 2012 Eurostat Data has about 3 mil people at risk of poverty.

Leakage: The proportion of support going to households that are not fuel poor (also called vertical efficiency). Hungary's fuel poverty condition seems to be due to the boost of natural gas prices as a consequence of its weak position as highly dependent importing country (mainly from Russia), which led to a further increase of domestic tariffs.

One of the main barriers to energy efficiency improvements and investments has been identified in the shared ownership character of buildings connected to district heating.

According to 2014 European Commission reports, in order to make energy prices more affordable for the general public and to contrast energy poverty in the country, Hungarian government reduced final consumer prices for natural gas by 6.5% compared to the gas prices set on 1 November 2013.

View of the industry

Energy Efficiency policy in Hungary is explored in order to identify sectors and actions where existing policies are limited and measures as WhCs can improve current policies.

Energy efficiency in industry and in heat generation was left at the discretion of market forces. It is possible to observe a general scepticism of the consumer for governmental measure regarding the improvement of the final service as most of the population considers public energy policies not to be completely transparent and for this reason not completely efficient.

For this reason, we can consider people and industry's attitude towards EEO scheme as neutral.

8 Ireland - VITO

8.1 Economic profile

Ireland is a small, modern, trade-dependent economy, which joined the European Union in 1973 and was among the initial group of 12 EU nations that began circulating the euro on 1 January 2002. Agriculture, once the most important sector, is now dwarfed by industry and services. Ireland has around 4,5 million inhabitants (2011). Overall however, the Ireland population in 2014 is enjoying healthy increases and the next official census could even see the total figures near 5.5 million [3]. Ireland has a surface area of around 70 thousand km2 [2].

GDP	$190.4 billion (2013 est[36]) $189.3 billion (2012 est)
GDP growth	0.6% (2013 est)[37] 0.2% (2012 est)
per capita	$41,300 (2013 est.) ($41,300) (2012 est.))
GDP by sector	Agriculture: 1.6%; industry: 28%; services: 70.4% (2013 est.)
Public Debt	124.2% of GDP (2013 est.) 117.6% of GDP (2012 est.)

8.1.1 Description of Status quo

Since 2008, Ireland has experienced a severe financial crisis characterised by a systemic banking crisis and a significant economic adjustment. Since then Ireland - with support from the EU and the IMF – made vast progress in dealing with its financial crisis, managed to regain complete lending access on financial markets, and ended its bailout programme in December 2013.

[36] In 2013 US dollars
[37] Real growth rate

“The recovery in the Irish economy has gained momentum and is broadening, though the underlying strength of the economy is less than that suggested by the recent exceptionally buoyant Quarterly National Accounts data. However, while the latest year-on-year headline growth rate overstates the scale of the improvement in economic performance, the evidence from a range of other data indicates that the recovery has strengthened and is becoming more balanced. Encouragingly, the domestic economic recovery has become more broad-based, supported by gradually improving employment and incomes. Against this background, consumer spending is growing and, allied to strong growth in investment spending, domestic demand is set to contribute positively to growth in 2014, for the first time since the downturn.”[38]

However, “…..It is too early to determine whether Ireland is set on a sustainable escape path from the recent economic crisis. As discussed later in this Review, there are many things that could still go wrong, or that may take a long time to put right, delaying a full recovery. Economists are notoriously bad at predicting turning points and it will only be after at least two years of sustained recovery that we will be certain that the recovery has really begun.…”[39]

“Project finance banks are making a comeback with higher levels of activity. With their expertise in advisory, origination, structuring and servicing, they remain core to raising funding but increased collaboration with institutional investors can now be seen. We can see this dynamic taking place in Ireland. Following severe setbacks to the country’s economy – including lowered sovereign credit ratings and a number of project cancellations – Ireland has received a significantly improved outlook from leading ratings agency Moody’s. As well as being the first Eurozone country to exit its bailout programme last December, the country has made a full return to the sovereign debt markets with a successful – and oversubscribed – issuance of government bonds in January.”[40]

In order to implement the EED, the government states that due to the challenging economic climate, Ireland is of the opinion that the scale of ambition would impose too great a challenge and cost burden on the energy supply industry and as a result, Ireland intends to adopt Option B and meet the 1.5% target using alternative measures. However, the main delivery mechanism will be via the introduction of an obligation scheme on energy suppliers.[41]

---

[38] Quarterly Bulletin of the Central Bank for Q4 2014
[39] Medium-Term Review, 2013-2020, July 2013, The Economic and Social Research Institute, Dublin
[40] Investors flock to Ireland’s infrastructure projects, 5 September 2014, World Finance
[41] Report on the Implementation of Article 7(9) of the Energy Efficiency Directive in Ireland, 5 December 2013

The following figures give an insight in the economic indicators and the position of Ireland relative to the average of European Union. After a strong decline in 2008, GDP growth is recovering but is still around 0% and around the average of the European Union (Figure 8.18.1).

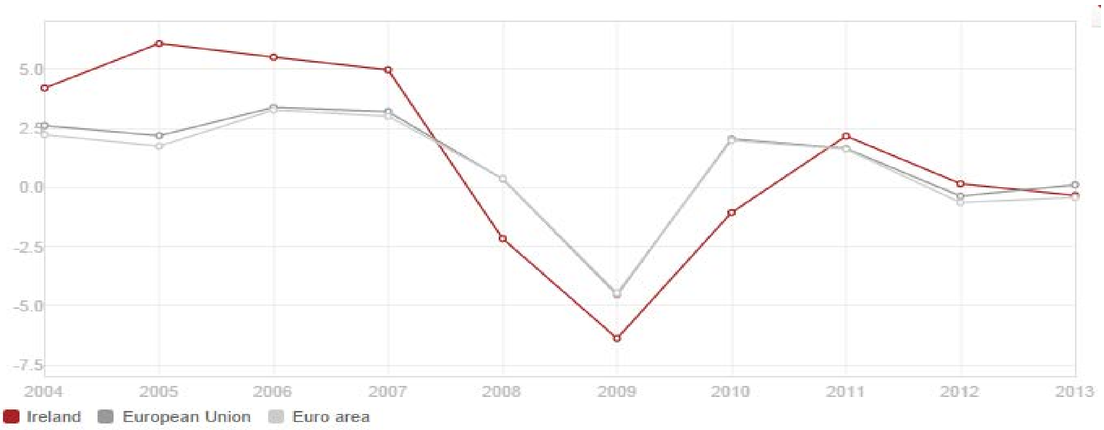


Figure 8.1: GDP growth (annual %), Annual percentage growth rate of GDP at market prices based on constant local currency

Source: The World Bank

When looking at the composition of GDP by end use (figure 8.2), we notice that the commercial balance (difference between the monetary value of exports and imports of output in an economy over a certain period) is positive and as such contributes substantially to the GDP.

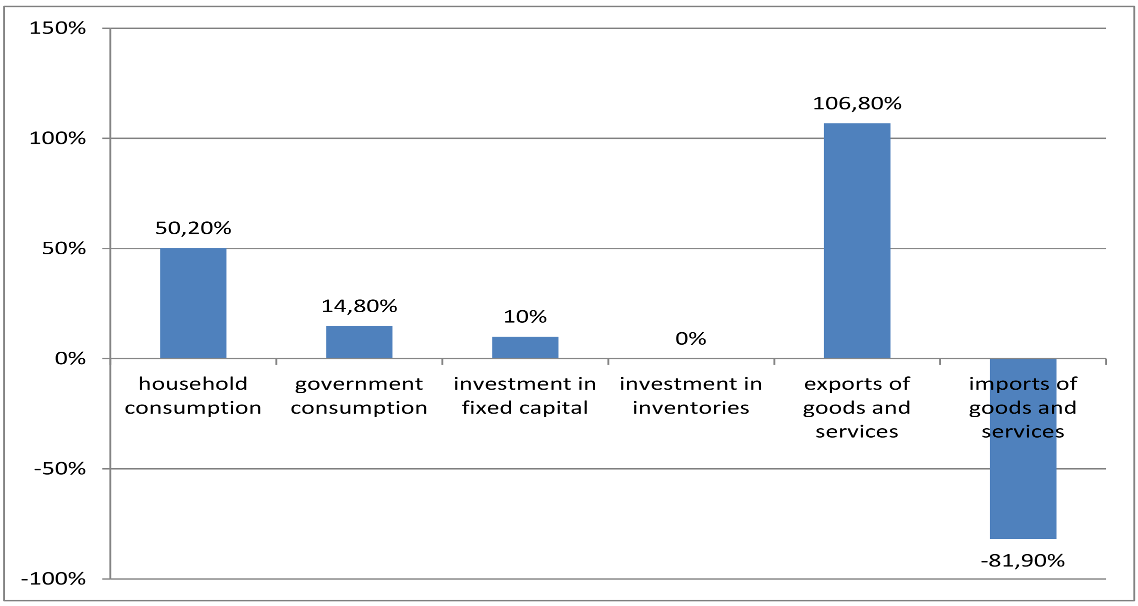


Figure 8.2: GDP composition by end use (2013)

Source: Index mundi

The central government debt increased considerably since 2007 and is higher than the European Union average. However, this does not prevent Ireland of allocating the necessary funds in order to achieve the targets of the EEO and the combined alternative measures. The Irish government strives for a shift to third party financing, community banks, other means of financing (e.g. employers →employees). SEAI continues the conversation about this in 2015.

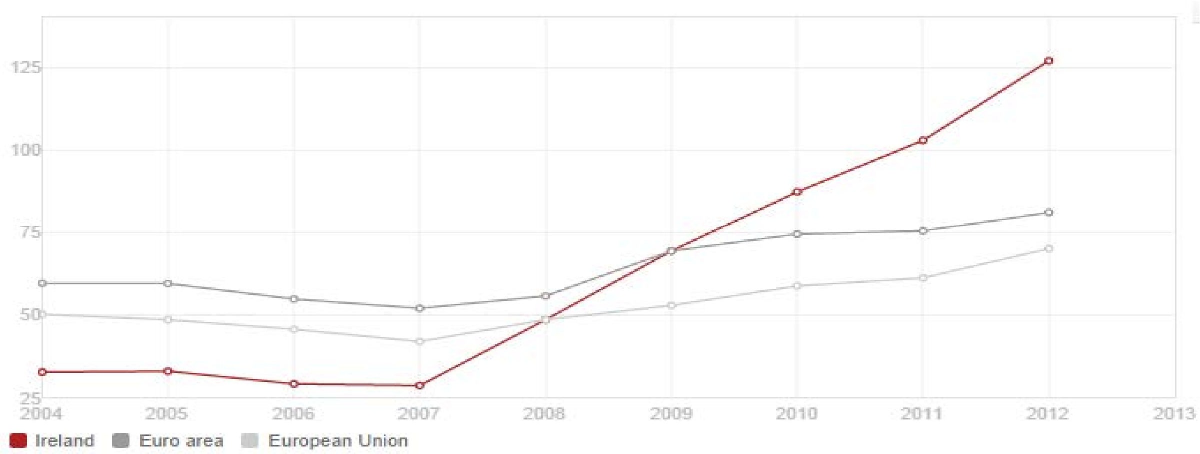


Figure 8.3: Central government debt, total (% of GDP)

Source: The World Bank

Electricity and gas prices in Ireland are increasing and are higher than the EU average (Figure 8.4 and Figure 8.5). Higher prices are envisaged to prompt additional action and to act in favour of the EEO.

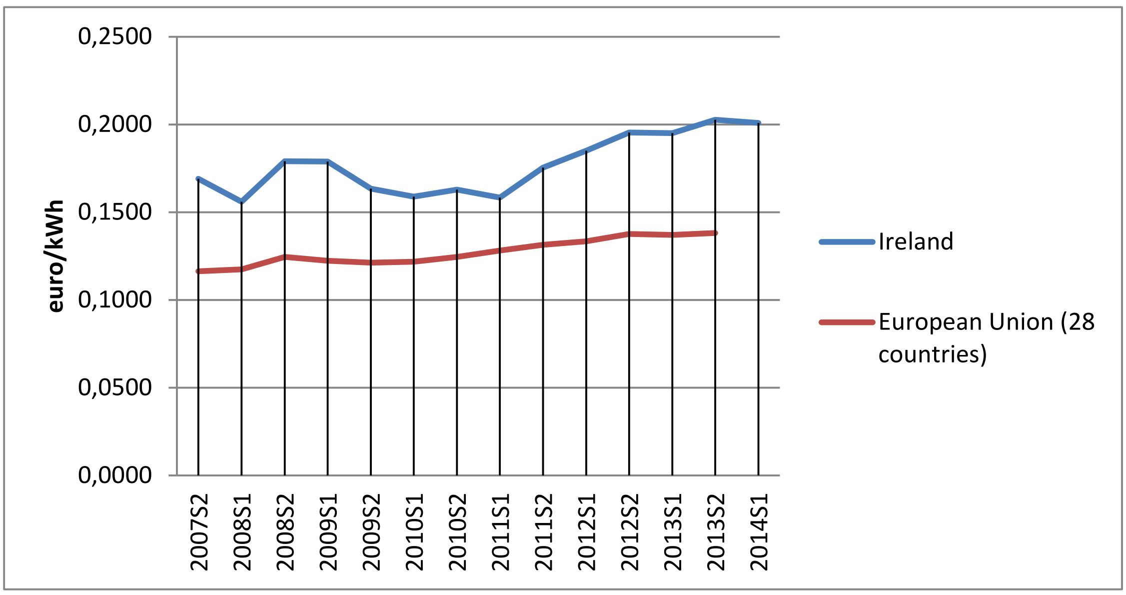


Figure 8.4: Electricity prices for domestic users in euro/kWh (excluding taxes and levies)

Source: Eurostat

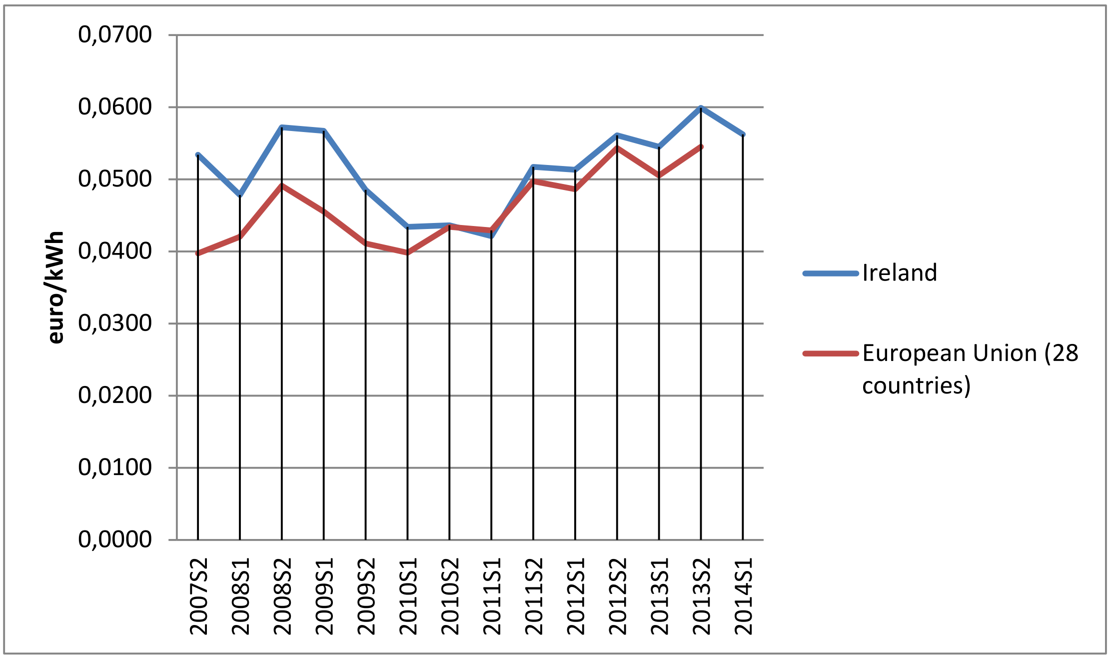


Figure 8.5: Gas prices for domestic users in euro/kWh (excluding taxes and levies)

Source: Eurostat

The energy dependence of Ireland is high and above the EU average (Figure 8.68.6). Ireland is net oil and gas importer. Hence, improving energy efficiency is more critical for Ireland in order to decrease its energy dependence.

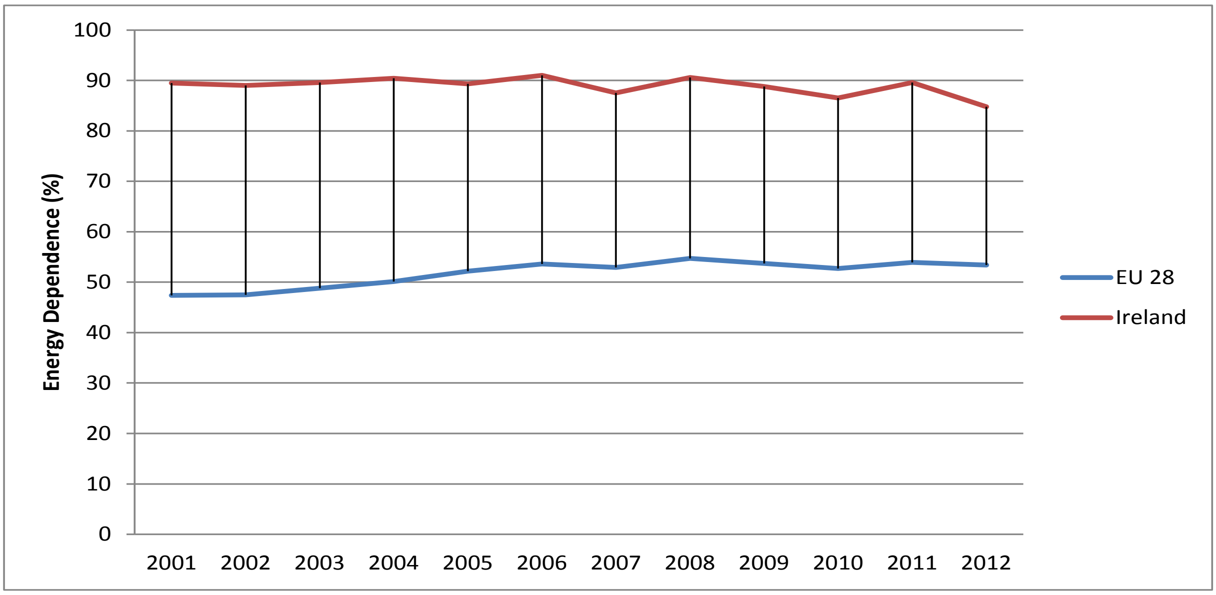


Figure 8.6: Energy dependence (%)

Source: Eurostat

The unemployment levels in Ireland show a decreasing trend over the last years.

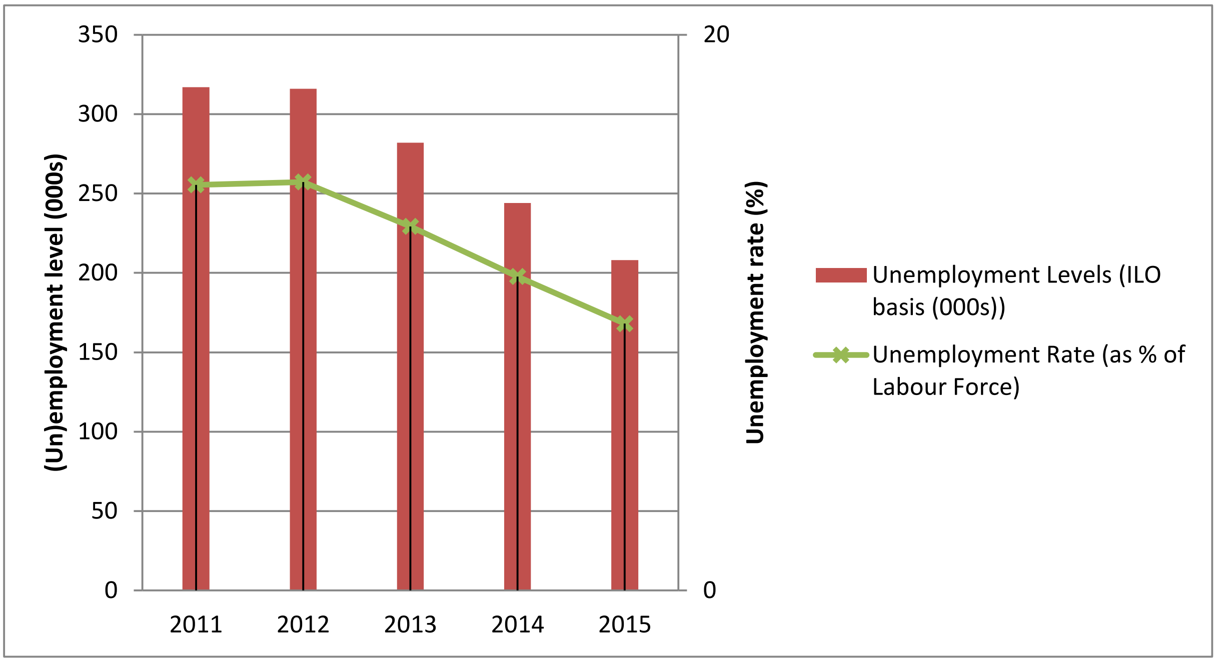


Figure 8.7: Unemployment levels (000s) and rates (%)

Source: Quarterly Economic Commentary, Economic and Social Research Institute (ESRI)

8.1.2 Evaluation of economic preparedness - Identification of financial challenges

The current economic state of Ireland is that of a recovering but still vulnerable economy. It is still not clear that a turning point has been reached. However recent improvements in the levels of activity of private lending banks contribute to a favourable climate for the execution of the Irish EEO which is planned to rely more on private funding than on public funding.

With about 80% of electricity generation in Ireland coming from imported fossil fuels, international fuel prices are the key driver of Irish generation costs and therefore electricity prices. The impact of this was seen during 2007 and 2008 when record-breaking world fossil-fuel prices led to higher electricity prices, while reductions in fossil-fuel prices since then correspondingly resulted in reductions in electricity prices for 2009 and 2010.[42]

The government's has a sufficient financial capacity to introduce, implement and monitor an EEO scheme. The scheme started in 2011 as a voluntary scheme. This received favourable response from suppliers. Since the transposition of the Directive, the scheme became mandatory from 2014 on. Operation of the scheme has been delegated by the Minister to SEAI (Ireland's energy agency). Implementation to date has been successful. Monitoring will be undertaken by SEAI to ensure the scheme is robust, but outsourcing of resources will be required for this which will require ongoing budget.

The EEF (Energy Efficiency National Fund), targeted to €70 million including up to €35 million from Irish Government, will support projects in the non-residential sectors (public, commercial, industrial). In addition a number of national banks have products aimed at lending to projects in the SME and industrial sectors for energy efficiency projects.

Suitable finance options are being considered for the residential sector including targeted loan products from banks and credit unions, as well as employer based loans. The Pay-as-you-save model (PAYS)[43] was thoroughly investigated and remains part of the options being explored, however it is unlikely that it will be a strict PAYS model where all repayments are met through savings secured on the home upgrade. Research with consumers indicate that they are not in favour of this and paybacks are long. Grant subsidies remain in place for the residential sector (source: stakeholder).

The uptake of the residential grant scheme has declined in recent years. However, a shift to community and area based models has meant the volume of homes retrofitted through government schemes has continued albeit at somewhat lower levels. SEAI anticipates that some cohorts will not be able to afford the grant scheme - an alternative scheme exists for the fuel poor, however further work is needed to determine the best way to structure the grant scheme to make it widely accessible. Work will need to be done to categorise the different situations for homes and what solutions suit each category best.

---

[42] Warmer Homes A Strategy for Affordable Energy in Ireland,

[43] PAYS offers people the opportunity of energy upgrading the building they occupy, without requiring them to provide upfront finance and without placing a debt obligation on them. A PAYS tariff is instead assigned to the building through a utility bill. Customers who sign up to a PAYS tariff see an immediate financial benefit, as the repayment tariff is set up to cost less than the amount of energy that the customer has avoided using. For instance, if a customer uses PAYS to reduce their annual energy bills by an estimated € 1000, the PAYS tariff would cost € 750 – a net saving of € 250 [1]

Finally, the fact that the public sector has been the subject of an employment embargo for some time has led to resource implications and limitations in some areas. This could undermine the scheme's implementation.

8.2 Energy & Climate Change profile (Energy Savings' Potential)

At this section, we evaluate the general energy and climate state of Ireland in relation to the EEO scheme, by exploring the energy saving's potential (Table 8.1) under the scheme. The main indicators considered in this part of the analysis involve:

- Primary energy consumption
- Energy intensity of the economy that measures the energy consumption of an economy and its overall energy efficiency.
- Final energy consumption both by sector and in residential dwellings
- Energy efficiency gains in households and industry, which is a metrics for energy efficiency progress in each sector.
- Distance to target in terms of primary and final energy that measures the savings needed to be achieved in order to fulfil the target set, expressed in ktoe.

8.2.1 Description of Status quo

National Climate Change Strategy

As part of the EU target under the Kyoto Protocol, Ireland agreed to limit the growth in its greenhouse gas emissions to 13% above 1990 levels by the first commitment period of 2008-2012. The National Climate Change Strategy 2007-2012[44] follows on from the first national strategy and takes account of the public consultation process, which followed the further review in Ireland's Pathway to Kyoto Compliance (2006). The purpose of this revised strategy is twofold:

- to show clearly the measures by which Ireland will meet its 2008-2012 commitment; and
- to show how these measures position Ireland for the post-2012 period, and to identify the areas in which further measures are being researched and developed to enable Ireland meet its eventual 2020 commitment.

[44] Ireland's Pathway to Kyoto Compliance, July 2006

The projections presented in Ireland's sixth national communication[45] indicate that the distance to target for the Kyoto Protocol will be 0.2 – 0.7 Mt CO2 equivalent. Ireland is, therefore, on track to meet its commitment under the Kyoto Protocol, and it is likely that there will be a very low requirement for the use of credits to ensure compliance with the agreed limit.

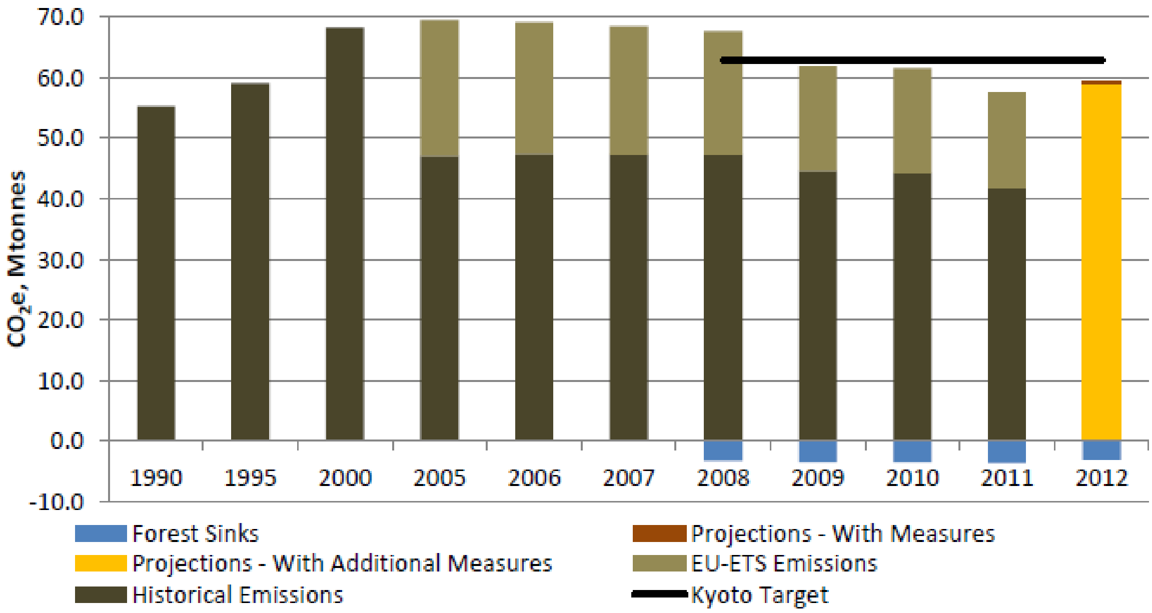


Figure 8.8: Historical and projected greenhouse gas emissions (including forest sinks) for the 2008 – 2012 period for each scenario and the Kyoto Protocol target (Ireland's 6th NC)[46]

[45] Ireland's sixth national communication under the United Nations Framework Convention on Climate Change, 7 March 2014
[46] See more at:
http://www.seai.ie/Renewables/Renewable_Energy_Policy/Policy_Drivers/#sthash.sTrTM5YY.dpuf

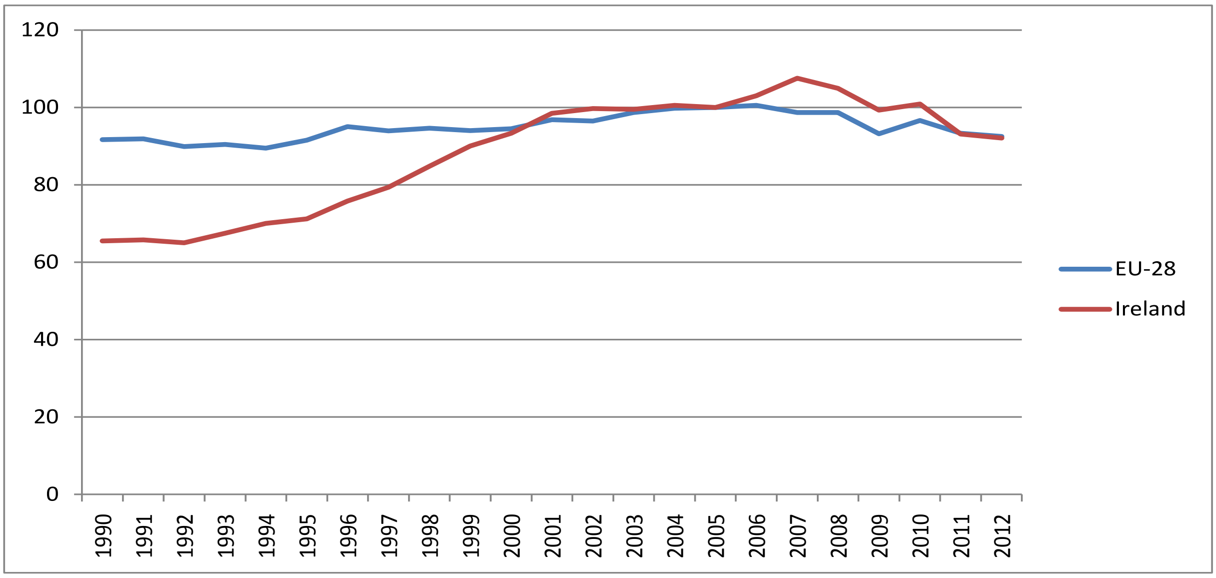


Figure 8.9: Primary energy consumption (2005=100)

Data Source: Eurostat (2012)

The primary energy consumption of Ireland was steadily increasing in the nineties and from 2000 to 2007 and is decreasing since 2008. The primary energy consumption amounted to 13,2 Mtoe in 2012.[47]

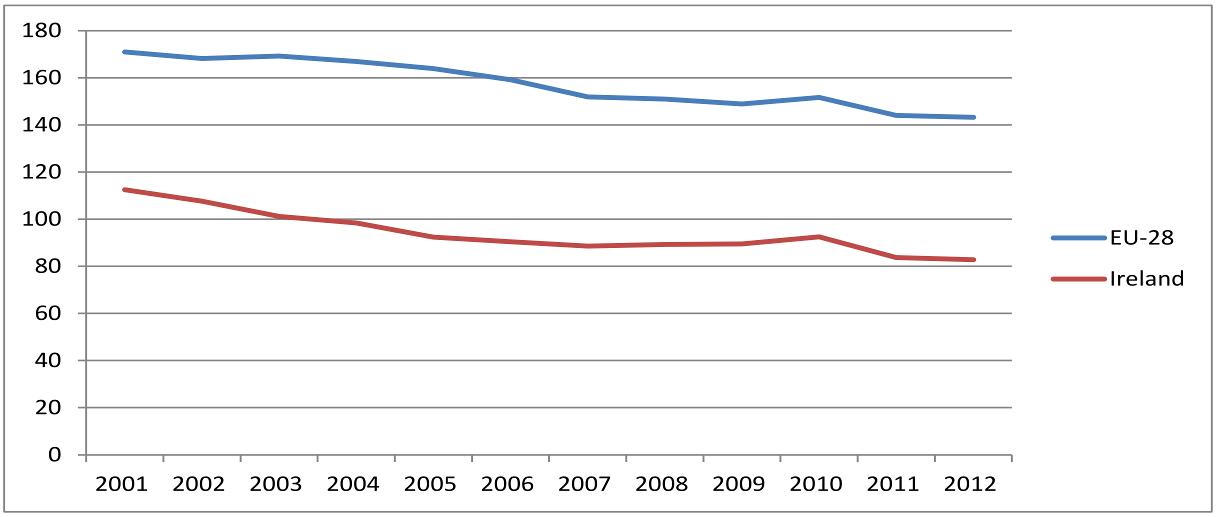


Figure 8.10: Energy intensity of the economy (kg oil equivalent per 1000 EUR)

Source: Eurostat. (2012)

[47] Energy in Ireland 1990 – 2012, 2013 report, SEAI

The Irish energy intensity is decreasing since 2001 and remains lower than the European average. The energy efficiency gains in Ireland are due to gains in the residential sector (higher than EU average over 2000-2011 period) and in the industrial sector (lower than EU average since 2009). However for the latter the efficiency gains decreased since 2008.

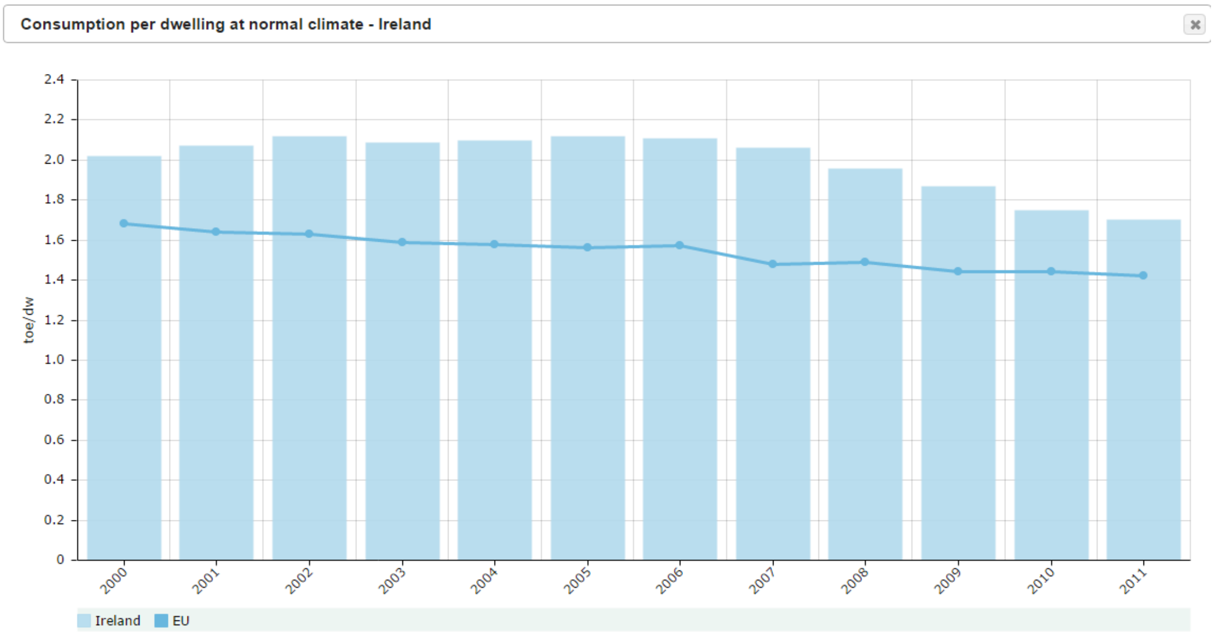


Figure 8.11: Consumption per dwelling

Source: Odyssee-Mure indicators

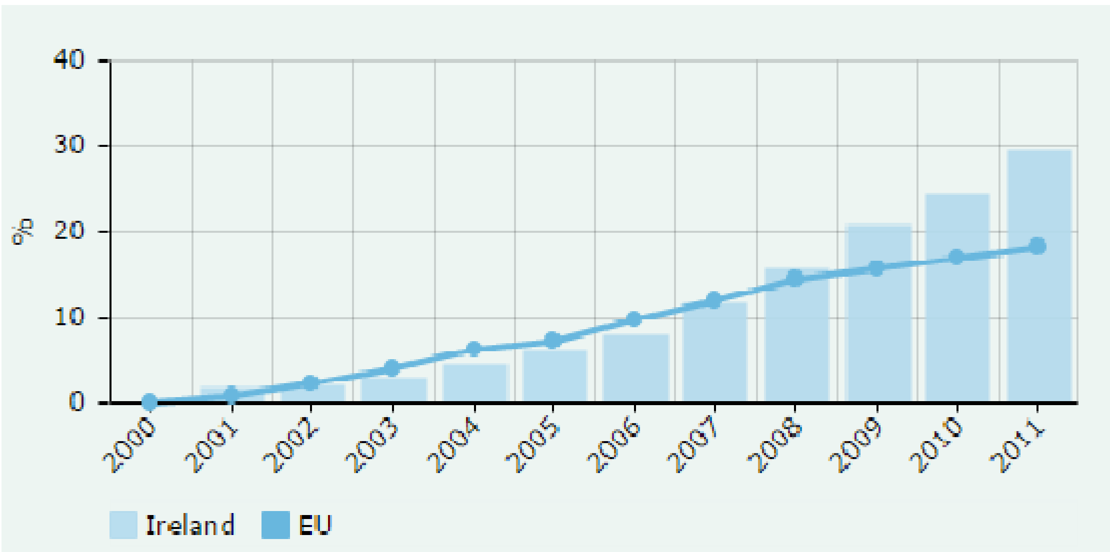


Figure 8.12: Energy efficiency gains in households

Source: Odyssee-Mure indicators

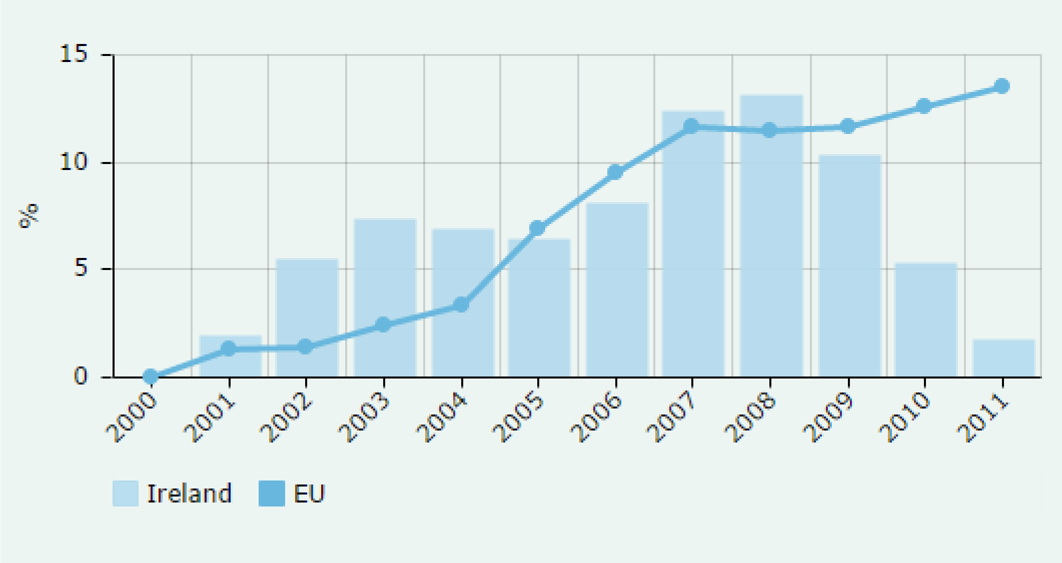


Figure 8.13: Energy efficiency gains in industry

Source: Odyssee-Mure indicators

Table 8.1: Potential for Economic Savings by Energy Form (2008)

	Economic saving potential GWh – Primary energy equivalent		
	Electricity	*Oil*	*Gas*
Residential	6,590	3,420	1,850
Commercial	6,000	1,560	1,000
Industrial	2,170	2,290	760
Total	14,760	7,270	3,610
% of reference base usage	**27%**	**24%**	**24%**

Source: SEI [1]

There is a considerable potential for economic energy savings in residential, commercial and industrial sector and for various technologies. However, the figures are based on a study published in 2008. A further study is pending publication and will highlight the potential for energy savings across all buildings sectors, industry and transport.

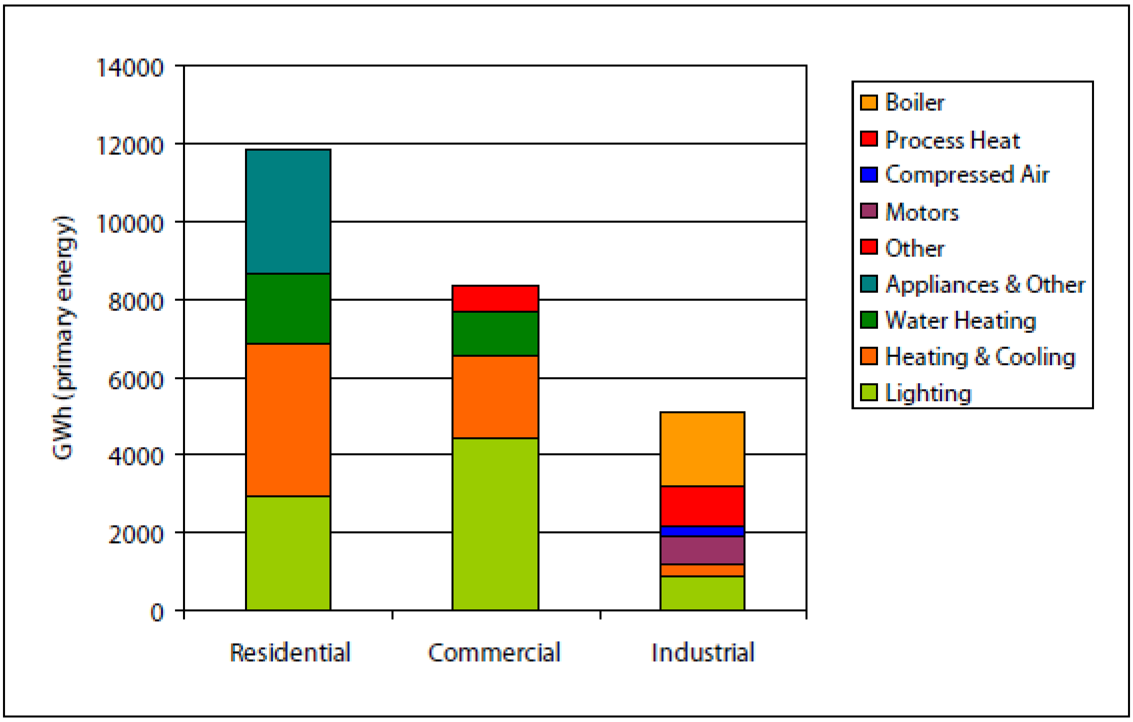


Figure 8.14: Economic Efficiency Savings Potential by Sector and by Technology (2008)

Source: SEI [1]

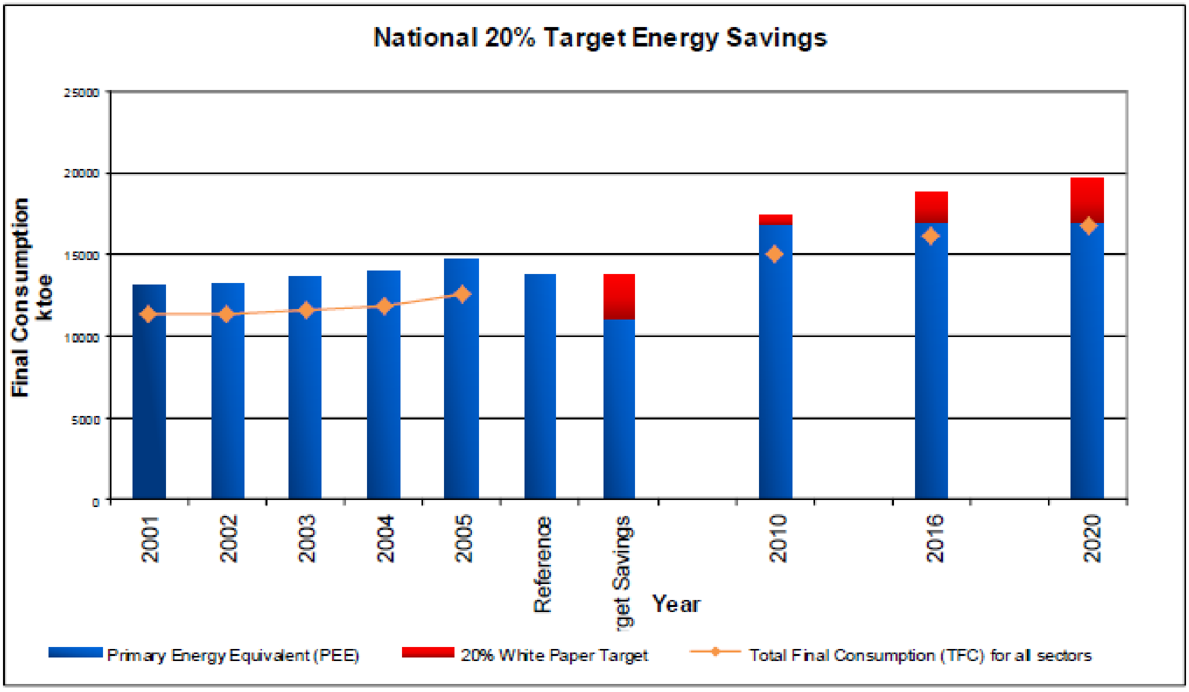


Figure 8.15: Illustration of target energy savings against final consumption

Source: NEEAP 3

8.2.2 Evaluation of energy savings' capacity - Identification of challenges

The 2008 figures in the previous paragraph show that there is a considerable energy savings potential in the residential (~50%), commercial (~30%) and industrial (~20%) sector. The residential sector has the highest potential but in the EEO the target allocated to obligated parties is sub-sectoralised as 75% non-residential, 20% residential and 5% fuel poverty residential. There is a potential risk of assigning not enough of the target to residential measures.

The study 'Ireland's Low-Carbon Opportunity'[48], carrying out an analysis of opportunities to reduce greenhouse gas (GHG) emissions in Ireland over the period to 2030, reveals that significant energy savings opportunities remain untapped. Among these are energy savings in the residential (retrofit buildings and new buildings) and the commercial sector (retrofit buildings). Experience in Ireland and internationally highlights the same core reasons for this: a lack of awareness or trusted information; constraints on capital investment; splits between who controls the energy use and who would benefit from the efficiency gain.

The EEO is focused on grants for the residential sector (mainly for home insulation and heating upgrades) but the risk exist that they do not cover enough of the cost of the measure to be taken since there is a prevalence of solid wall construction in the residential sector that necessitates more expensive solutions for wall insulation in many cases. Another risk is that grants are not used because of the split incentive between who invests (owner) and who benefits (tenant). As a consequence potential savings could still remain untapped. In the future Ireland plans to stimulate projects in the residential sector by financing mechanisms rather similar to those used for the non-residential sector and this could contribute to more investments. The following suitable finance options are being considered including targeted loan products from banks and credit unions, the pay-as-you-save model (see section 8.1.2) as well as employer based loans.

The study of 2009, including the results of SEI programmes that support energy savings in business, show that a typical small to medium-sized enterprise that has not addressed its energy use in the past will typically find it easy to reduce costs by 10-20%. In 2014 the Energy Efficiency Fund is launched to stimulate projects in the non-residential sector. In addition a number of national banks have products aimed at lending to projects in the SME and industrial sectors for energy efficiency projects.

---

[48] Ireland's Low-Carbon Opportunity, An analysis of the costs and benefits of reducing greenhouse gas emissions, Analysis carried out by McKinsey & Co, SEI, July 2009

The raising energy cost will prompt additional action.

Based on the analyses of potential for energy efficiency, stakeholders think that reaching the EED targets are feasible. On-going government intervention will be required to ensure targets are met.

8.3 Market preparedness

8.3.1 Description of Status quo

Electricity Market Structure

The Single Electricity Market (SEM), which commenced as planned on 1 November 2007, created a single market for the trading of wholesale electricity on the island of Ireland.

Electricity generators in the Republic of Ireland are ESB, Airtricity, Synergen (70% ESB), Edenderry Power, Endesa-Ireland and Huntstown (Viridian). ESB owns the transmission and distribution networks. The Transmission System Operator (TSO) is EirGrid plc, which assumed the role from ESB Networks on 1 July 2006. EirGrid ensures the safe, secure and economic operation of the high voltage electricity grid. EirGrid is owned by the Irish State and is established as a result of a government decision to create an independent organisation to carry out the TSO function, in order to assist the liberalisation of Ireland's electricity industry and the development of a competitive market. The electricity industry is regulated by the Commission for Energy Regulation (CER) which also regulates the natural gas market. The functions and duties of the CER have been altered and expanded significantly by legislation transposing EU directives into Irish law.

Electric Ireland is the largest supplier in terms of customers across all segments, and is also now the largest supplier in consumption (MWh) terms in all segments (shares of MWhs of 56.34%, 39.06%, 35.3% and 40.89% in domestic, small business, medium business and LEU segments respectively).

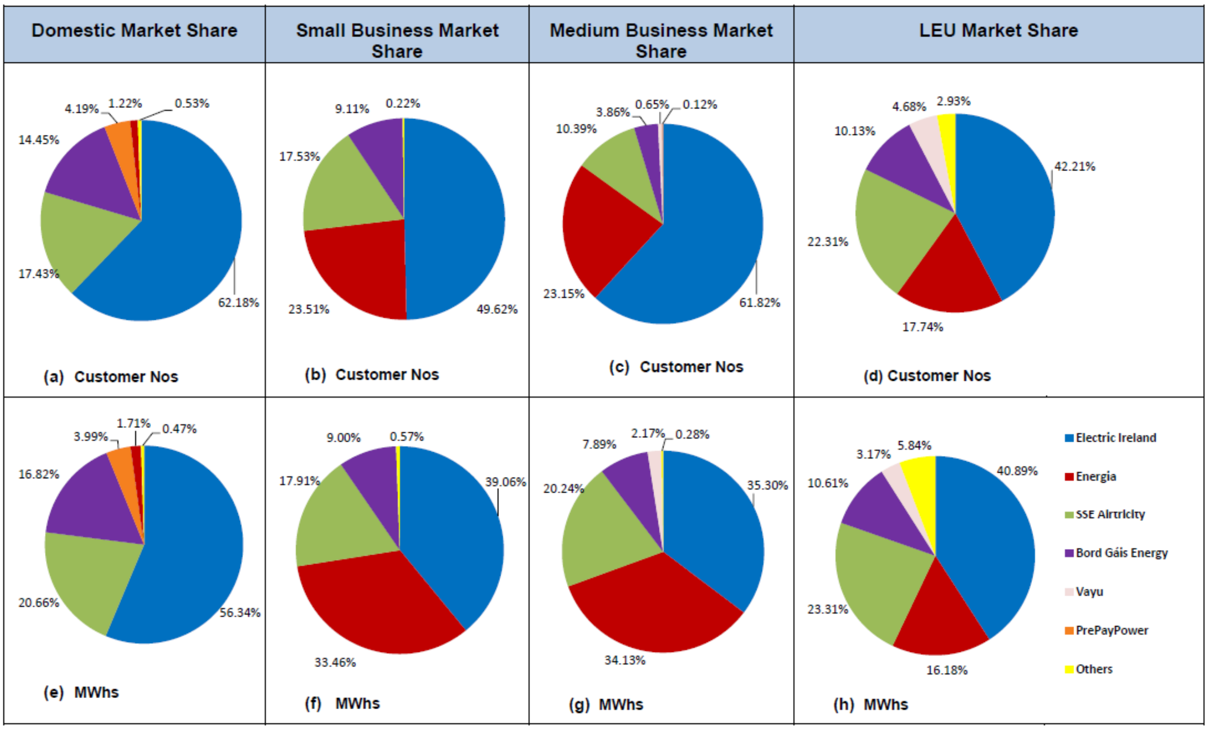


Figure 8.16: Q2 2014 Electricity Market Share by Market Segment [4]

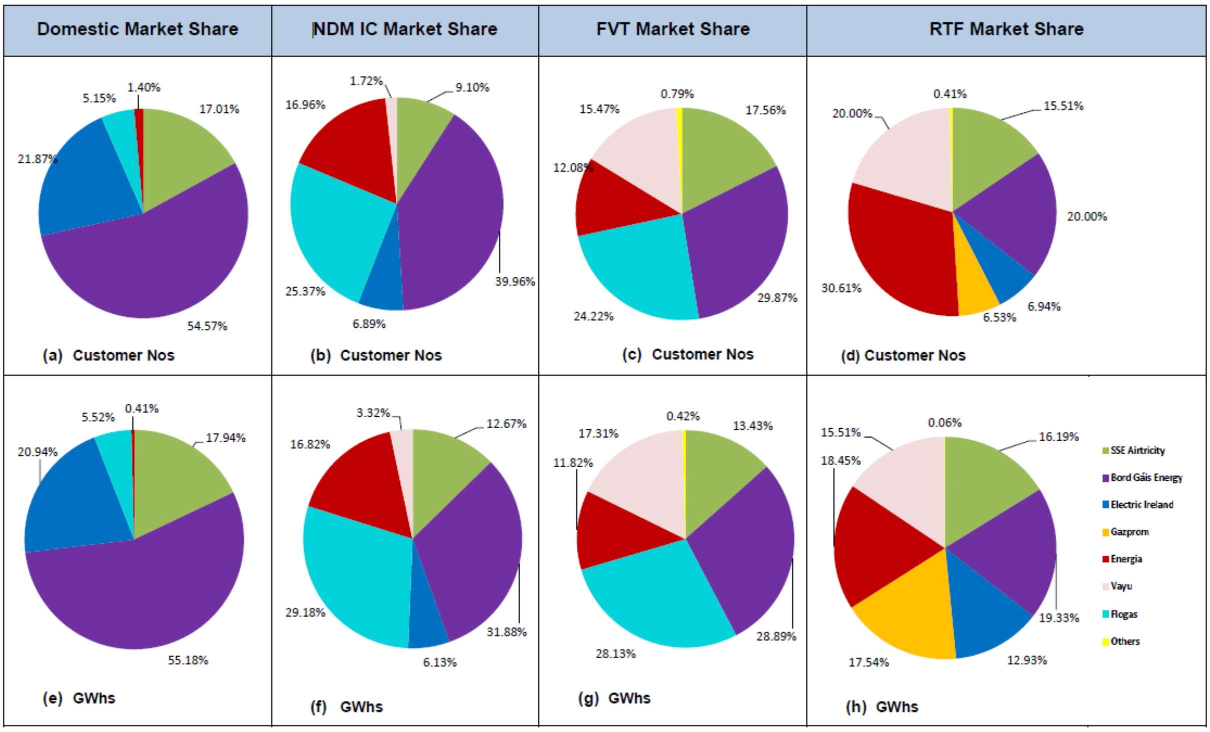


Figure 8.17: Q2 2014 Gas Market Share by Market Segment [4]

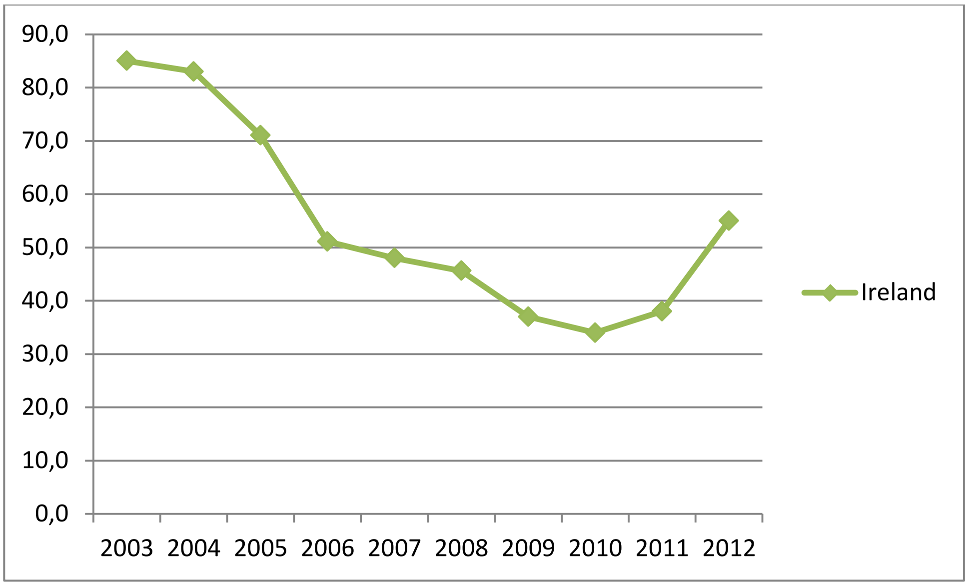


Figure 8.18: Market share (%) of the largest generator in the electricity market

Source: Eurostat

ESCO's market Development

The ESCO sector is in a phase of rapid development at present, largely due to strong support from the government and associated initiatives (EC JRC 2012) discussed further below. On the demand side, there are public and private sector organisations. On the supply side, there are a small number of large ESCOs that are pursuing large scale projects and particularly interested in Exemplar projects. Most of the larger ESCOs that provide full EPC solutions are large multinationals. There are some subsidiaries of large companies, doing ESCO projects as a side-business, that were particularly established to take advantage of the currently available grant programs. There are also a good number of small and medium energy supply companies, typically providing biomass heat supply contracts and co-generation contracts. Finally, there is a small number of smaller ESCOs emerging that are looking for opportunities of a suitable scale in the nascent ESCO market. New entrants are often traditional service organisations and manufacturers exploring the ESCO model in order to attracts new clients and occupy new business segments.

The latest figure about the size of the market is available from 2005 (€100 million), nevertheless it is expected that a study will reveal the current data in the near future (EC JRC 2012).

SEAI has taken a very active role in developing and supporting the ESCO market in Ireland, with momentum building in 2012 and 2013. In addition to promotional workshops, there is a dedicated section on the SEAI website where relevant documentation – policy, case studies, handbooks, standard forms of contract – is available (EC JRC 2012). SEAI has collected a series of case studies and disseminates their experiences. These projects were undertaken in the public and the private tertiary sectors and covered the following technologies: lighting, heating and insulation, water saving measures, equipment modernisation.

Information about barriers is scarce and therefore it is difficult to compare them. It seems that the ESCO and EPC concept is establishing a strong root these days in Ireland based on a complex set of actions. There is a strong supportive legislation and actions have been taken against disabling policies. Financing of ESCO projects is not a major barrier, though there is room for development primarily in involving banks to larger extent. Essentially, the "pay as you save" system is able to deal with split incentives and the energy efficiency investment costs are transferred between owners when a property is sold. On the other hand, transaction costs are high, which may decrease as experience and trust increases. There are problems with the knowledge and awareness of potential clients, which should be further improved through trainings, online dissemination of information and demonstration projects. As a result, trust needs to be further developed, too [3].

Table 8.2: ESCOs in Ireland in a snap shot

Number of ESCOs	large ESCOs: fewer than 5 small ESCOs: estimate fewer than 10 energy supply companies: circa 20, small and medium enterprises
ESCO market size and potential	*market size* is unknown *market potential* is unknown
ESCO market trend	strong growth
ESCO association	none
Typical ESCO projects	mostly pilot projects, mainly in the public and private tertiary sectors
Main type of contract	EPC, EPRP, LESC

Energy efficiency performance of the market

It can be seen that the penetration of all of the electrical appliances shown in figure 8.19 has increased over the period, with microwave ovens showing the largest increase (91% in 2009/2010 compared with 6.3% in 1987). While it could be argued that microwave ovens are a more energy efficient form of cooking, when compared to cooking on a hob or oven, but the significance is that the increase points towards a proliferation of convenience electrical appliances. The digital revolution of the last decade resulted in a large increase in the number of digital appliances. Ownership of home computers increased by 1,167% and the number of households with two or more TV's points grew by 363%. Most digital appliances use small amounts of energy, with the exception of televisions, set-top boxes and similar items that are on continuously, making them more significant energy users than occasional use items. Digital appliances are now consuming more than traditional appliances in many household in the OECD, according to the IEA. It can be reasonably assumed that the increasing penetration of appliances has had a significant effect on the demand for electricity. Furthermore, anecdotal evidence suggests that there has been an increase in the size of a number of traditional appliances, in particular televisions and refrigerators, which have also increased electrical demand. Some efficiency gains have been made through technical improvements and the labelling of appliances by energy usage has also helped inform purchasing decisions and contributed to a decrease in energy demand in some appliances. While it is not currently possible to quantify these effects on electricity consumption in Ireland (due to data limitations), the consumption is likely to be similar to typical OECD household electricity appliance consumption, as estimated by the International Energy Agency [5].

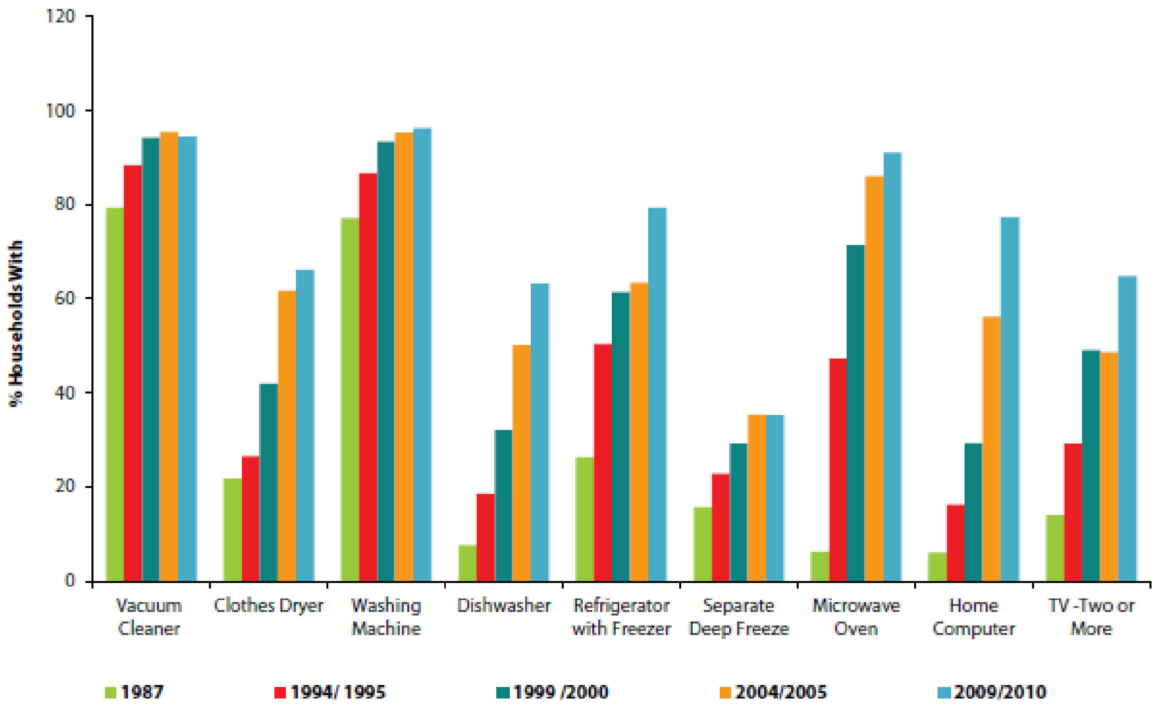


Figure 8.19: Penetration of Electrical Appliances – Various Years [5]

SMEs Access to finance

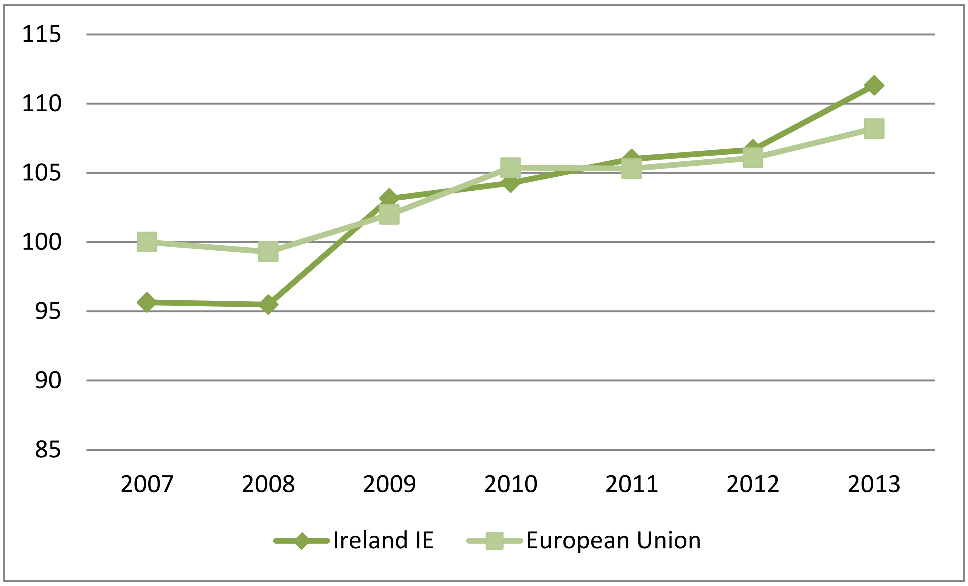


Figure 8.20: SMAF index in Ireland and European Union (EU=100, 2007)

Source: European Commission website

8.3.2 Evaluation of market preparedness – Identification of challenges

There is a registration scheme established for contractors under grant schemes and their works are inspected to a level of at least 10%. In addition the energy supplier obligation requires the energy suppliers to audit 20% of the works they report for energy credits against targets. The Building Energy Rating assessors (BER) who perform EPCs are also subject to both examination and audit.

There were 1321 contractors registered at time of checking (22/10/2014).

There is a number of reskilling and training programmes focused on energy which are QQI[49] run and FETAC[50] based. SEAI also supported some industry based training by setting training requirements on ISO 50001 and worked on developing a standard syllabus used by two training companies which ran free training. It is likely that SEAI will do something similar for

[49] Quality and Qualifications Ireland, http://www.qqi.ie/Pages/About-Us.aspx

[50] The Further Education and Training Awards Council or FETAC is a former statutory awarding body for further education in Ireland; it was established on June 11, 2001. FETAC was dissolved and its functions were passed to Quality and Qualifications Ireland (QQI) on November 6, 2012.

SI399 on energy efficient design. In the residential grant programme space SEAI runs toolbox talks and accompanied inspections for purposes of training the registered contractors. In addition SEAI has been running energy map training for small and medium enterprises on structured energy management for the past 6 years.

A new survey on the state of the commercial building stock (pending publication) is supplementing the significant data already available on the residential sector. Residential sector data includes the national BER research tool[51] where all BER certificate details are made public. This has been used to estimate the potential remaining for different energy efficiency measures.

Energy savings could be realized more easily under the EEO by a combination of measures. Deep retrofit is being encouraged, but in the end the market is being driven by the cheapest savings, and associated deemed energy savings credits.

The Irish EEO scheme addresses risks related to picking the low hanging fruits and subsequent risks of not realizing energy savings potential towards target fulfilment by the fact that the residential grant programme tries to encourage harder to treat measures and is looking at how to encourage deeper retrofit. Encouragement of company audits in the non-residential market will seek to promote wider efficiency projects, The EPC model should help in this space by packaging a number of measures to balance payback levels.

8.4 Administrative preparedness

8.4.1 Evaluation of administrative preparedness in relation to the EEO scheme

The Irish stakeholders believe that the state can be effective in the implementation and enforcement of the EEO scheme because there is Irish legislation in place and energy efficiency notices have been issued to obligated suppliers by the Minister. A Penalty process is included in the legislation and prices have been published regarding any non-compliance. There are quarterly governance meetings with suppliers to discuss issued on the scheme.

There are some previous actions or existing energy efficiency measures that may provide experience in encountering free riders. It is always difficult to determine free-ridership - for example via a grant scheme or other support mechanism but Ireland has worked out an

[51] http://www.seai.ie/Your_Building/BER/National_BER_Research_Tool/

approach for materiality and believes that this approach also addresses the issue of additionality. The energy supplier must provide either funding or services (pre-audits, project manager, MRV). This demonstrates materiality (i.e. that the measure is taken really). A key feature of the materiality system under the existing voluntary programme, is that energy suppliers must have in place an agreement with a third party prior to any energy savings being realised. Ireland believes that this demonstrates causality, the manifestation of which may be services in kind or monetary contributions - both of which are features of the existing programme. There are different layers of evidence for additionality. In the voluntary scheme it appears in many cases that if the supplier does not take the role of initiating the project, the project was not going to happen anyway and this demonstrates that the project is additional. In the grant scheme for households results of earlier research show that measures are generally not implemented without the grant. In the planned scheme there will be conducted again some research to survey the degree of additionality. For the not grant aided projects there is in place a robust audit system with checks for quality/additionality. The government is in discussions with a number of parties who are interested in creating a trading platform for energy savings, which if successful, would, in their opinion, represents a strong indicator of materiality.

8.5 Legislative preparedness

8.5.1 Description of Status quo

The government published legislation to support both the voluntary agreement period and the new obligation scheme. SI[52] 131 2014 is new legislation published to support the EEO.

8.5.2 Evaluation legislative preparedness – Identification of challenges

There are no particular legislative challenges to designing the EEO.

[52] Statutory Instruments

8.6 Social & Political acceptance/feasibility

8.6.1 Description of Status quo

At this section, we explore the social and political acceptance of the EEO scheme by looking at the following indicators:

- The Market Performance Indicator (MPI), which indicates to what extent the market brings the expected or desired outcome to final consumers. It is the average of four components: comparability, trust, problems & complaints and expectations, each of which has an equal weight. It is measured as a score between 0 (negative evaluation) and 10 (positive evaluation). In order to neutralize the external effects, we would use the normalized indicator, nMPI [7].
- Level of fuel poverty within the country
- Social perspective
- Industry perspective

Irish consumers' rating for their energy suppliers are quite high, ranking the retail electricity and gas market as the seventh among all European countries as to trusting providers and comparability in 2012 [6, 7].

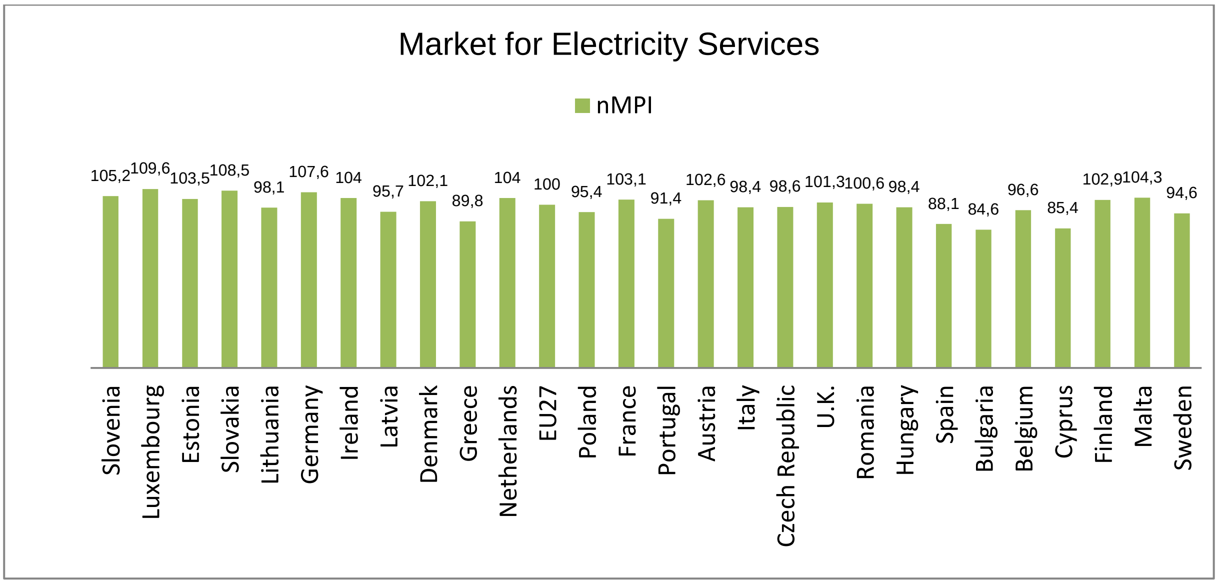


Figure 8.21: nMPI Scores in European Electricity Services' Markets [6]

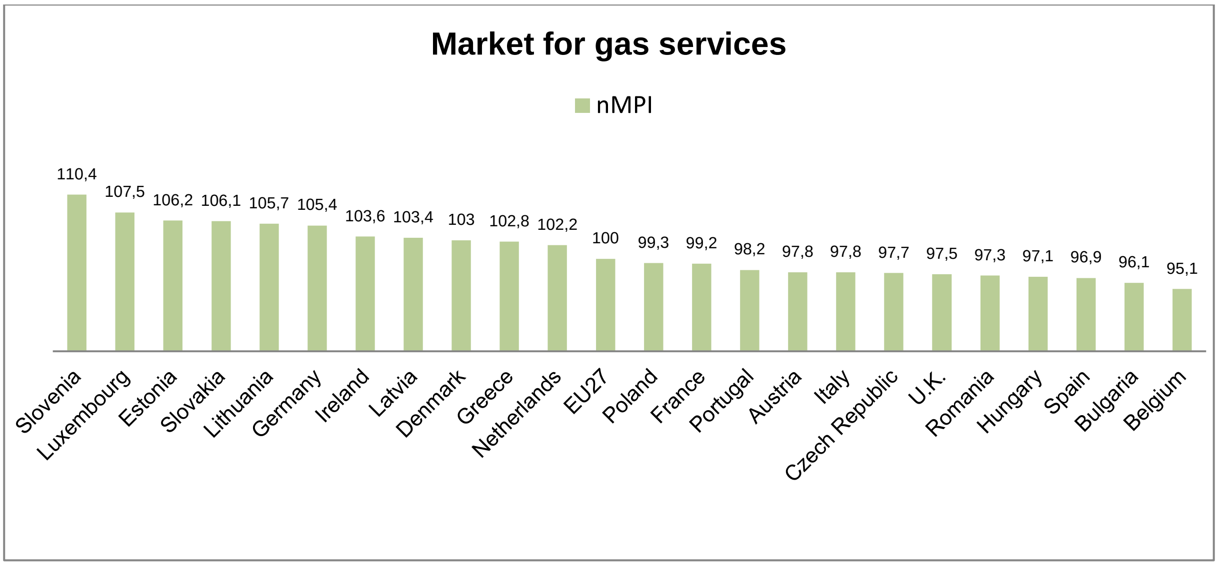


Figure 8.22: nMPI Scores in European Gas Services' Markets [7]

8.6.2 Evaluation of social acceptance/feasibility – Identification of challenges

Energy efficiency is still very much a priority for the Irish Government, and political support is evident. Legislation is in place to support the EEO, the public sector have signed up to energy efficiency targets. The government has invested in the energy efficiency fund and is currently exploring ways to encourage financing models and products in the residential sector.

Fuel poverty is specifically addressed via a Warmer Homes Strategy. The strategy document includes estimates of the extent of the issue.[53]

On average, households had to pay more for their energy needs relative to their income in 2009 than was the case in 2005, meaning that their energy needs became less affordable during this period. The average share of household income spent on energy (all households) was 3,8% in 2005 and 4,8% in 2009. [53]

A preliminary measure of energy poverty is estimated which compares an individual household's actual expenditure on energy, relative to its income, to the average proportion of income spent on energy across all households in the State. Under the preliminary approach, a household is considered to be experiencing energy poverty if, in any one year, it spends more than 10% of its disposable income on energy services in the home. Another

[53] WARMER HOMES, A Strategy for Affordable Energy in Ireland

approach is a subjective measure of energy affordability. It is also possible to measure energy affordability based on self-reported, subjective measures. This approach is based on householders' responses to a range of questions that elicit subjective responses, posed as part of ongoing survey research. According to the first approach (actual expenditure on energy more than 10% of disposable income) approximately 20% of all households in 2009 were experiencing energy poverty. According to the subjective approach 8% of households experienced energy poverty in 2008. The numbers reported as being in energy poverty vary considerably depending on the approach adopted (expenditure versus subjective reporting). This is one of the challenges in developing a robust reporting measure as neither methodology accurately represents the true picture of households in energy poverty. This dichotomy highlights the need for a comprehensive measure that reports on the need to spend as opposed to actual expenditure. [53]

It is difficult to ascertain that residential consumers trust their energy suppliers but in research on which consumers would go to for energy efficient advice, energy suppliers were quite high on the list. They are also beginning to provide wider advice services to consumers, which should see them connected in the consumer mind with this space.

Whether or not the public view is against or in favour of the introduction of the EEO scheme is difficult to judge. It is not sure that the wider consumer world is very aware of obligations but they are becoming more aware that their energy suppliers are beginning to provide services and incentives in this space. Probably they are not aware of the underlying driver.

There are no indications that social partners (building owners, gas and electricity retailers) would be uncooperative or negative against the EEO scheme.

The fact that the social acceptance of the EEO scheme could play a significant role in the implementation of the EE scheme is not an issue at this moment. However, this might become one if it was seen that suppliers were passing on significant costs to consumers but this is not evident to date.

The stakeholders contacted to validate this report are: Josephine Maguire and Jim Scheer of SEAI.

REFERENCES

[1] Demand Side Management in Ireland, EVALUATING THE ENERGY EFFICIENCY OPPORTUNITIES, Main Report, A Study by Kema for Sustainable Energy Ireland, January 2008

[2] KKL Energy assessors, http://kkl.ie/

[3] ESCO Market Report 2013, Paolo Bertoldi, Benigna Boza-Kiss, Strahil Panev, Nicola Labanca, JRC Science and Policy Reports, 2014

[4] Electricity & Gas Retail Markets Report Q2 2014, CER, 2014

[5] Energy in the Residential Sector, 2013 Report, SEAI

[6] 8th Consumer Markets Scoreboard, 2012, European Commission, DG SANCO, http://ec.europa.eu/consumer_research/editions/cmc8_en.htm

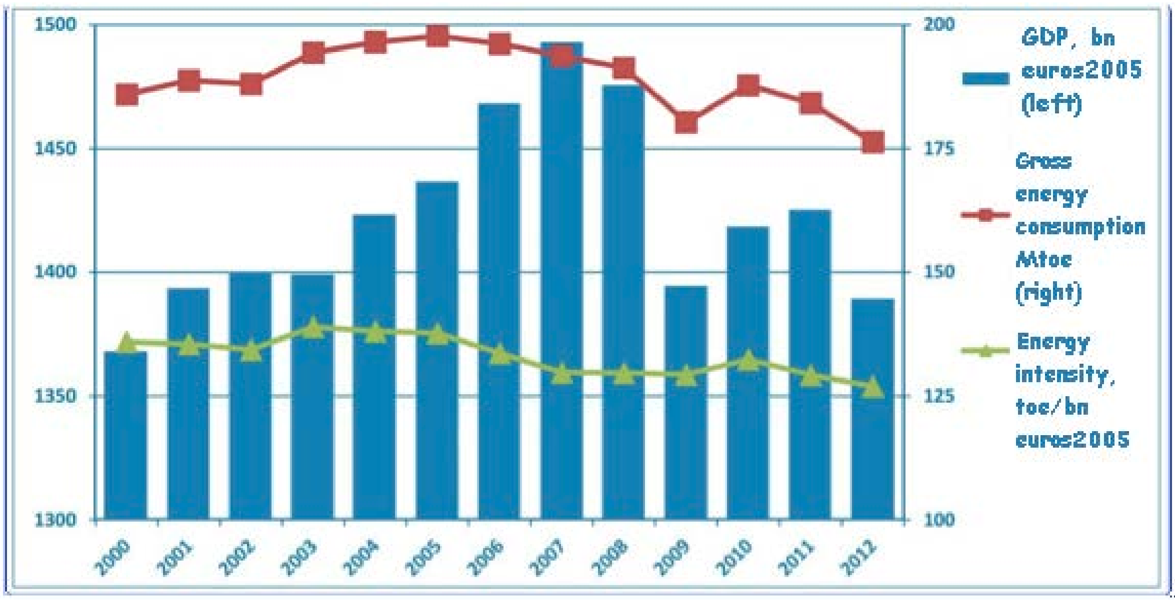
[7] European Consumer Markets Monitoring survey, http://ec.europa.ec/consumers/strategy/cons_satisfaction_en.htm

9 Italy - FIRE

9.1 Economic profile

9.1.1 Description of Status quo

Italian GDP has been constantly growing in the first years of 2000 until 2007, as shown in the figure below



Since then, the country has been facing an economic recession phase, interrupted only in the years 2010 – 2011, which is still going on. The figure below shows how GDP (blues rectangles) collapsed in 2009, falling almost to the level of 2001, before somewhat recovering in the two following years and decreasing again in 2012 to below the 2001 level.

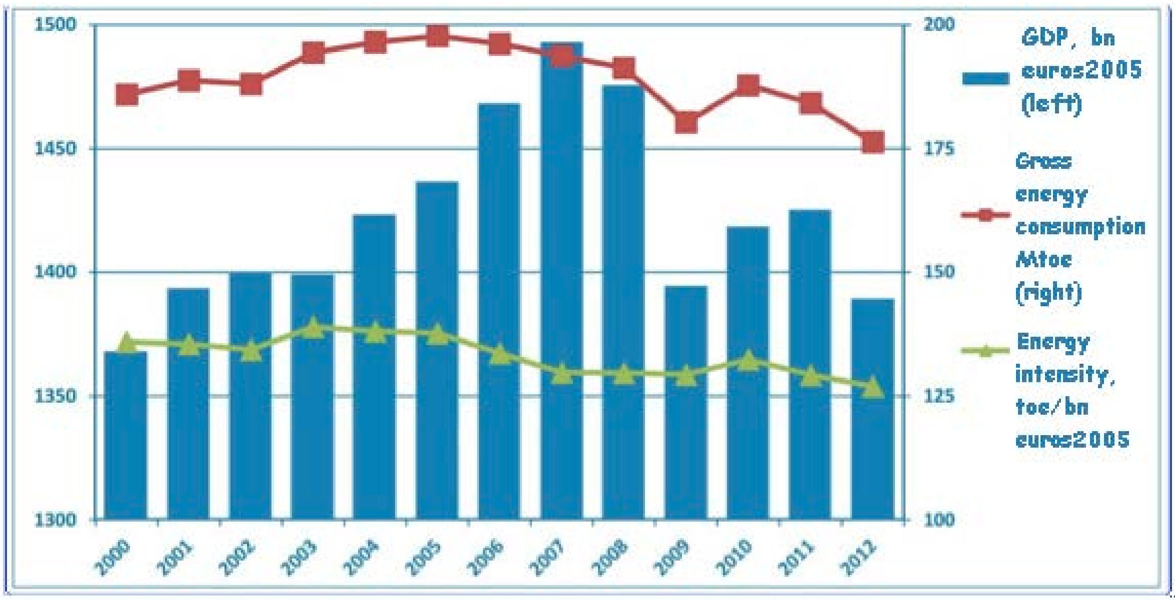


Figure 9.1: Energy intensity, GDP and energy consume in Italy, 2000 – 2012

Source: Annual energy efficiency report, ENEA 2012.

In the same years, energy consumption followed the GDP trend facing a strong decrease in 2009, recovering in 2010 but then decreasing again in the following years.

Concerning energy prices, since 2008 electricity and natural gas prices decreased and started growing again only in 2010 (Figure 9.2), while energy consumption followed GDP trend and stopped growing in 2008, falling down in 2009, also showing a relation between energy prices and energy consumption. Since then its level it is still far away from 2008 (Figure 9.1).

Figure 9.2 shows the level of energy prices (electricity and natural gas prices) in all EU28, allowing a comparison between Italy and EU28 average prices in the period of time 2011 - 2013. The energy prices include taxes and levies, which in 2014 had a share of almost 30% of the final cost for households and around 37% of the final cost in 2014[54]. As it is clearly pointed out by the figure, the level of Italian energy prices is always above the European average in the two cases taken in to account (households and residential sectors). Energy savings related to energy efficiency measures can represent one of the main solution to increase the competition of the Italian industries.

[54] Electricity price statistics, Eurostat data source.

	Electricity prices						Gas prices					
	Households (1)			Industry (2)			Households (3)			Industry (4)		
	2011	2012	2013	2011	2012	2013	2011	2012	2013	2011	2012	2013
EU-28	0.179	0.188	0.199	0.110	0.115	0.120	0.056	0.063	0.065	0.035	0.040	0.041
Euro area (EA-17)	0.190	0.198	0.211	0.116	0.121	0.127	0.062	0.069	0.073	0.037	0.042	0.043
Belgium	0.214	0.233	0.217	0.110	0.108	0.108	0.063	0.069	0.066	0.033	0.035	0.040
Bulgaria	0.083	0.085	0.092	0.065	0.069	0.081	0.043	0.049	0.051	0.029	0.036	0.036
Czech Republic	0.150	0.150	0.153	0.111	0.104	0.102	0.054	0.066	0.064	0.031	0.034	0.034
Denmark	0.291	0.300	0.300	0.099	0.097	0.103	0.116	0.111	0.113	0.045	0.048	0.049
Germany	0.253	0.260	0.292	0.125	0.128	0.143	0.059	0.064	0.066	0.046	0.047	0.048
Estonia	0.097	0.110	0.135	0.072	0.078	0.097	0.042	0.050	0.052	0.028	0.037	0.038
Ireland	0.190	0.216	0.230	0.116	0.132	0.136	0.051	0.061	0.065	0.038	0.038	0.042
Greece	0.125	0.139	0.156	0.105	0.118	0.125	:	:	0.077	:	:	0.053
Spain	0.198	0.219	0.223	0.114	0.121	0.122	0.054	0.066	0.073	0.029	0.036	0.039
France	0.138	0.139	0.147	0.085	0.095	0.096	0.058	0.064	0.068	0.037	0.039	0.041
Croatia	0.114	0.121	0.137	0.091	0.090	0.095	0.038	0.038	0.047	0.041	0.043	0.046
Italy	0.199	0.213	0.229	0.152	0.165	0.168	0.069	0.077	0.083	0.031	0.042	0.042
Cyprus	0.205	0.278	0.276	0.167	0.224	0.208	-	-	-	-	-	-
Latvia	0.117	0.138	0.138	0.098	0.110	0.113	0.039	0.051	0.051	0.029	0.037	0.038
Lithuania	0.121	0.126	0.137	0.105	0.114	0.123	0.044	0.051	0.060	0.035	0.045	0.044
Luxembourg	0.168	0.170	0.167	0.100	0.105	0.098	0.051	0.058	0.062	0.042	0.051	0.051
Hungary	0.168	0.155	0.140	0.100	0.095	0.096	0.056	0.048	0.043	0.031	0.044	0.041
Malta	0.170	0.170	0.170	0.180	0.180	0.180	-	-	-	-	-	-
Netherlands	0.174	0.186	0.192	0.098	0.097	0.096	0.064	0.076	0.081	0.034	0.037	0.040
Austria	0.199	0.198	0.208	0.113	0.110	0.111	0.069	0.076	0.077	0.035	0.045	0.045
Poland	0.147	0.142	0.148	0.101	0.092	0.093	0.046	0.047	0.047	0.033	0.034	0.036
Portugal	0.165	0.199	0.208	0.099	0.114	0.115	0.061	0.074	0.084	0.034	0.040	0.042
Romania	0.108	0.105	0.132	0.080	0.083	0.090	0.028	0.027	0.029	0.023	0.026	0.028
Slovenia	0.144	0.154	0.161	0.099	0.095	0.097	0.067	0.080	0.067	0.045	0.058	0.049
Slovakia	0.168	0.172	0.170	0.128	0.132	0.129	0.047	0.052	0.050	0.035	0.040	0.037
Finland	0.154	0.155	0.158	0.076	0.076	0.075	:	:	:	0.042	0.047	0.049
Sweden	0.209	0.203	0.210	0.089	0.081	0.080	0.119	0.117	0.123	0.051	0.054	0.055
United Kingdom	0.143	0.168	0.174	0.098	0.115	0.118	0.043	0.052	0.053	0.025	0.032	0.035
Iceland	:	0.111	0.105	:	:	:	:	:	:	:	:	:
Norway	0.213	0.188	0.191	0.111	0.092	0.097	:	:	:	:	:	:
Montenegro	0.087	0.091	0.102	0.061	0.065	0.073	:	:	:	:	:	:
FYR of Macedonia	:	:	0.081	:	:	0.080	:	:	:	0.038	0.047	0.041
Serbia	:	:	0.056	:	:	0.057	:	:	0.041	:	:	0.038
Turkey	0.122	0.131	0.150	0.079	0.086	0.093	0.029	0.032	0.041	0.022	0.025	0.031
Albania	0.115	0.116	0.116	:	:	:	:	:	:	:	:	:
Bosnia and Herzegovina	0.075	0.080	0.080	0.061	0.065	0.065	0.045	0.056	0.056	0.048	0.057	0.057

Figure 9.2: Electricity and natural gas prices, Italy and EU28 2011 - 2013

Source: Eurostat.

The energy dependency rate shows the extent to which an economy or a country depends on primary energy sources imports in order to meet its energy needs. Italy has a very high energy dependency rate as it is pointed out in **Error! Reference source not found.**9.1: almost 80-85% of its natural primary sources on average (including oil, natural gas and solid fuels) comes from imported sources.

Table 9.1: Italy energy dependence, 2001- 2002

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Italy	85.1	84.1	85.5	83.9	88.6	84.0	81.4	83.4	81.4	75.1	77.6	79.5

Source: Eurostat.

Countries with such a high level of energy dependency should improve their energy efficiency, with the result of having the same results importing (and using) less energy sources. The decrease in the Italian import is due not only to energy efficiency improvement but also to external factors (economic crisis and fall of the industrial production). Decreasing energy dependency through the development of energy efficiency and RES is a priority recognized by the Italian energy strategy issued in 2013 (D.M. 8 marzo 2013).

The Italian energy dependency is higher than the EU28 average (**Error! Reference source not found.**) even if few other countries reach the 80% rate of dependency (Belgium, Cyprus, Malta, Portugal, Hungary, Luxembourg) and others are above 60% (Greece, Ireland, Spain, Lithuania, Latvia, Austria, Slovakia). Reducing energy dependence and improving at the same time energy security are two of the main arguments of the national energy policy in favour of WhC, as stated by GSE in the last report on the mechanism in 2013[55].

[55] Annual report "Rapporto annuale sul meccanismo dei certificati bianchi, gennaio – dicembre 2013", 2014, GSE.

Table 9.2: Energy dependence rate per EU country, 1995-2011

%	1995	2000	2005	2009	2010	2011
EU-27	43.2	46.7	52.4	53.8	52.6	53.8
Index 1995	100	108	121	124	122	125
BE	80.9	78.1	80.1	74.3	76.8	72.9
BG	57.2	46.5	47.5	45.3	40.1	36.6
CZ	20.6	23.0	28.3	27.1	25.6	27.9
DK	33.3	-35.3	-50.9	-20.4	-16.9	-8.5
DE	56.8	59.5	61.2	61.5	59.8	61.1
EE	32.4	32.0	25.4	21.4	13.1	11.7
IE	69.2	84.6	89.3	88.2	85.6	88.9
EL	66.7	69.5	68.6	67.8	69.1	65.3
ES	71.7	76.7	81.4	79.2	76.8	76.4
FR	48.0	51.6	51.7	51.0	49.1	48.9
IT	82.0	86.5	84.4	82.8	83.8	81.3
CY	100.4	98.6	100.7	96.3	100.7	92.4
LV	70.4	59.7	63.0	58.8	41.6	59.0
LT	63.4	59.8	57.0	50.3	82.0	81.8
LU	97.7	99.6	97.3	97.4	97.0	97.2
HU	48.0	55.2	63.2	58.7	58.3	52.0
MT	104.8	100.3	100.0	101.1	99.1	100.6
NL	18.3	38.7	38.4	36.5	30.7	30.4
AT	66.6	65.6	71.4	65.0	62.1	69.3
PL	0.0	10.6	17.6	31.7	31.6	33.7
PT	85.4	84.9	88.5	81.0	75.4	77.4
RO	30.8	22.0	27.6	20.2	21.7	21.3
SI	50.8	52.6	52.3	48.1	49.4	48.4
SK	68.9	65.0	65.4	66.4	63.0	64.2
FI	53.9	55.3	54.2	54.0	48.3	53.8
SE	37.6	39.2	37.7	37.1	36.7	36.8
UK	-16.2	-17.0	13.4	26.2	28.1	36.0

Source: EU Commission, "EU Energy in figures", 2013.

The Italian government debt is the third highest one after Greece and Portugal out of all the EU countries, which have a threshold of 60% (even if the trend between 2012 and 2013 has been an increase of the debt for almost half of the EU28, as shown in Figure 9.3). Having a very high public debt level nullifies the effect of higher taxes revenues that could be used to sustain the economic growth. For this reason, the cut of the debt should be among the top priorities of the country economic policies, but it is a difficult achievement due to the economic stagnation and the GDP trend illustrated above. Since most of the national policies are financed through electricity and gas tariffs, the cut of the public debt should not have a particular impact on the available resources[56]. On the other hand, it is deeply affecting the capability of public and private organizations and families to invest in energy efficiency, since

[56] The same cannot be said of RES incentives, since in that case the strong impact on tariffs of the incentive schemes has taken the government to a deep revision of the policies and a cut in subsidies between 2011 and 2014.

the adopted policies put a hard strain on them through taxes and reduction of services. For this reason a lot of effort has been placed in introducing tools and incentives to support third party financing, among which there is the guaranteed fund introduced in the transposition of the EED directive (still to enter into force).

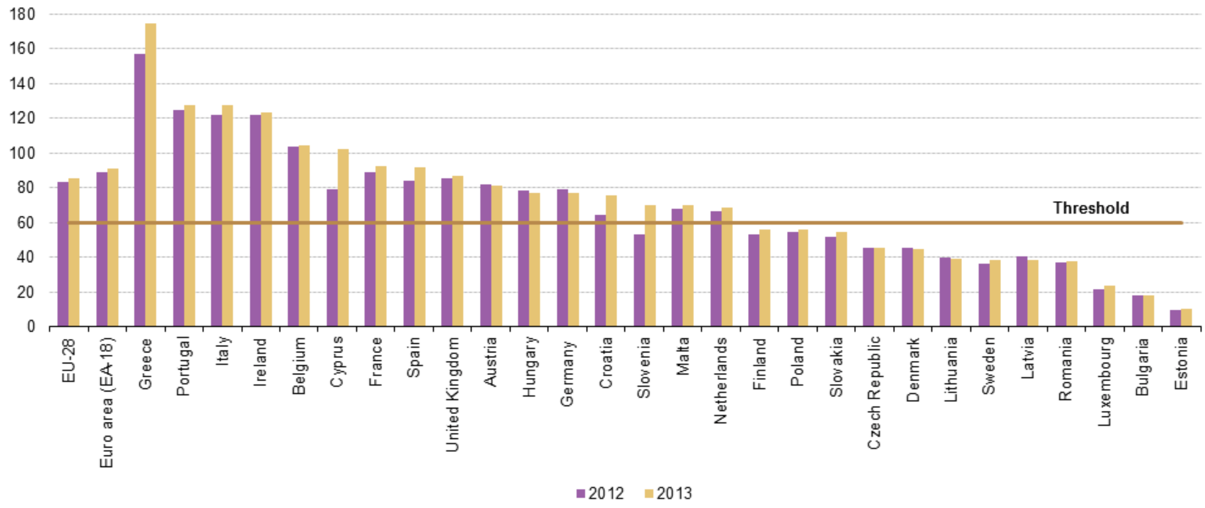


Figure 9.3: General government debt (5) in 2012 and 2013

Source: Eurostat.

The situation of the Italian economy has been in a negative phase during most of 2014, and it is foreseen to return in a positive phase by mid-2015 by the OECD. The main driver will be represented by the raise of investments that will support the increase of exports and consequently of the internal growth. The evolution of the economic key indicators at world level will obviously impact on the development of the European and Italian markets.

In line with the negative economic framework shown in the previous figures, the level of the unemployment rate is still very high: 112 shows how the situation has been getting worst in 2014.

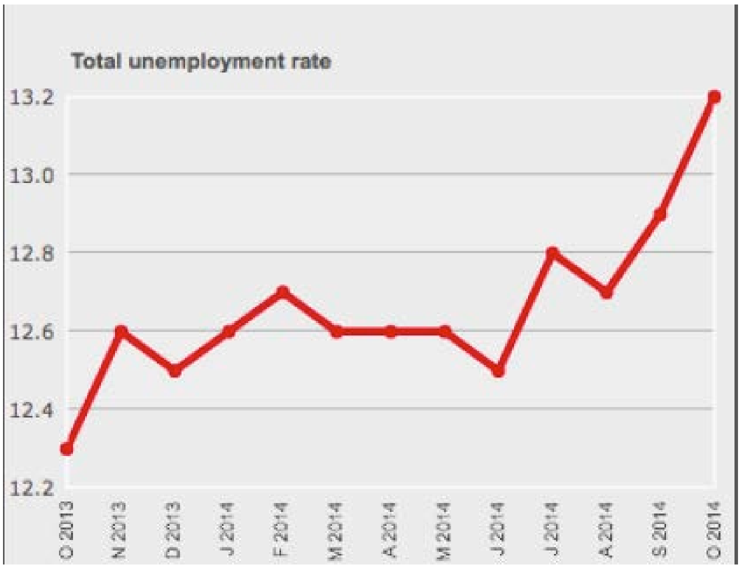


Figure 9.4: Italy unemployment rate (%) in years 2013 – 2014

Source: ISTAT.

OECD foresees a change towards a positive trend only in 2016, but the rate will stay high in comparison to other EU countries.

9.1.2 Evaluation of economic preparedness - Identification of financial challenges

Together with the economic situation, which negatively affects also the possibility to access to third party financing, it is important to take into consideration the high level of Italian energy dependency and the costs of energy compare to other EU countries. The reduction of energy dependence could lead to an economic development generated by energy efficiency. On the basis of the objectives identified in the National energy strategy 2011, it is considered crucial also the decrease in primary energy consumption in a range from 17% to 26% in 2050 (compared to the levels of 2010), by decoupling economic growth from energy consumption[57].

Even if the underlying economic framework presently is not positive, the situation in terms of convenience in implementing energy efficiency projects can be assumed interesting, especially if compared to other countries. In this situation, an EEO obligation linked to an incentive schemes due to the presence of a tradable market for white certificates, as it is the case in Italy, can help accelerating the process and facilitating the achievement of the energy

[57] Report on white certificates scheme, GSE, 2013.

efficiency targets. It is worth noticing that when the white certificate scheme was introduced in Italy in 2001 (even if the market started effectively in 2005) the situation was completely different: the economic and financial framework was good, the introduction of the Euro had yet to produce a loss of purchasing power, energy prices were still low, after a decade characterized by the lowest oil prices. At that time the introduction of the scheme was seen as a tool capable of ensuring the achievement of energy efficiency targets, while creating an ESCO market[58] and stimulating the interest toward energy efficiency through the possibility for ESCOs to sell white certificates obtained through energy efficiency projects.

The Italian white certificates (WhC) scheme is an energy efficiency obligation scheme, based on an energy efficiency obligation imposed on electricity and gas distributors. The scheme acts also as an incentive for voluntary parties (ESCOs and companies with energy managers or energy management systems) that can sell white certificates obtained through the implementation of energy efficiency projects to obliged distributors on a tradable market for certificates. The purchase of the white certificates is the economic incentive for the end user or operator (obliged or not) who sell it and determines an additional cash flow to that related to energy saving. The scheme works on the basis of a market made up of a demand (the obligation) and an offer of WhC, which determines the price of the certificates and therefore the amount of the incentive.

In addition to the WhC scheme, other kinds of incentives have been created to support energy efficiency in the country, such as the thermal account and the tax deductions of 65%-50% for energy efficiency actions in buildings[59]. Thermal account allocates funds for a total annual expenditure of 200 million euro for the interventions made or to be made by public administration and a cumulative annual expenditure of 700 million euro for the interventions made by private entities.

Another tool to support the creation of favourable market framework is the Fund for youth employment in the field of green economy, launched in Italy at the beginning of 2012, which consists of 460 million euro in form of a low interest loan. Besides D.Lgs. 102/2014 provides for the introduction of a new revolving guarantee energy efficiency fund that shall be defined through a ministerial decree in 2015.

[58] In the beginning only ESCOs could present projects, together with electricity and gas distributors and energy service companies owned by them. Afterwards also companies with energy manager and energy management systems were allowed to act as voluntary parties.

[59] Even if tax deductions imply a (small) increase in the public debt, they are kept active since the overall economic effect on the public balance sheet is estimated positive by various studies, due to the increase in revenue from labour taxes and VAT (tax deductions have been quite good at reducing black labour).

So, even if the underlying economic framework presently is not positive, the situation in terms of convenience in implementing energy efficiency projects can be assumed interesting. In this situation, an EEO obligation linked to an incentive schemes due to the presence of a tradable market for white certificates, as it is the case in Italy, can help accelerating the process and facilitating the achievement of the energy efficiency targets. It is worth noticing that when the white certificate scheme was introduced in Italy in 2001 (even if the market started effectively in 2005), its introduction was seen as a tool to ensure the achievement of energy efficiency targets, while creating an ESCO market[60] and stimulating the interest toward energy efficiency through the possibility for ESCOs to sell white certificates obtained through energy efficiency projects.

9.2 Energy & Climate Change profile (Energy Savings' Potential)

9.2.1 Description of Status quo

The financial crisis in Italy meets high energy prices for small and medium enterprises and for the service sector. This mix helped creating awareness for energy efficiency and implementing energy efficiency actions, after more than a decade of large disinterest linked to the low cost of energy that characterized the nineties.

As shown in Figure 9.5: Energy intensity in the industrial sectors

9.5, energy intensity in industry has been growing from 1996 to 2003 in Italy and started decreasing in the last years, following the energy consumption trend. The chemical sector had the most important energy intensity reduction together with the textile one. According to IEA's Energy efficiency market report 2014, energy efficiency played the main role in reducing energy consumption between 2003 and 2007, structural effects have been visible between 2005 and 2009, and activity modifications between 2007 and 2011.

[60] In the beginning only ESCOs could present projects, together with electricity and gas distributors and energy service companies owned by them. Afterwards also companies with energy manager and energy management systems were allowed to act as voluntary parties.

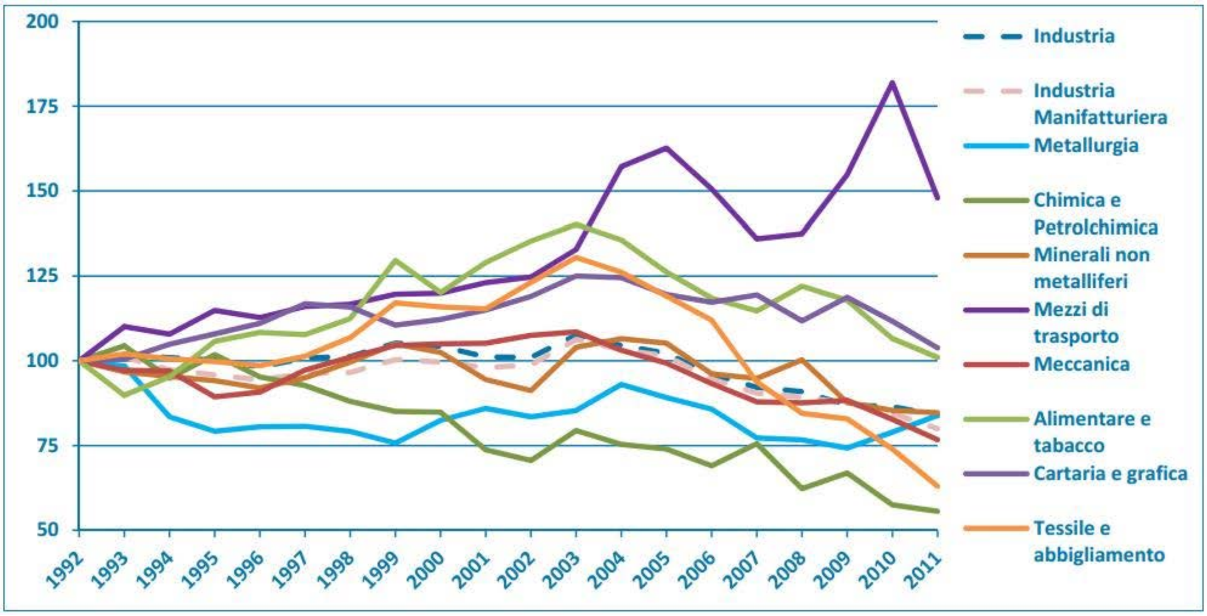


Figure 9.5: Energy intensity in the industrial sectors

Source: Annual energy efficiency report, ENEA 2012.

In addition to energy intensity rate, ODEX is another important index used to measure energy efficiency trend and improvements. Figure 9.6: Odex index, 1990 - 2011

9.6 shows how energy efficiency improved since 1990, illustrating the good performance of the residential sector (1.8%/year 1990-2005 due to heating systems enhancements and around 0.5% yearly in the last ten years, mainly due to electricity appliances enhancements) and of the industrial sector which scored a 7% improvement between 2005 and 2011.

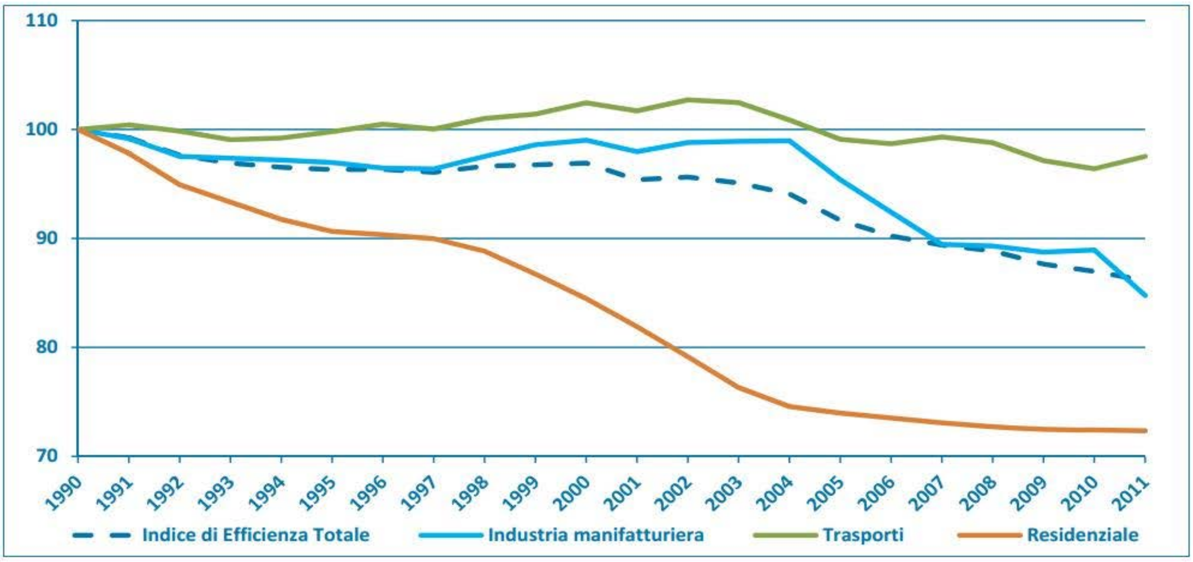


Figure 9.6: Odex index, 1990 - 2011

Source: Annual energy efficiency report, ENEA 2012.

Figure 9.7 shows the total primary energy sources trend in Italy in the last 40 years, highlighting how the role of natural gas has grown in comparison with the share of oil, and how renewable sources have been increasing significantly in the last few years.

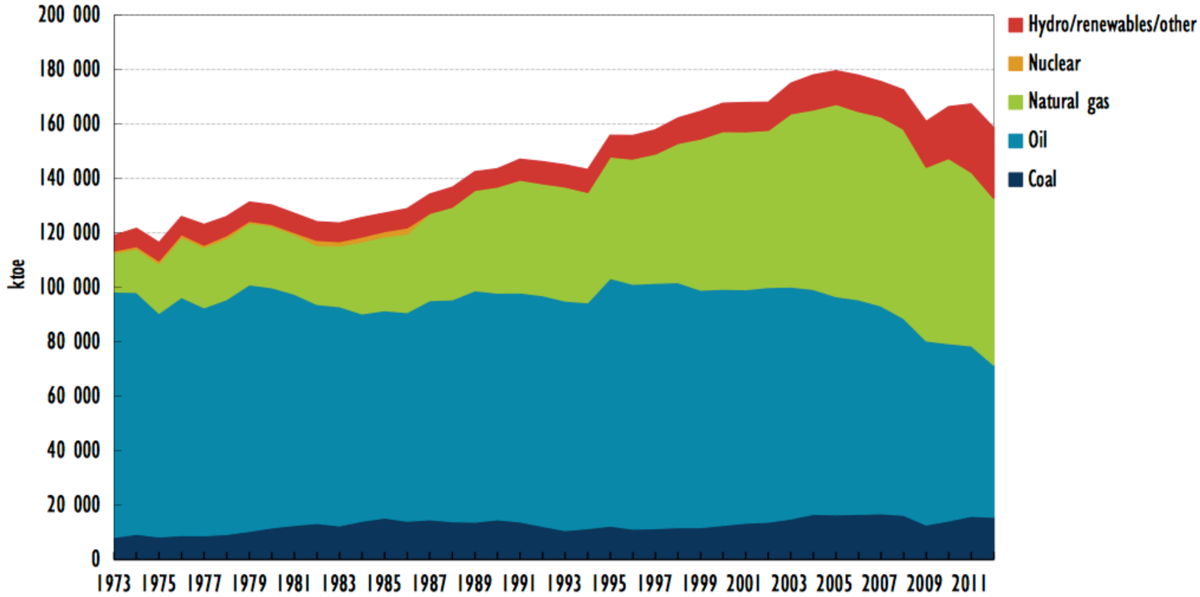


Figure 9.7: Total primary energy sources trend in Italy, 1965 – 2010

Source: IEA energy supply security 2014.

The five largest energy consumers in 2012 were Germany, France, United Kingdom, Italy and Spain, accounting all together for 64% of total EU28 energy consumption. Almost all the EU28 registered a decrease of the consumption between 2006 and 2012, and in the same period of time energy consumption increased in Estonia (+11.6%), the Netherlands (+2.9%), Poland (+0.8%) and Sweden (+0.4%).

The Figure below shows the energy intensity of Italy and of EU28, which means the relation between the gross inland consumption of energy and the GDP. The level of energy intensity in the country is quite low compared to the others, due to the energy efficiency actions but also to the Italian industrial structure.

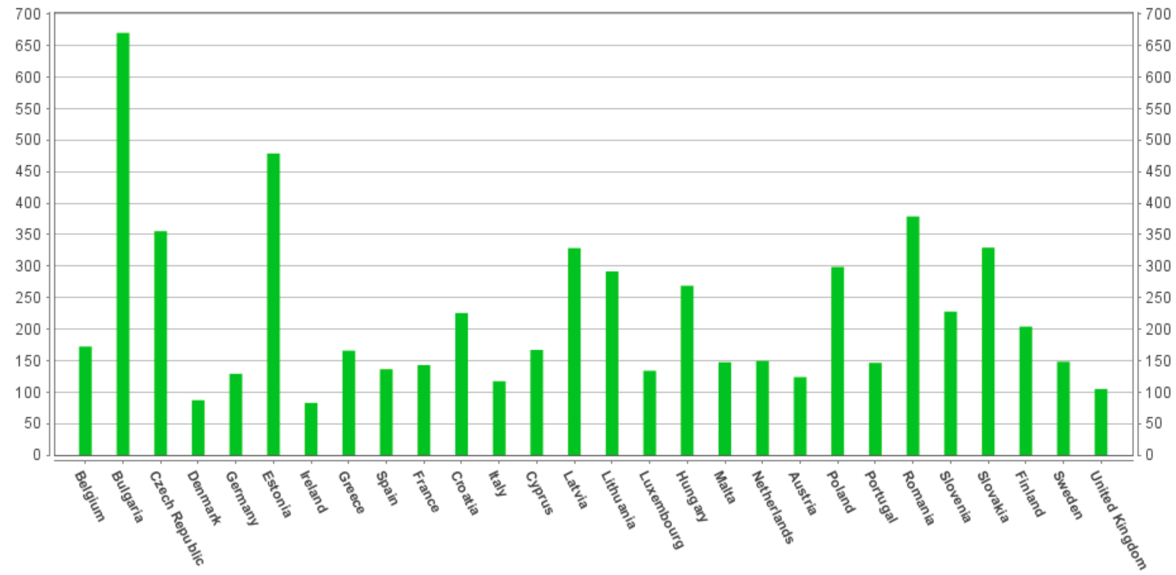


Figure 9.8: Energy intensity of the economy, EU28, 2012

Source: Eurostat.

Concerning Figure 9.9: Primary energy consumption in 2011 and national energy efficiency targets for 2020 in EU Member States

9.9 and Figure 9.10: Final energy consumption in 2011 and national energy efficiency targets for 2020 in EU Member States

9.10, it is interesting to put on evidence the fact that while there are reductions to be foreseen in the primary energy consumption, the final energy consumption is supposed to rise. It means that a large part of the effort is expected to come from improvements in the transformation sector[61], at least for countries such as Italy (plus Poland and United Kingdom).

The national indicative energy efficiency targets, as they stand today, strongly reflect different national circumstances (particularly concerning the economic outlook), different situations regarding early actions to improve energy efficiency, and different analytical capabilities existing in Member States. The level of ambition at the moment set by the Member States will go a long way towards the political objective of 20 % but will not achieve it, particularly in the event of economic recovery in Europe[62].

[61] Trends and projections in Europe 2013, Tracking progress towards Europe's climate and energy targets until 2020, EEA Report n. 10/2013.

[62] Same as above.

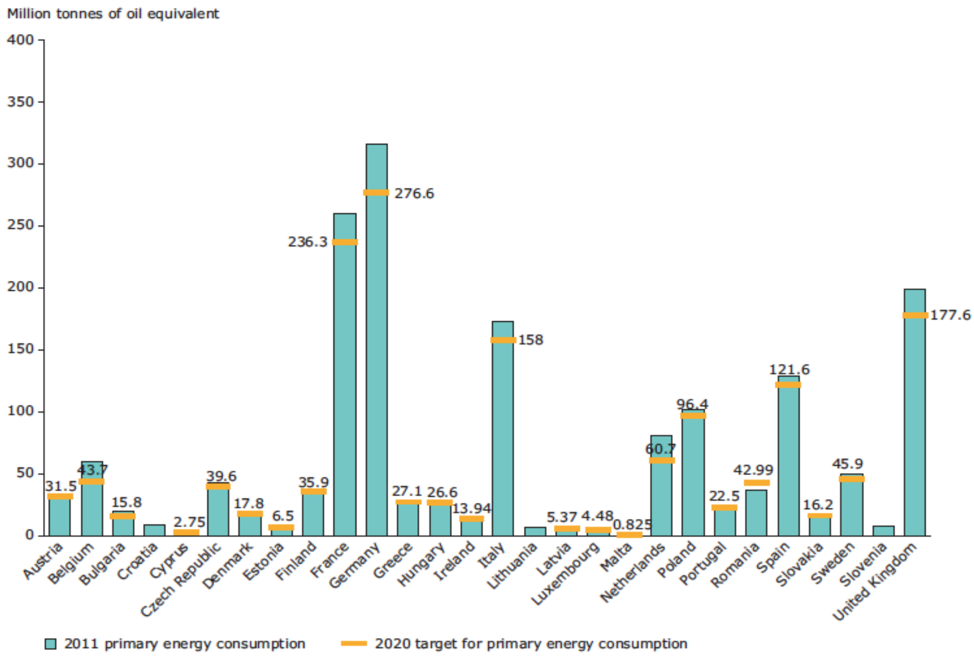


Figure 9.9: Primary energy consumption in 2011 and national energy efficiency targets for 2020 in EU Member States

Source: EEA based on Eurostat data extracted 17 August 2013.

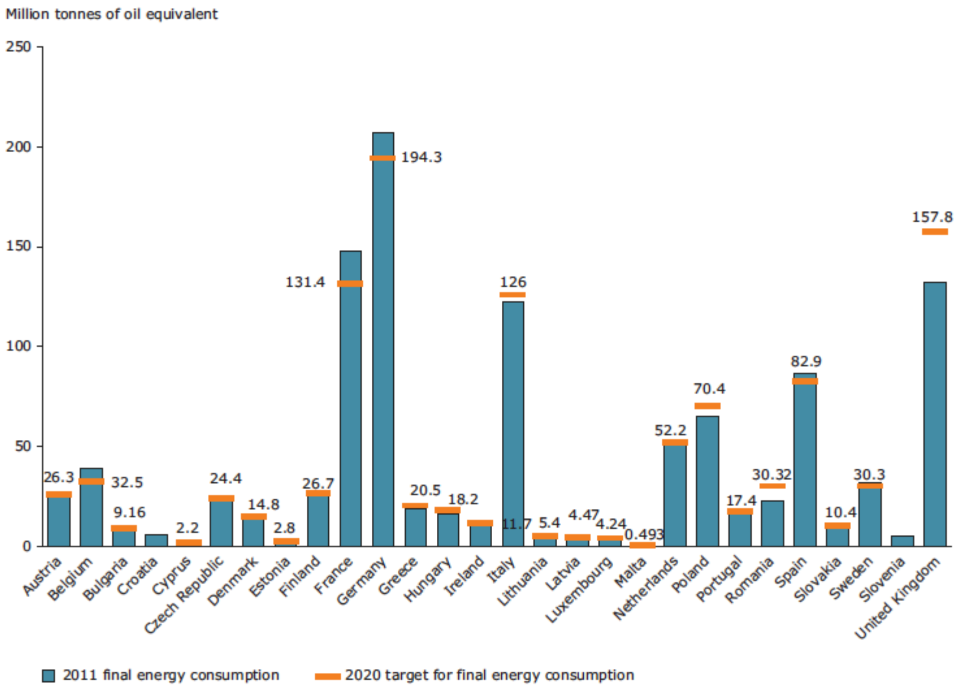


Figure 9.10: Final energy consumption in 2011 and national energy efficiency targets for 2020 in EU Member States

Source: EEA based on Eurostat data extracted 17 August 2013.

Concerning the final energy consumption per sector in Italy it is important to underline the role of the transports and households sectors in the total consumption. Industry fell to the third position due to delocalization and the financial crisis.

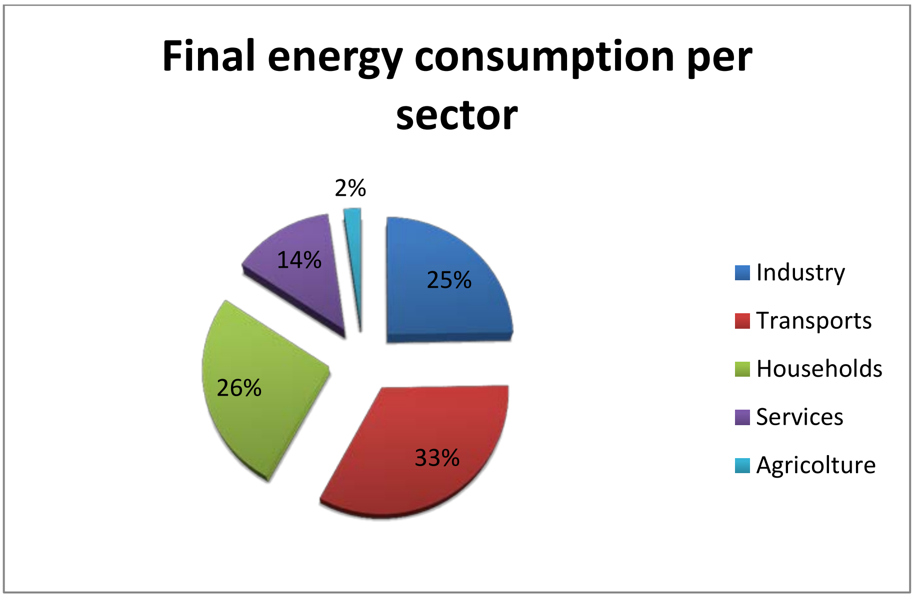


Figure 9.11: Italian final energy consumption per sector, 2012

Source: Annual energy efficiency report, ENEA, 2014.

As shown in Figure 9.12: Final residential energy consumption per dwelling in the EU27, 2009

9.12, the average final residential energy consumption per dwelling in the EU-27 in the year 2009 was 1.46 toe. Italy in this case registered a level of consumption below the EU average.

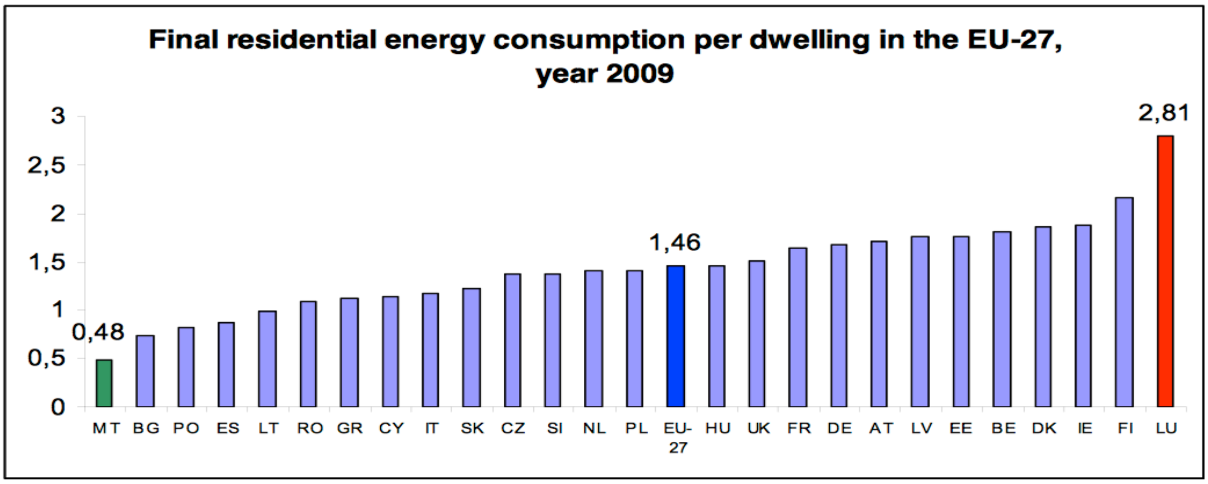


Figure 9.12: Final residential energy consumption per dwelling in the EU27, 2009

Source: JRC Energy Efficiency Status Report, 2012.

9.2.2 Evaluation of energy savings' capacity - Identification of challenges

Challenges

Table 9.3 shows the energy savings per sector achieved in 2012 compared with the 2016 national target as set in the NEEAP 2011 in line with the 2006/32/EC directive. The industrial and residential sectors performed very well thanks to the WhC schemes, minimum requirements, and tax deductions, whereas the transport and tertiary sector are behind schedule.

Table 9.3: Achieved energy saving as final energy consumption, Mtoe/year

Sector	Energy saving achieved - 2005-2012	Energy savings to be met in 2016	Target achieved % with respect to NEEAP 2011 (2006/32/EC directive)
Households	3.79	5.16	73.5%
Service sector	0.19	2.11	9.0%
Industry	1.76	1.73	101.8%
Transport	0.63	1.87	33.6%
Total	6.38	10.88	58.6%

Source: Italian NEEAP 2014.

Table 9.4, which reports the results with respect to the Italian National energy strategy in line with the 2012/27/EU directive, shows a similar situation, with worst results for the transport sector.

Table 9.4: Achieved energy saving as final energy consumption, Mtoe/year

Sector	Energy saving achieved - 2011-2012	Energy savings to be met in 2020	Target achieved % with respect to the National energy strategy
Households	0.96	3.67	26.2%
Service sector	0.05	1.23	4.1%
Industry	1.09	5.10	21.4%
Transport	0.22	5.50	4.0%
Total	2.33	15.50	15.0%

Source: Italian NEEAP 2014.

Italy has the capability to reach its targets, as the results indicated in the above mentioned tables show. Concerning EEO, according to the NEEAP 2014 there is still a high potential for savings in the industrial sector, even if the target for 2016 have been reached, and in the transport sector, still far from the target. Households will continue to play an important role in terms of savings. To reach the targets support schemes will be used together with minimum requirements and other policies: white certificates will cover 60% of the 6.75 Mtoe target covered by EEO and alternative measures, according to the NEEAP 2014.

The white certificates, thermal account, and tax deductions cover well the possibility to improve energy efficiency in buildings and in industrial processes and thus the targets seems to be achievable, according to the present trends. The transport sector target is based both on minimum requirements (3.43 Mtoe) and on measures on the public transport (1.97 Mtoe), with a slight contribution from the white certificates scheme (0.10 Mtoe). Most will thus depend on how the economic crisis will affect the capability of families and companies to renovate their vehicle's park.

Figure 9.13 shows the total energy intensity and the electrical intensity of the service sector: the first one strongly decreased in 2011 to the 2005 level, while the second one continued its growth.

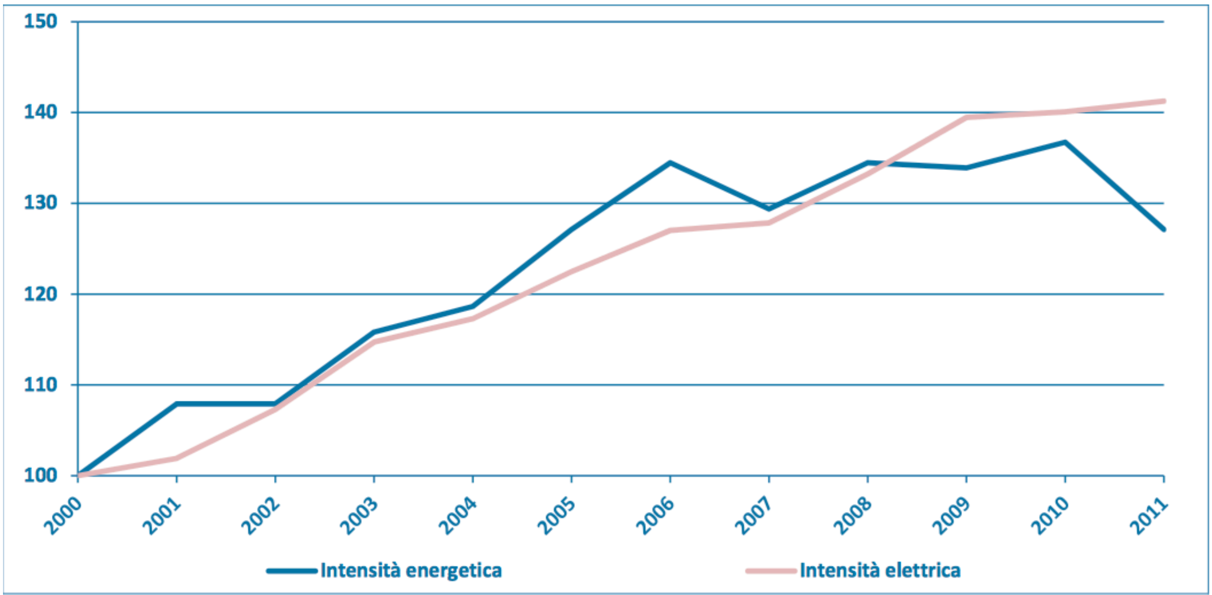


Figure 9.13: Energy intensity trends in the service sector in Italy, 2000 – 2011

Source: Energy efficiency annual report 2012, ENEA 2014.

The industrial sector, as shown in figure 9.14 registered a relevant decrease in the energy consumption starting from 2005, with a slight recovery in 2010 to decrease again in the following year. The economic crisis had a central role in the consumption reduction, even if part of the results in the last years has been achieved thanks to the white certificates (around 2 Mtoe of additional savings in 2013).

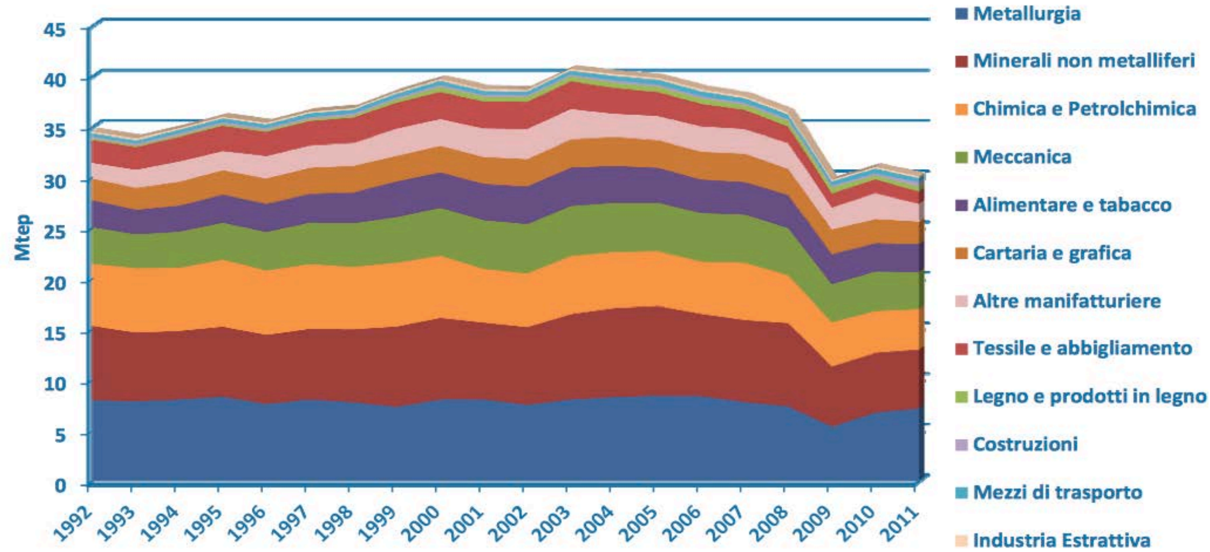


Figure 9.14: Energy consumption in industry, 1992 – 2011, Italy

Source: Energy efficiency annual report 2012, ENEA 2014

In the last Report of the Italian ministry for the economic development to the European commission on energy efficiency, WhC scheme seems to be quite in line with the savings targeted by 2020 (Figure 9.15). In addition to WhC, two more incentives will support the WhC scheme towards meeting with the requirements of Article 7 and 2020 energy efficiency targets: tax deduction and thermal account (Figure 9.16).

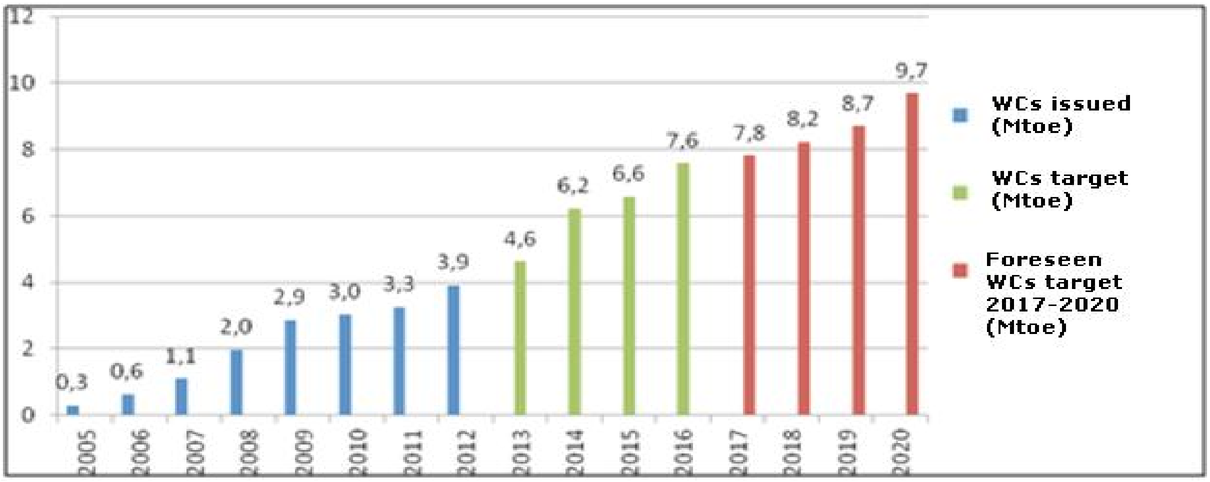


Figure 9.15: White certificates primary energy savings achieved and expected, 2005 – 2020

Source: Annual energy efficiency report, ENEA, 2014.

WhC have been able to become very effective in supporting industrial process, mainly through monitoring plans projects (i.e. the savings are measured through meters). It also considers only additional savings with respect to the market baseline (determined for each technology and sector) and the technology lifespan of the project.

The scheme has been able to promote also the ESCO market and the availability of information about the transformation of the processes in industry linked to the proposed projects.

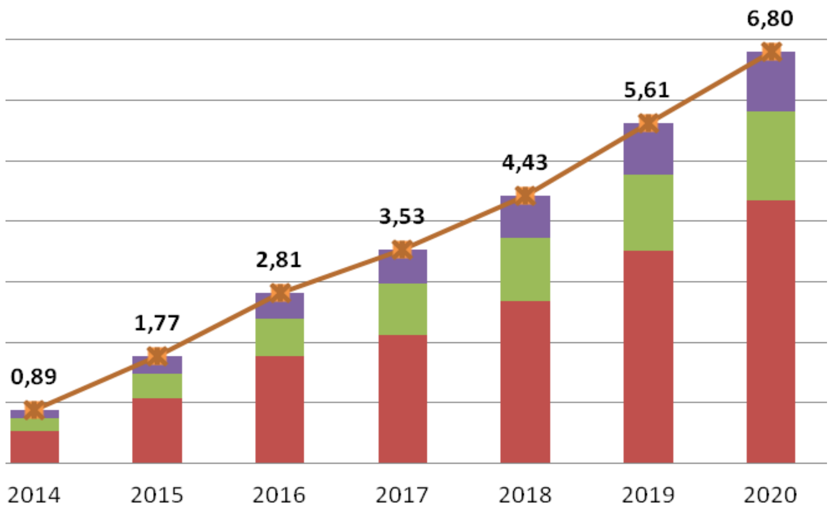


Figure 9.16: Summary of expected savings coming from the national incentive schemes

Source: notification to the European Commission on art. 7 of the EED, 2014.

Regarding the qualification of energy operators (another potential challenge) increased efforts have been placed in training activities and also two certification schemes are available: the UNI CEI 11352[63] for ESCOs and in the UNI CEI 11339[64] for Energy management experts were launched respectively in 2010 and in 2009. A new standard for energy auditors

[63] At the moment 100 energy services companies have been certified under UNI 11352. A not complete list is availble at http://www.fire-italia.it/ESCO_certificate.asp

[64] To this regard, SECEM (FIRE related certification body) has certified more than 120 experts in Italy at the moment. More information available at http://www.secem.eu. Data for other certification bodies are not available at the moment.

is expected in the next year.

Moreover, the role of end-users is expected to become a more active role thanks to the extensive availability of smart meters (at least for electricity): the chance to directly control its own energy consumption should lead towards a smarter approach also thanks to more understandable and clearer energy bills.

9.3 Market preparedness

9.3.1 Description of Status quo

ESCOs are the main subjects taking part in the WhC scheme in Italy, with around 72% of the savings generated within the scheme. Companies with appointed energy managers are the second driving force, with 25% of the generated savings. **Error! Reference source not found.** 9.17 shows how the different actors who took part in the mechanism behaved in 2013 and how many projects they presented: as already highlighted before, energy services companies are the first actors in terms of number of projects, followed by electricity distributors (DE), companies with the compulsory appointment of the energy manager (SEM), natural gas distributors (DG) and companies with the voluntary appointment of energy manager (EMV).

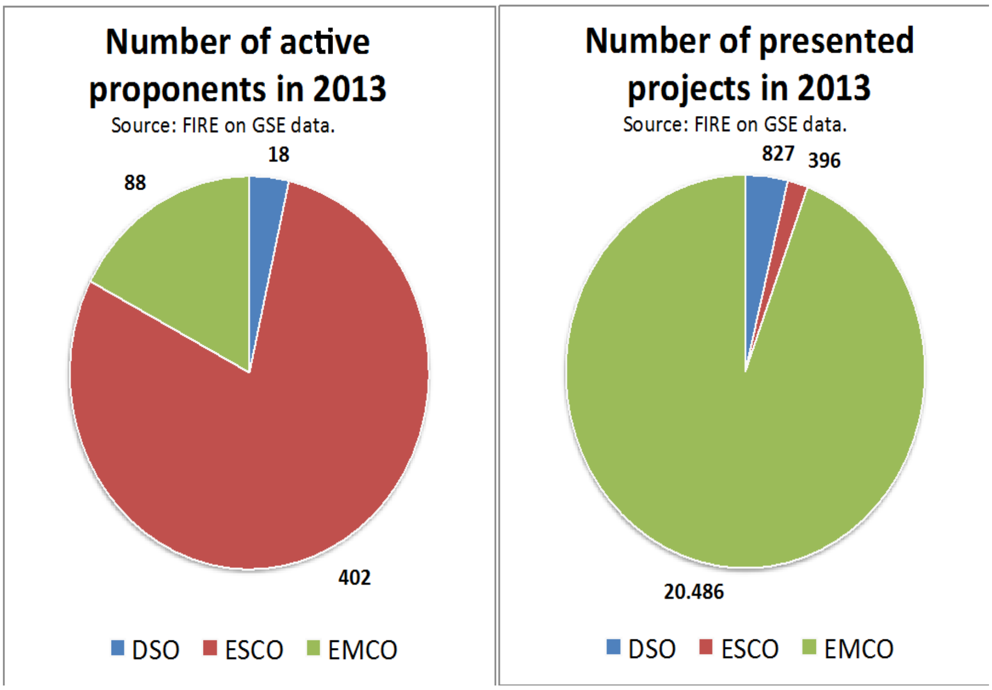


Figure 9.17: White certificates projects: breakdown by applicant

Source: FIRE on data from the Annual report on white certificates scheme, GSE 2013.

According to the JRC 2013 ESCO report, the current ESCO TPF market size in Italy is around €500 million including all energy efficiency services costs (also energy costs) for all kind of contracts, while the market potential is estimated around €1-10 billion[65].

WhC have been crucial for the development of ESCOs, as they represent the main voluntary actor of the mechanism. To this regard, starting from July 2016, all the energy services companies willing to participate to the mechanism will have to be certified under the Italian standard UNI CEI 11352[66] (certification of ESCOs). This standard has been introduced in 2010 in order to help the market in finding skilled ESCOs and to help the willing be ESCOs in identifying what skills and abilities need to be strengthen. A similar standard – UNI CEI 11339 –is available for energy management experts and will become mandatory starting from July 2016 for EMCOs in order to participate in the WhC scheme.

The ESCO standard shall also facilitate ESCOs in accessing third party financing resources, an important issue as shown in Figure 9.18. In the last years experiences from the market showed that some banks financed certified ESCOs, considering the certification as mitigation of risks, and used white certificates as an additional guarantee to the capability of the project to repay the debt.

---

[65] ESCO market report 2013, JRC.

[66] At the moment around 100 energy services companies have been certified under UNI 11352. A partial list is available at http://www.fire-italia.it/ESCO_certificate.asp.

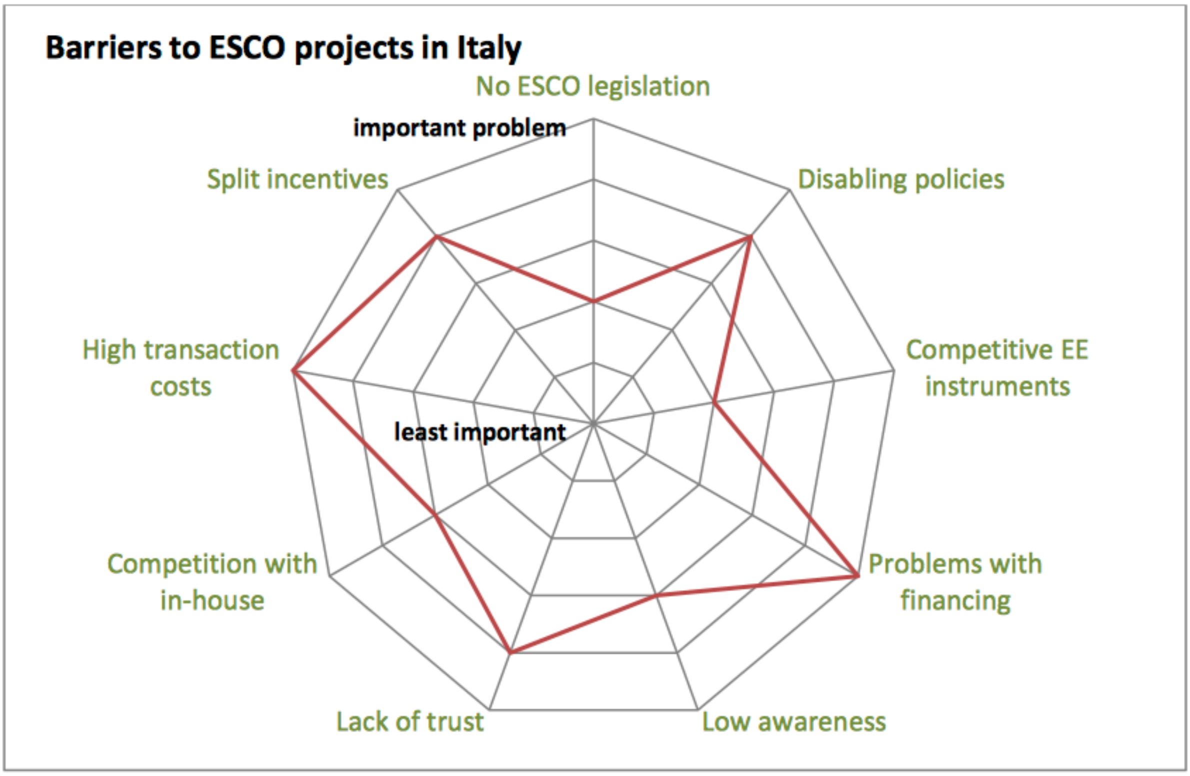


Figure 9.18: Barriers to ESCOs projects in Italy

Source: ESCO market report 2013, JRC.

Finally, it is worth noticing the link between the energy market and the development of an EEO scheme. An EEO scheme does not require necessarily a liberalized market, but the possibility to reach good results will be hampered by the typical inertia of monopolist players. Even if a tradable market is associated to the EEO, in order to give the driving role to private operators and end-users, the monopolists will not see any advantage in promoting the scheme development. In Italy the white certificate scheme was thought of and design in connection with the liberalization of the market and requested by the laws that started this transformation in 1999 and 2000[67]. DSOs were chosen as obligated parties because, when D.M. 24 April 2001 introduced the WhC mechanism, electricity and gas suppliers were just starting to operate and their development posed to many uncertainties to assign them the obligation.

As shown in the previous paragraphs, ESCOs are the main driving force in the Italian scheme. This is mainly due to the passive role played by DSOs especially in the first years (with some

[67] D.Lgs. 99/1999 started the liberalization of the electricity market, whereas D.Lgs. 164/2000 started the liberalization of the natural gas market. The process was completed in 2007, with the complete opening of both demand and supply activities.

Notable exception regarding utilities with a strong link with the territory) and to the fact that EMCOs were admitted to the scheme only in 2008. Nevertheless, in the last years energy players began to understand the opportunity to offer energy efficiency in bundle with electricity and gas, both in order to increase lowering profit margins and to tie end users to longer contracts. This had repercussions also on DSOs, which started to play a more active role (for example by offering TPF or web tools to collect deemed savings projects). The white certificate scheme became an important tool to support this transformation, since it helped both energy suppliers and ESCOs to find a path toward the development of energy services and supported this transformation with an extra cash flow (useful also to mitigate projects risks when operating within an EPC with TPF framework).

Figure 9.19 and Figure 9.20 show the market share of the main players in the electricity and natural gas sector. Many of them are companies that operate under the same corporates that control DSOs acting under the obligation of the WhC scheme. This facilitates the development of synergies intragroup in connection to the white certificate scheme and it is stimulating a more active role also for distributors (within the limits of action of the liberalized market and its antitrust requirements).

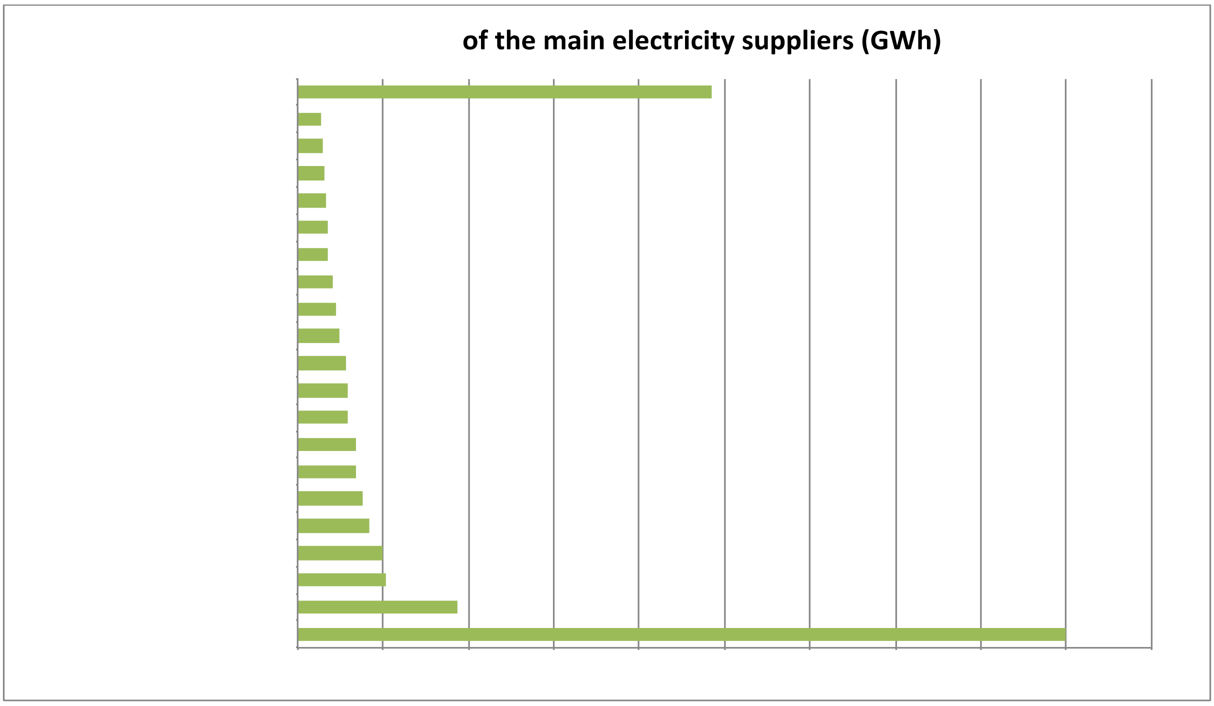


Figure 9.19: Contribution of the largest groups on the supply of electricity, 2013

Source: FIRE on the Annual report 2014, Italian Regulatory Authority for Electricity Gas and Water

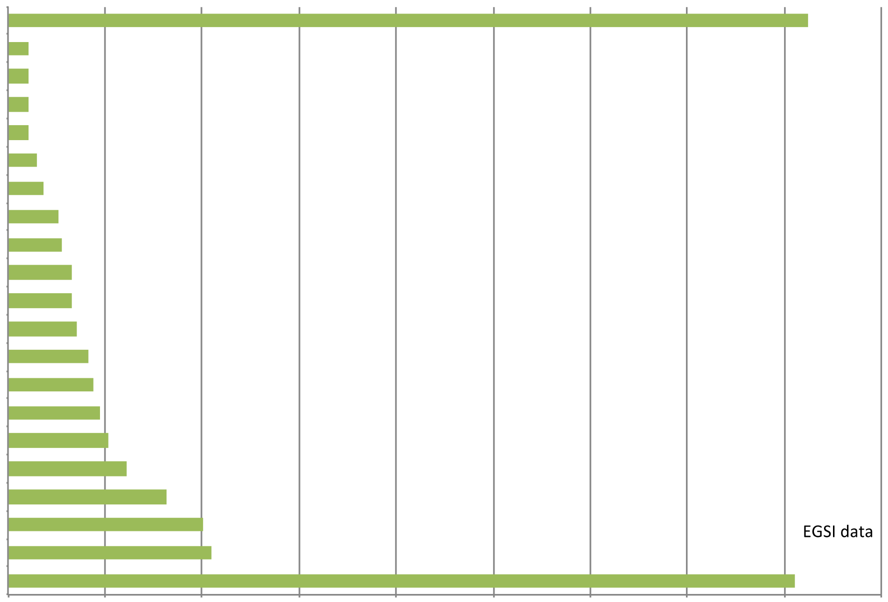


Figure 9.20: Contribution of the largest groups on the supply of natural gas, 2013

Source: FIRE on the Annual report 2014, Italian Regulatory Authority for Electricity Gas and Water

In Italy banks and financial institutions started to be active in the energy efficiency market, financing energy efficiency actions through the recognition of white certificates incentive scheme in the business plan. It means that finally the system is considered trustable and able to guarantee a safe and interesting economic and financial investment in energy efficiency, as many experiences collected by FIRE demonstrates. The current economic crisis could affect these results, even if this market is facing now a positive and developing phase but still far away from the complete achievement of its goals.

The main issue with financing is not the lack of economic resources, but the capability to convince investors (investment funds, banks, etc.) to lend money. This is related both on the insufficient qualification of investors, ESCO, and end users and on the necessity to develop new business models to help putting together small projects or dealing directly with small sizes. On the other hand the risk assessment should find new ways and procedures. Too often financing is a question of credit worthiness of the end user, as many surveys on this topic show. The presence of schemes like white certificates can sometimes facilitate the lending process, but it won't avoid the guarantees required in the traditional approach.

Even if it is reasonable to keep into account this point, in a market dominated by a diffused crisis perhaps it is useful to put more stress on the capability of the energy efficiency project to repay the debt. In other words it could be helpful to develop ideas and tools on how to put more attention on the project and less attention on the client, eventually with the support of guarantee funds, insurance packages, or white certificates, that can help reducing the pay-back time of the project, thus mitigating the risks.

9.4 Administrative preparedness

The main challenge from an administrative and managing point of view is the capability to ensure an effective cooperation among the different subjects involved in the design and management of the WhC scheme: Ministry of economic development, Ministry of environment, AEEGSI, GSE[68], ENEA[69], RSE[70], GME[71]. When many different bodies have to work together there is the risk of some friction and the governing ministries should take care of this. Besides, the Ministry of economic development is going to introduce new guidelines, most probably revisiting some aspects like the tau coefficient, and the changes introduced by GSE in the management of the scheme by replacing AEEGSI are going to produce some consequences due to differences in the evaluation and verification procedures.

9.4.1 Description of Status quo

As already said before, Italy launched its national white certificates incentive scheme already in 2001, so it has been working for more than a decade bringing very good results for the achievement of energy efficiency national goals. Starting from simplified projects mainly in the civil sector, the scheme has become an effective mechanism to promote energy efficiency through complex projects in the industrial sector, mostly based on measured energy savings.

The scheme is based on an energy efficiency obligation, imposed on electricity and gas distributors with more than 50,000 clients, and on a tradable market for certificates, thus acting as an incentive for medium and large end-users and energy service companies (the voluntary parties).

---

[68] Public owned company that manages most of the incentives for renewable energy sources and energy efficiency

[69] Italian National Agency for New Technologies, Energy and Sustainable Economic Development.

[70] It is joint stock company, whose unique shareholder is GSE S.p.A., which develops research in electro-energy, with particular focus to the strategic national projects of general public interest .

[71] GME has the mission of organising and managing the Italian power exchange, together with green certificate’s and white certificate’s markets. It is a company owned by GSE.

The Italian WhC scheme main purpose is to promote energy efficiency among end-users, but other important objectives include to strengthen the ESCO market and to permit the accounting of the energy savings.

In the transposition of the 2012/27/EU directive (legislative decree 4 July 2014 n. 102) the WhC scheme is addressed as the main policy measure to implement art. 7, and it is expected to give a contribution to 60% of the national target in 2020 (the other 40% being covered by tax deductions and heat account). It acts both as an energy efficiency obligation scheme and as an incentive, due to the presence of a market for the trade of white certificates.

Since the beginning of 2013 GSE has become the main institutional counterpart in the WhC mechanism, substituting the AEEGSI in providing the management of the scheme, the evaluation of the savings associated with energy efficiency projects (in cooperation with ENEA and RSE), and the verification procedures (both documental and on site).

Almost every project involving an improved efficiency in the final consumption of energy is eligible under the scheme – from boilers to lighting systems, from solar thermal to cogeneration, from electric motors to industrial process projects – with the exception of projects aimed at increasing efficiency in electricity generation. Each of the eligible projects is expected to issue white certificates for a period of five years (eight years for building envelope related projects and ten years for high efficiency cogeneration).

A characteristics that affects the savings accounted for in the national statistics on energy efficiency is that the WhC scheme issues certificates only for additional savings (also referred to as "additionality"). It means that a market and regulatory baseline is defined for every technology[72]. Savings are first evaluated as the difference between the ex-ante and ex-post situations and then reduced if the ex-ante level is below the baseline.

In 2011 AEEGSI introduced a multiplier (the *tau* coefficient) that integrates energy savings by taking into account the technical life of the action, discounting them with a 2% coefficient to consider wear and other causes of performance reduction over the years. In fact, the coefficient introduced a discrepancy between the targets expressed in annual savings and the volume of certificates, by allowing the inclusion of future savings beyond the standard 5 year certificate lifespan. Nevertheless, this issue was overcome by the D.M. 28 December 2012 new targets and guidelines, and the multiplier had the benefit to increase the public attention to the scheme and accelerated the rise of monitoring plan projects, especially in the industry, that were needed both to allow to reach the targets and to effectively promote energy efficiency in industry. The decree also set new targets for the period 2013 - 2016 and

[72] More information are available on the dedicated report in the Enspol web site.

many changes in the administrative framework. The *tau* coefficient supported a growth of the scheme, especially for small and industrial projects.

Presently more than 80% of the white certificates comes from new industrial projects presented as monitoring plans. This has three important consequences: most of the savings are measured and not just estimated, the free rider phenomenon has been reduced, since in most cases white certificates play an important role in the decision process to implement the energy efficiency project, and ESCOs are acquiring a knowledge about energy efficiency in the industrial sector. This last point allowed many companies that started as consultants able to present applications to obtain white certificates for projects already implemented by end-user became effective ESCOs, capable of offering advanced financing and EPC contracts even related to measures related to the industrial process.

The achieved results show that policy makers and white certificate rulers have been good at managing the scheme so far and at producing the expected results, overcoming the difficulties that have arisen.

9.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

Being in place for more than ten years, the scheme has faced and fortunately solved many administrative issues, such unconformities, issue with the definition of the market baseline, and the fast increase of proposals.

In a scheme that deals with all types of energy efficiency measures and all sectors, considers only additional saving and with monitoring plans provide for proponents to define the baseline and the additionality within the proposal (PPPM, which of course has to be approved), one of the difficulty is to ensure the application of the same criteria to all projects, even if different evaluators are used. That can be achieved by organizing frequent meetings within the evaluators group, to share issues, ideas, and suggestions.

Another issue is how to carry on the documental and on-site verification in order to find non conformities and how to deal with them, considering that these activities shall comply with strict regulations in order to avoid differential treatments, corruption, and the possibility for proponents not compliant with the rules to apply to go to the administrative court (with all the involved costs). It is important that the procedures used for the verification process are public and transparent, with coordination among control groups.

The fast increase of the proposals presented every month is an important issue to deal with. Passing in few years from some hundred ktoe to some million ktoe of savings means that the number of people involved in the evaluation activities has to increase rapidly. In Italy the scheme started with four people, whereas presently there are around fifty people involved. It is important to manage this need in the right way, considering that time is needed to let the new evaluators understanding how to operate and maintain a homogeneous approach.

The change of the managing body, from AEEGSI to GSE, obviously introduced new challenges to let different public bodies work together with the same criteria and evaluation methods.

9.5 Legislative preparedness

9.5.1 Description of Status quo

The Italian WhC scheme was launched in 2004 by Ministerial decree of 20 July 2004, modified and updated by the Ministerial Decree 20 December 2007. The main structure of the mechanism was defined by these legislative acts, and was updated again in 2011 by the Legislative Decree n. 28 of 2011 and the Ministerial Decree of December 28th of 2012. In the transposition of the 2012/27/EU directive (legislative decree 4 July 2014 n. 102) the WhC scheme is addressed as the main policy measure to implement art. 7[73].

Mechanism distortions can always happen, especially in a market such as the energy market that is changing fast every year from a technological and legislative point of view. The main challenge, then, is to adapt the white certificates scheme to all these changes in real time, trying to avoid all the possible distortions (such as the "free riders effect", for which there are no detailed studies available). The mechanism can be efficient only if there is a continuous and constant improvement and control over its provisions, enabling the trading obligation to perform at its best.

Another issue is related to the different regulation approach. Until 2012 the AEEGSI (Authority for electricity, natural gas and water) has been in charge of the scheme regulation. Since 2013 the Ministry of economic development is in charge of setting the rules. The political nature of the Ministry ensures strict links with the government, but on the other hand sometimes sacrifices its capability to change rule in short times (see paragraph 9.4 on the challenges and implications of the new regulation scheme).

[73] White certificates in industry: the Italian experience, D. Di Santo, G. Tomassetti, E. Biele, S. D'Ambrosio, IEPPEC conference in Berlin, FIRE, 2014

9.5.2 Evaluation legislative preparedness – Identification of challenges

An issue to face is the different speed between laws, ministerial decrees, and operative guidelines. In the Italian experience a clear example is the delay in the start-up of the scheme. D.M. 24 April 2001 set the starting date in 2002, but in fact AEEGSI needed two years to define the guidelines and another decree had to be issue to move the starting time to 2005, while modifying and translating the targets. That required the possibility to present projects implemented between 2001 and 2004 and the consequence was an extra number of certificates in the first period (the oversupply of certificates on the market was not due only to very convenient projects like CFL, in fact).

Another example is the delay of more than one year in the publication of the new guidelines provided for by D.M. 28 December 2012. Fortunately in the last years the scheme has not shown big criticalities, and this reduced the possible impact of this delay.

Some delay has also been present in 2012, when the introduction of the tau coefficient almost tripled the number of monthly proposal. This issue has been solved in some month by increasing the number of evaluators. It is important to think about this issue and to anticipate the reinforcement need of the evaluators group.

Mainly the administrative process has been managed correctly, apart from a lack of evaluators for some years.

9.6 Social & Political acceptance/feasibility

9.6.1 Description of Status quo

The indicators in the Figure 9.21 are used to measure fuel poverty. They refer to the inability of people to keep their home adequately warm, to pay their utility bills and to live in a dwelling without defects. Data show that in 2012 10.8% of the European population were unable to keep their home adequately warm (the percentage increases up to 24.4% when referring to low-income people). In Italy specific legislative measures exist for this target of household customers, clients who hold contracts for the supply of electricity and/or gas with such particular economic or health condition. This audience was typically quantified in just over 3 million citizens.[74]

Country	Arrears on utility bills (%)	Inability to keep home adequately warm (%)	Dwellings with leakages & damp walls (%)	Country	Arrears on utility bills (%)	Inability to keep home adequately warm (%)	Dwellings with leakages & damp walls (%)
Bulgaria	50.7	70	29.5	Estonia	20	9.6	30.3
Hungary	58.8	33.9	53	Belgium	14	18.8	26.2
Greece	54.4	47.6	21	Ireland*	27.5	12.5	16.2
Latvia	39.5	35.1	43.3	France	17.8	15.2	22.1
Cyprus	25.9	50.6	34.6	Czech Rep.	19.4	15.3	20
Slovenia	37.5	17.3	46.1	Spain	17.9	18.2	17.9
Italy	24.5	44.1	30.1	Slovakia	18.3	13.6	19.7
Romania	41.5	25.4	30	Netherlands	8.6	8.7	27.4
Lithuania	22.8	38.2	28.6	Germany	8.6	14.8	21
Portugal	14.5	43	28.4	Denmark	5.5	7.1	25.3
Croatia	40.9	21.8	19.9	Luxembourg	6.6	2.2	28.9
Poland	30.1	27.6	20	Austria	11.3	7.7	15.2
Malta	19.4	32.1	12.4	Finland	13.7	3.8	8.6
UK	20.3	19.4	21.4	Sweden	10.3	3.5	11

Figure 9.21: Percentage of people at risk of poverty affected by fuel poverty as reflected by three related indicators

Source: Eurostat data 2012

The Italian WhC scheme does not have any provisions regarding the fight to the fuel poverty, as it is the case of other EU EEO incentive schemes: in UK, for example, one of the criteria of the energy saving programme is that the energy saving measures are targeted at low-income areas. An electricity and gas tariff reduction is instead provided for low income consumers. It is not linked to the white certificates or to the alternative measures.

9.6.2 Evaluation of social acceptance/feasibility – Identification of challenges

The cost of the scheme on the end user tariffs is around 0,2% of the whole electricity bill cost. Therefore it doesn't represent an issue even for fuel poverty categories. A more important impact came from the RES incentives (around 18% of the bill cost). This has created issues with social acceptance regarding the “conto energia” incentive scheme, even

[74] More info are available at http://www.autorita.energia.it/it/index.htm

if most people were not in disagreement with paying more for promoting RES. Given the far lower impact of energy efficiency incentives there has been no particular issues in financing them through the tariffs. This can change in the future, due to the stress posed by the RES incentives to the tariff structure and the risk that even low impact measures like WhC could stimulate some parties to ask for a cut on the financing. It is worth noticing that tax deductions, which are paid through the general taxes, present a relevant risk in terms of yearly discussion of the measure within the State finance law, as tax deductions mean less revenue for the state revenues. In relations to the WhC scheme and tax deductions it is possible to state that the two incentive schemes refer to different field of intervention, as WhC refer more to the industrial sector while the tax reductions refer to the tertiary and residential sectors. Moreover, in order to apply to the WhC scheme it is necessary to present a project intervention with specific (and quite high) savings prevision.

A last consideration is due to the view of the main stakeholders on the WhC scheme.

DSO have not appreciated it for many years. They usually were not interested in implementing energy efficiency projects and did not see any advantage in playing an active role. In fact they saw only the cost of acquiring white certificates (even if most of their value is reimbursed, there are the financial costs due to the delay needed to obtain the reimbursement). The situation has changed in the last years, and some DSO even started offering TPF and web tools to collect different projects.

ESCOs have always been favourable to the scheme, since they recognized its capability to improve and enhance their market. Companies with energy manager or energy management systems also understood the possibility to strengthen their business.

Industrial and consumers association like the scheme, since it allows for benefits for their members.

Paradoxically more problems were faced by the institutional bodies, in order to overcome the different approach each of them should have desired to apply for the evaluation of the market.

It is worth noticing that information and dissemination of the scheme rules and of the best practices can help mitigating the risk of lack of social acceptance.

10 Lithuania - DEA

10.1 Economic profile

Lithuania is one of the Baltic countries, which has regained its independence from the Soviet Union in 1991. In 2004 the country became a part of the European Union and NATO. Since then there have been big changes in Lithuanian economy. Lithuania is now a market-based economy highly influenced by the development in the Euro zone. As from 2015 Lithuania will also adapt Euro as local currency instead of Lithuanian Litas.

As the Energy sector is taking a very big role in the country's national economy and policy, it is very important to highlight history and current situation in the Lithuanian Energy Sector. The Lithuanian energy sector is based on fossil fuels. However Lithuania is not self-sufficient with its own energy sources and is strongly dependent on a single fossil fuel supplier, Russia. Lithuanian energy sector needs significant improvements in order to comply with the new standards and requirements from the EU, to assure energy efficiency and safety as well as to decrease CO2 emissions.

The Lithuanian EU membership agreement with the EU involved a decommissioning of the Ignalina nuclear power plant. The plant was old, inefficient and posed a security risk to the country and the region. The facility was subsequently shut down December 2009. The gap in production was offset by increase in import from neighboring countries, including Russia. In order to improve situation and increase energy independency, National Energy strategies and Action plans have been established. The main current strategic energy projects in Lithuania are:

- Synchronization with the EU energy systems and integration into energy markets of the Baltic Sea Region.
- Diversified import of energy - implementation of LitPol and NordBalt electricity interconnection links between Lithuania – Poland (LitPol) and Lithuania-Sweden (NordBalt). The project LitPol Link concerning the interconnection between Lithuania and Poland is expected to be completed by 2015 and will have a capacity of 500 MW, while NordBalt interconnection with the total capacity of 700 MW also has to be implemented by 2015.
- Project of the new Visaginas nuclear power plant – which is currently an issue of great debate in Lithuania. Two referendums have been held in Lithuania, where society did not agree with the project; however its implementation is still being discussed.

A new natural gas terminal "Independence" went into operation October 2014. The project has been implemented in collaboration with Norway, and has already reduced dependence on natural gas supply from Russia. Moreover Lithuania is setting goals to increase usage of Renewable energy sources and improve energy efficiency.

10.1.1 Description of Status quo

The following indicators were used to reflect Lithuania's Economic capacity and status quo in order to implement the EEO Scheme:

- Annual GDP growth
- GDP per capita
- Central Government debt
- Electricity prices
- Gas prices
- Energy dependence

The annual GDP growth in Lithuania in 2014 is expected to be 2.9%[75], and even though lower than previous projections' economic development, it is still higher than the EU average. Significant growth in domestic demand is stimulated by the recovering labour market and increasing wages are keeping the economy going. As the main driving force of economic growth, domestic demand has led to fast growth in employment in the economic activities oriented towards the domestic market. The expansion of employment in 2013 was primarily due to a recovery in the construction sector which recorded a fast growth in jobs amid increase in construction volumes[76].

No doubt however, that the economic development for 2014 will be negatively affected by trade restrictions with Russia. The restrictions, enforced in August 2014, are applied to nearly a fifth of Lithuania's exports to Russia and amount to more than LTL 3 billion (EUR 870m). This is a rather significant share of Lithuania's exports, but only about a fourth of these exports are of Lithuanian origin, while three-fourths are re-exported goods. The restrictions are applied to trade in agricultural and food products, therefore a direct negative effect will be felt mostly in agriculture and food industry.

---

[75] Economic Outlook for Lithuania, Bank of Lithuania
[76] Lithuanian Economic Review, Bank of Lithuania

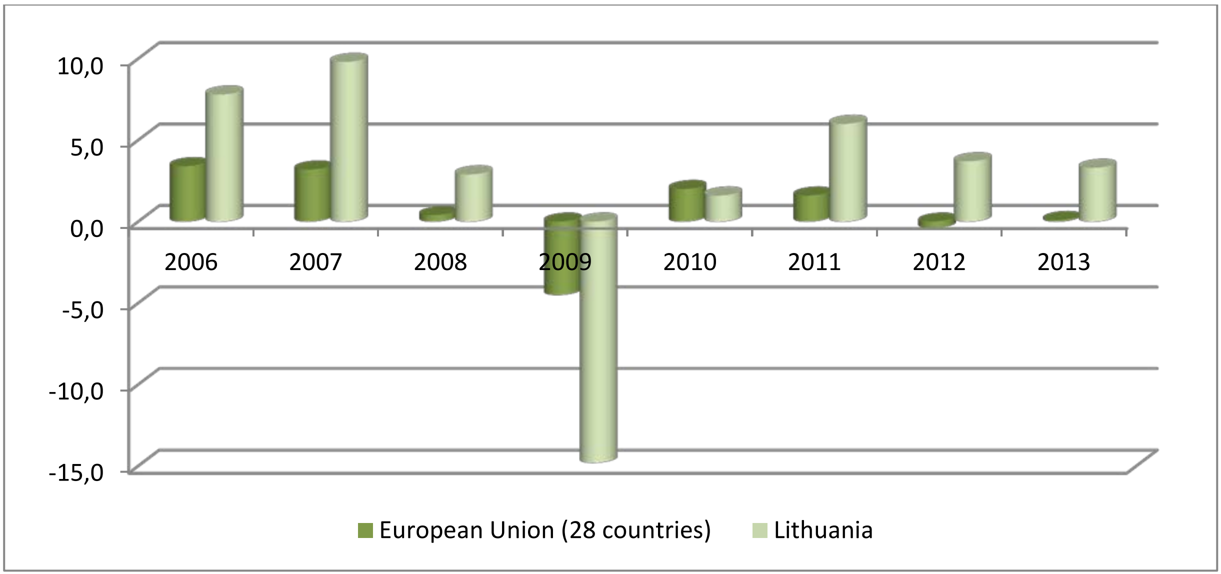


Figure 10.1: GDP growth, % per year

Source: Eurostat

GDP per Capita adjusted for difference in prices and purchasing power is still lower in Lithuania compared to the EU average. The country's higher growth rate is reducing the span year by year, but Lithuania is still one of the poorest European Union members.

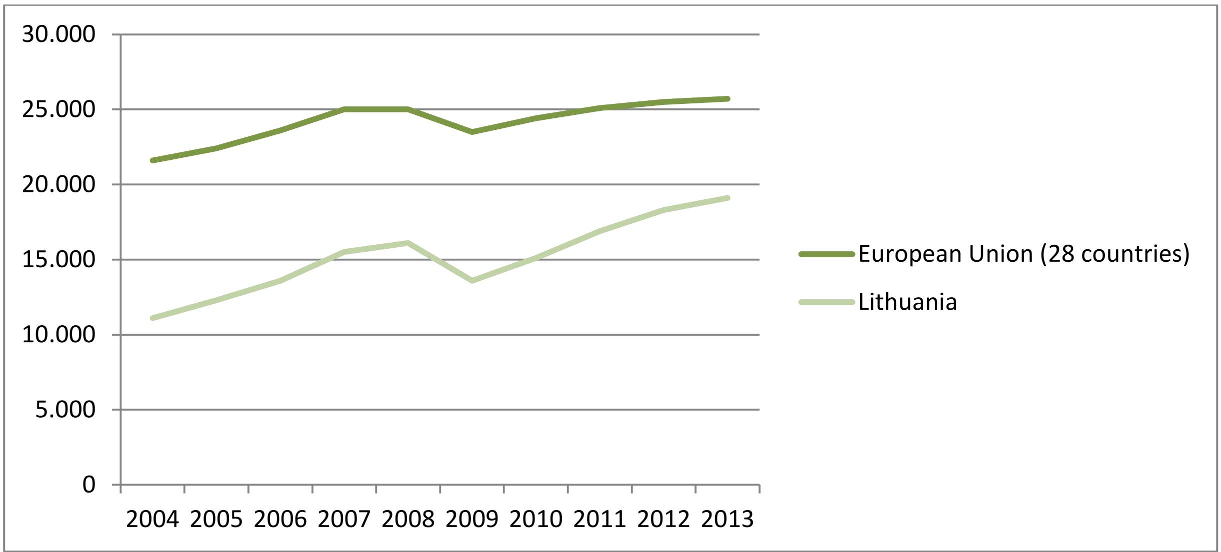


Figure 10.2: GDP pr. capita in Lithuania, EUR purchasing power adjusted

Source: Eurostat

Lithuanian national legislation foresees a monthly minimal salary for a full-time job, which today is around 236 Euros after tax[77]. 20-25 % of the workers in Lithuania receive the minimum monthly salary. And even though the price level is still lower compared to the European average, price level convergence after joining the European Union is rapid. The prices of basic household items are approaching European levels.

Inflation in 2013 was 2 %, while 0.4 % is projected for 2014. This is related to global commodity prices: food commodity and oil prices are lower than a year ago and the present trade restrictions; imported natural gas became cheaper, subsequently lowering prices for Lithuanian gas consumers.

The government gross debt is still low at 39 % of GDP in 2013 compared to EU average and well under the Euro criteria of 60 %. Government budget deficit is negative but again below the 3 % in 2013 after a number of years during the financial and economic crises with large deficits on the public accounts.

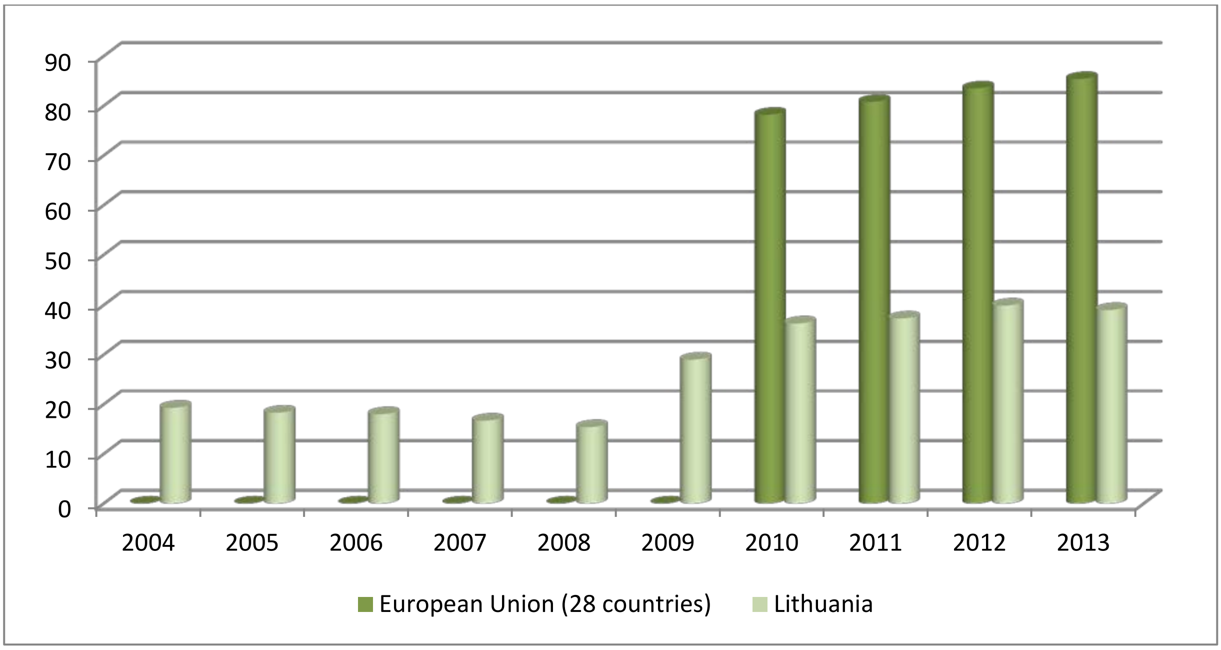


Figure 10.3: Government gross debt, % of GDP

Source: Eurostat

[77] Energy poverty in Lithuania: Symptoms, UrbanEnergy.org.

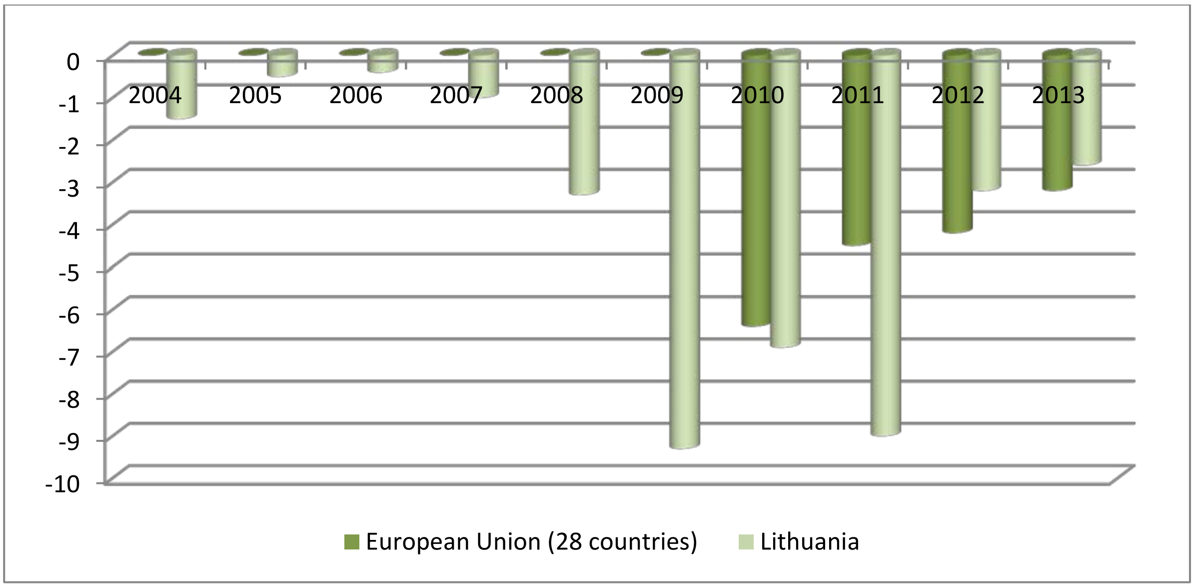


Figure 10.4: Government net deficit, % of GDP

Source: Eurostat

Electricity and gas prices have increased over the period from 2009 to 2014 but with a slight decrease from 2013 to first part of 2014. The decrease in electricity prices can be linked to the global development in the energy market for gas and coal and the construction of new interconnections to Poland and Sweden. For gas a mild winter in combination with the construction of the new LNG terminal in Klaipeda has helped stabilize prices.

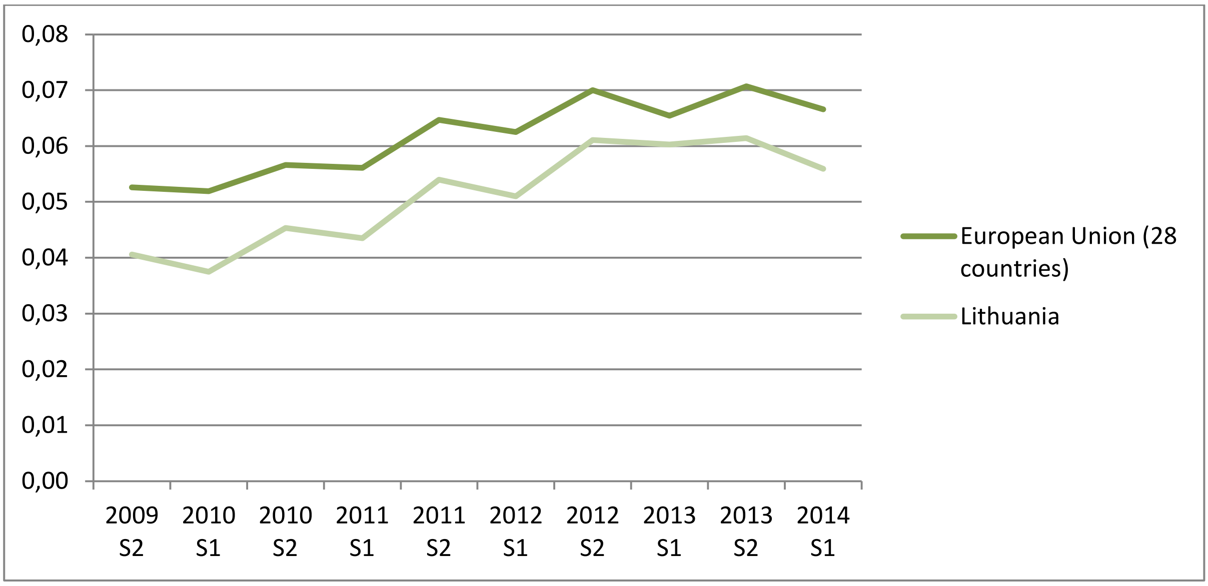


Figure 10.5: Gas prices for households, Euro/kWh Note. Consumer retail prices including all taxes, levies and VAT.

Source: Eurostat

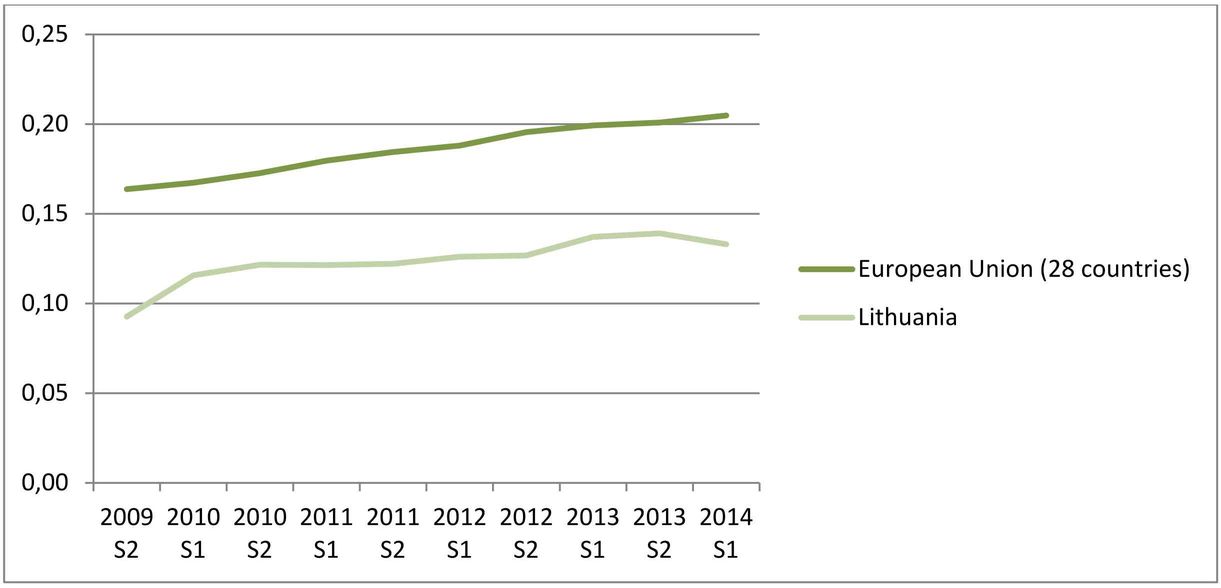


Figure 10.6: Electricity prices for households, Euro/kWh Note. Consumer retail prices including all taxes, levies and VAT.

Source: Eurostat

Fuel dependency from imported fossil fuels has for a long time been a main driver for Lithuanian energy policy and will continue to be so in the coming years. Since the closing of the Ignalina nuclear power plant in 2009 the Lithuanian dependence on imported fuels has increased significantly to 80.3 %. According to a resent Communication from the EU Commission on Energy Security[78], Lithuania has been 100 % dependent on import of Russian gas. Around 70 % of Lithuanian electricity comes from Russia. Lithuania's new LNG terminal that opened in October 2014 is seen as a huge step towards breaking free from dependence on Russian energy imports. However, the quickest and most effective form of energy security is still to use less.

[78] European Energy Security Strategy, EUR-lex.

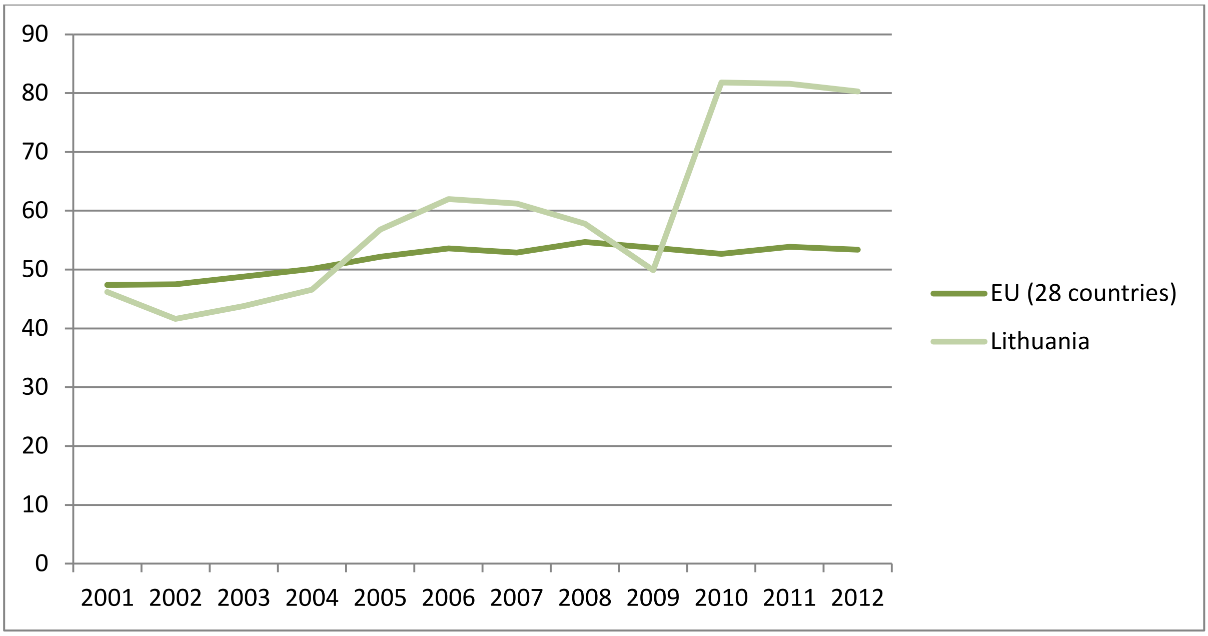


Figure 10.7: Energy dependence all fuels, net import in % of gross inland consumption

Source: Eurostat

Note. Energy dependence shows the extent to which an economy relies upon imports in order to meet its energy demand. The indicator is calculated as net imports divided by the sum of gross inland energy consumption plus maritime bunkers.

10.1.2 Evaluation of economic preparedness - Identification of financial challenges

The view on the economic preparedness for EEO Schemes implementation in Lithuania is split. From interviews[79] with stakeholder representatives from the Energy Agency, the electric power distribution network operator (Lesto), the Lithuanian District Heat Association (LDHA) and the Ministry of Energy, agree that Lithuania, there seems to be a general consensus that the country is in the best economic position, after a number of difficult years and compared to other countries. On the other hand stakeholders agree that there is a big potential to increase energy efficiency in Lithuania, which would result in energy savings in the longer term and improve its competitiveness and security of supply.

[79] Stakeholder interviews conducted in September 2014: Mantas Vaskela, Head of Innovation Department in Lesto (Electrical power distribution network operator in Lithuania). Tadas Norvydas, Head of the Sustainable Energy Development Department in Lithuanian Energy Agency. Mantas Paulauskas, Marketing expert - Consultant in Lithuanian District Heating Association. Mindaugas Stonkus, Heat and the Energy Efficiency Department advisor in Ministry of Energy of the Republic of Lithuania.

Fuel dependency is very high as shown in Figure 10.7. Especially the dependence from Russian gas is of such concern that a strategy aiming at greater energy independence was adopted in 2011. Reduction in consumption and improved energy efficiency are necessary steps towards that goal as mentioned in the strategy.

According to an Energy-Efficiency-Watch survey[80], more than 50 % of interviewed national experts in Lithuania consider the greatest barrier to energy efficiency in Lithuania is lack of regulation or its implementation. More than 40 % think that financing is the greatest barrier.

Over the last 10 years a few different models of renovation financing have been in place for private households and multi-family homes. The current model foresees that the government subsidizes up to 40 % of renovation costs, and the private banks lend the rest with a 3 % fixed interest rate over a maximum of 20 years. Despite this, renovation speed remains slow. Part of the reason is that despite the fact that these funding schemes have been quite popular, the public funds set aside for the purpose has been limited. Today's schemes involve both national and EU funds reducing the burden on the public finances.

Lithuania remains one of the poorest countries in the EU with income and living standards lower than average. GDP growth however, is relatively high compared to the rest of EU. Public budgets are in deficit, but not as much as other countries and below the 3 % Euro criteria. As seen in Figure 10.3 also the public debt is below EU average.

In sum, taking the economic crisis into account, the public funds seem in relatively good shape. That gives reason to believe that a strong public commitment towards supporting implementation of an EEO scheme financially could be achieved. For example, the increased energy cost could be offset part or in full by reducing energy taxes.

Poverty and social subsidies however, and the lack of private funds for building renovation is still a significant obstacle. State subsidies for heating services further enhance this vicious circle of poverty and subsidies. Those that are subsidized lack the means but also any economic incentive. As of recently, the situation has changed and the state now subsidized up to 100 % of renovation cost to those with social subsidies.

[80] Assessment of Energy Efficiency Action Plans and Policies in Member States, Country Profile Lithuania, Energy Efficiency Watch.

10.2 Energy & Climate Change profile (Energy Savings' Potential)

10.2.1 Description of Status quo

Lithuania's third National Energy Efficiency Action Plan (NEEAP) [81] from May 2014, set a final energy consumption savings target of 327 ktoe in year 2016 and 740 ktoe for 2020. 19 % of which is to be achieved in the energy sector, 14 % in industry and in the household sector, 12 % in transport, 10 % in services and 31 % through cross-sectorial measures. Those cross-sectorial measures include building regulations, voluntary agreements with energy companies on energy efficiency (individual meters in households and industry), tax rebates and information campaigns.

Part of the 2020 target will be met adopting an EEO scheme according to Article 7 of the EED. It is still unclear how much of the total target that will be implemented through the means of an obligations scheme and how much through alternative measures.

In 2012 Lithuania adopted a new National Energy Independence Strategy[82] with three main objectives: Energy independence, Competitiveness and Sustainable development. The strategy set a target of achieving annual savings of 1.5 % of the final energy consumption through 2020. The strategy identifies the highest potential in buildings and transport with a total of 80 % of the 2020 target. The remaining should be achieved through the adoption of stricter construction norms.

Primary energy consumption grew by 3.3 % per year until 2008. In 2008, the country was hit by the global economic crisis and energy consumption fell by 28 % from 2008-10. Part of the decline was also a result of the decommissioning of the Ignalina nuclear power plant in 2009[83]. As a result of the shutdown, electricity imports surged in 2010.

---

[81] Lithuania's National Energy Efficiency Action Plan (NEEAP), European Commission.
[82] National Energy Independence Strategy, Government of Lithuania.
[83] The production from the inefficient nuclear plant has for most part been substituted with import of electricity, produced with higher efficiency. Subsequently the same final consumption can be obtained with a smaller amount of primary energy.

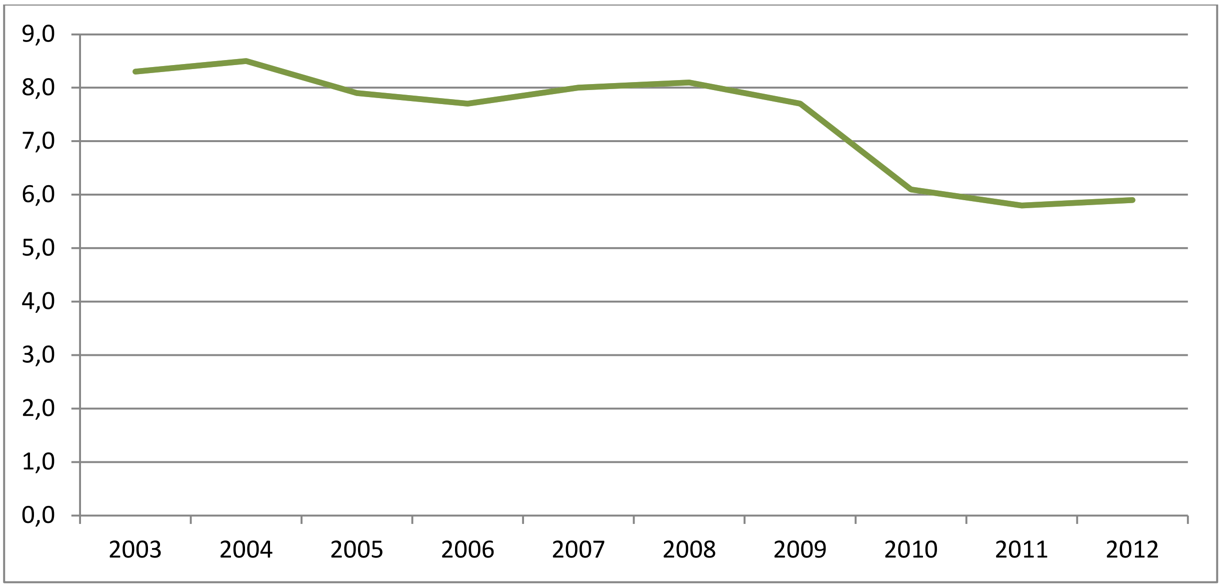


Figure 10.8: Primary energy consumption, Mtoe

Source: Eurostat

Note: Mtoe = Million tonnes of oil equivalent

Primary energy consumption per capita is 30 % lower than the EU average, at about 2.2 toe per capita in 2012. The lower per capita consumption, compared to EU average, is valid for all main sectors industry, transport and households.

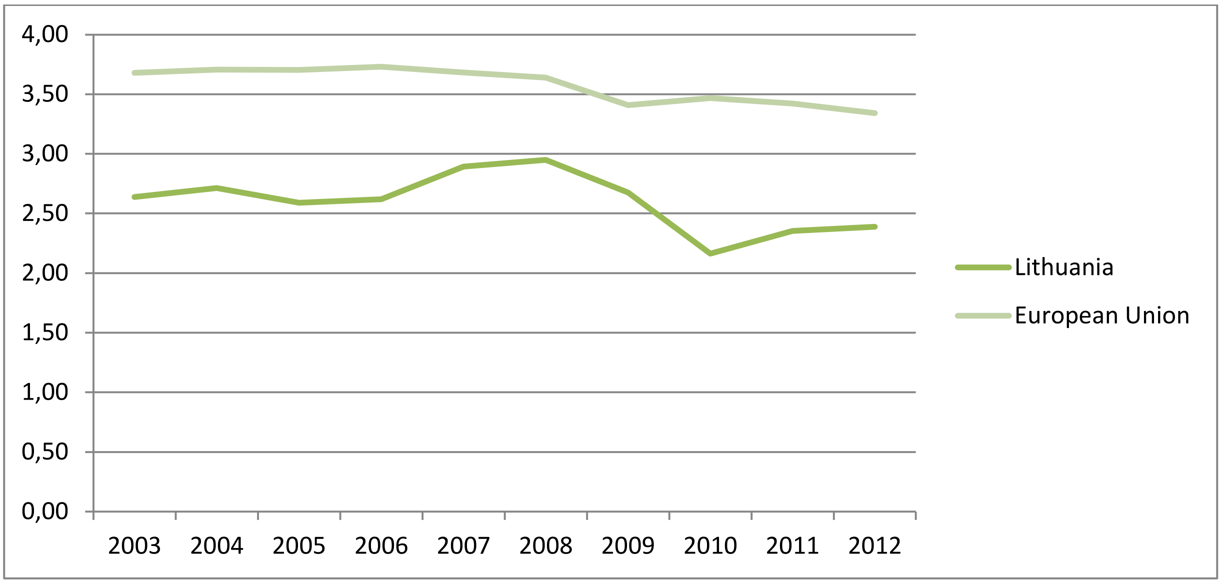


Figure 10.9: Primary energy consumption per capita, toe

Source: Odyssee-Mure.

As it is shown in figure 10.10 the final energy consumption in the country increased in all sectors, including transport, over the period from 2000 to 2012. The difference in growth rates between primary and final consumption reflects improved energy efficiency manly in the energy sector and through increased energy imports.

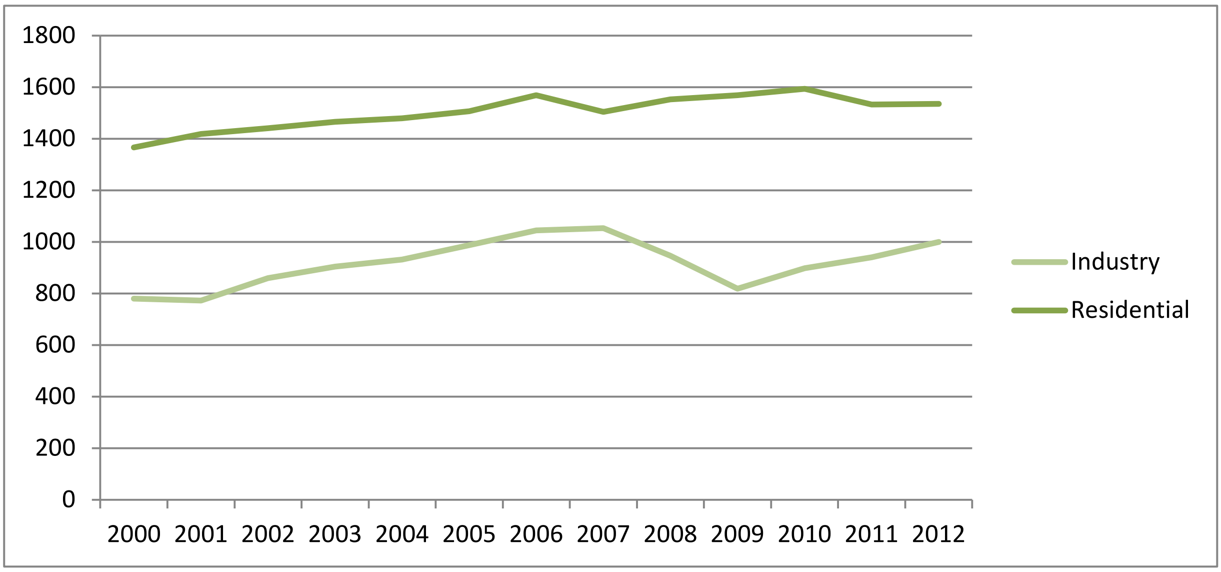


Figure 10.10: Final energy consumption by sector, ttoe

Source: Eurostat

Note: ttoe = 1000 tonnes of oil equivalent

The energy intensity, measured as total energy consumption per unit of GDP is, despite a sharp fall since 2001, still twice the EU average. Between 2001 and 2009 energy intensity fell by 4.5 % per year – much higher than the EU average but also from a much higher level. As mentioned, the decommissioning of the nuclear power plant, that had a low efficiency rate, lead to a strong increase in the efficiency from 2010.

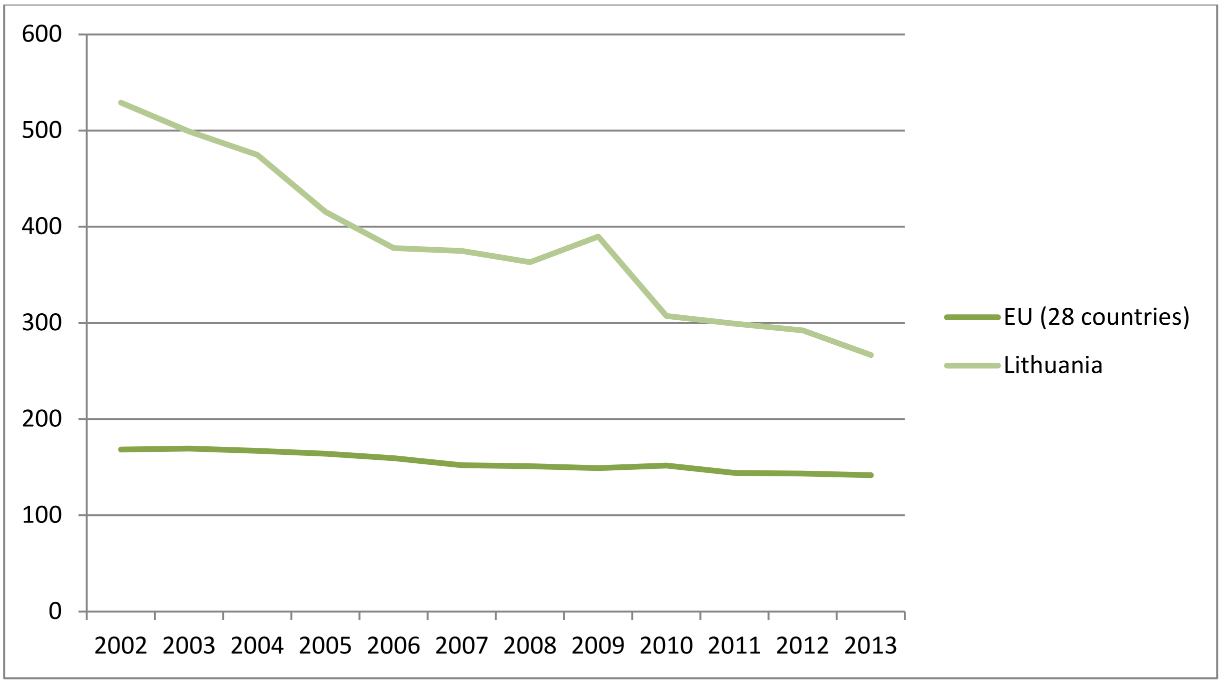


Figure 10.11: Energy intensity of the economy, ktoe/EUR

Source: Eurostat

Note: Energy intensity is calculated as gross inland consumption of energy divided by GDP (kg of oil equivalent per 1 000 EUR)

Apart from the energy sector, most of the efficiency gains (ODEX)[84] were achieved in the industrial sector. The overall energy efficiency of industry has increased by around 42 % since 2000 compared to under 15 % for the average EU (28), mainly due to large improvements in particular energy-intensive branches such as steel, paper, and non-metallic.

For households energy efficiency has improved more modestly around 7 % from 2000 to 2012. Compared to the rest of the EU the Energy efficiency gains in residential have been much lower.

[84] ODEX is the index used in the ODYSSEE-MURE project to measure the energy efficiency progress by main sector (industry, transport, households) and for the whole economy (all final consumers). The ODEX indicators represent a better proxy for assessing energy efficiency trends at an aggregate sector level than the traditional energy intensities, as they are cleaned from structural changes and from other factors not related to energy efficiency (more appliances, more cars etc.).

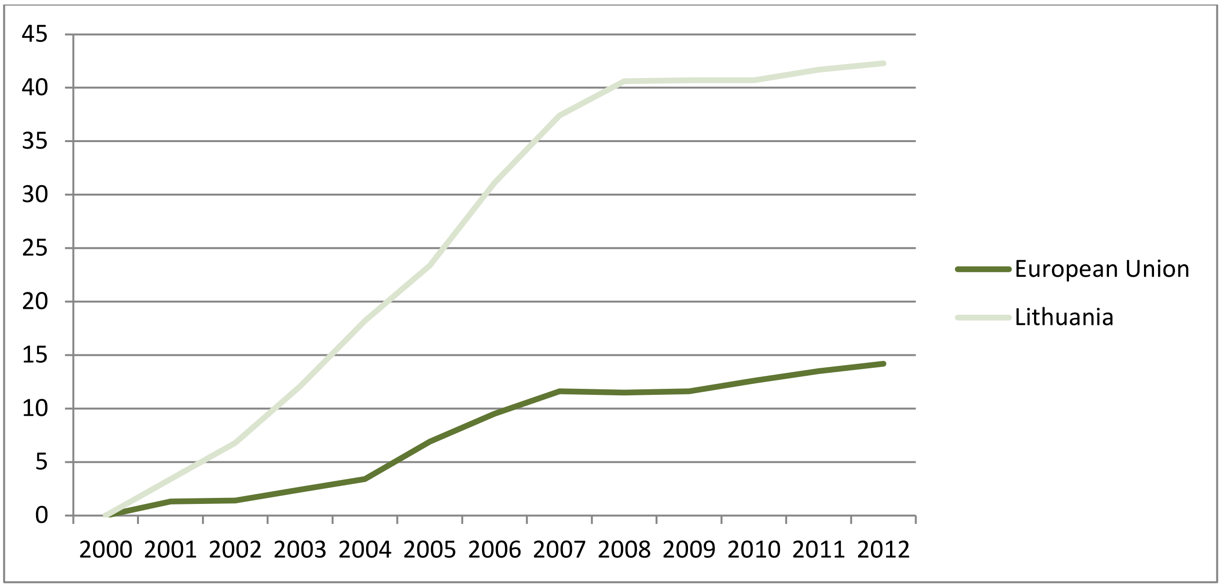


Figure 10.12: Energy efficiency gains in manufacturing industry, %

Source: Odyssee-Mure.

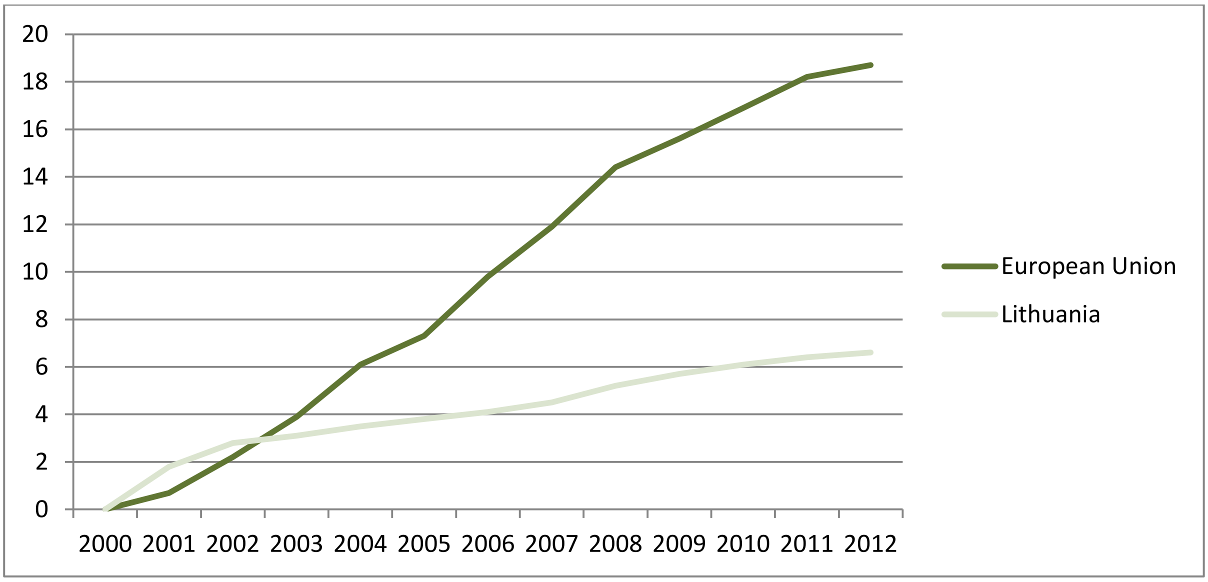


Figure 10.13: Energy efficiency gains in residential, %

Source: Odyssee-Mure.

Despite improvement in the energy performance, analysis indicates that there are still large potentials to be realized[85]. Especially the industry sector, compared to the same sector in other European member states, is very inefficient. One study indicates an overall saving

[85] Analysis of energy saving potentials in selected EU countries, Danish Energy Association.

potential for the industry sector in Lithuania on almost 70%, if compared to the second most efficient industry sector in Europe.

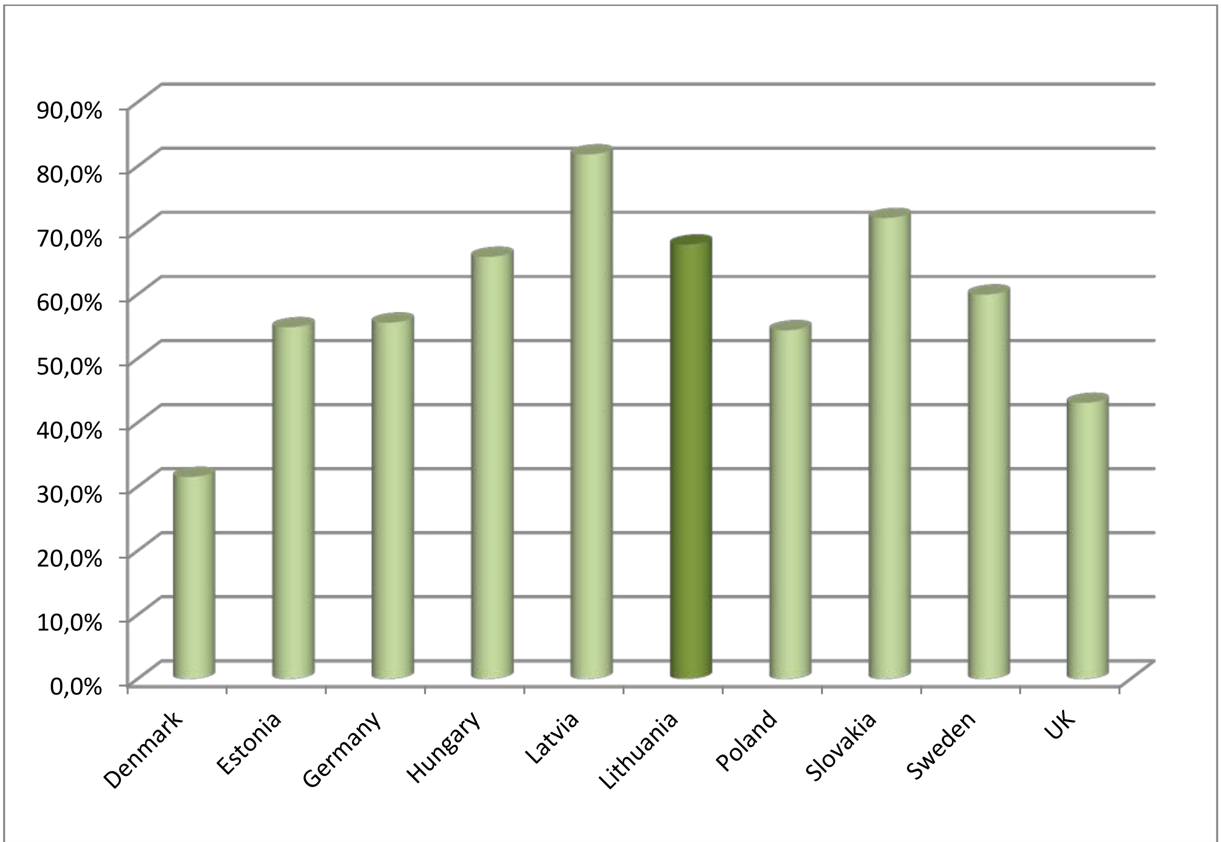


Figure 10.14: Industrial energy saving potentials, 2011

Source: Analysis of energy saving potentials in selected EU countries, Danish Energy Association

Note: Potential energy Industrial efficiency potentials in selected countries, measured against the country with the second best industrial energy performance.

10.2.2 Evaluation of energy savings' capacity - Identification of challenges

There is a significant energy savings potential in Lithuania both in transport, industry and especially in buildings where the efficiency gains have been far from the pace in other European countries. According to the European Investment Bank[86] 65 % of the Lithuanian building stock was built between 1960 and 1990. Many of these buildings are in various

[86] Supporting urban development, European Investment Bank.

needs of urgent renovation, but although building renovation remains among priority rhetoric since the beginning of the last decade, modernization of the building stock i.e. is slow. A number of challenges and barriers can explain the current situation.

The Lithuanian GDP is one of the lowest in EU, and even though energy prices are lower than the EU average energy costs still take up 10 % of disposable income[87]. To compensate for the high relative energy costs, the heating season is kept short in many homes compared to countries with a similar geographical position. The result is that many buildings are not heated sufficiently leading to poor living conditions and low public health. Renovation of the Lithuanian building stock is therefore as much about improving health and general living condition as it is about saving energy. In fact, taken into account, as it has been seen in other countries e.g. UK, that part of the efficiency gains will be offset by a raise in general comfort, making the real energy saving potential significant lower.

In sum however, given the massive potentials in both households, industry and transport, there seems little doubt that Lithuania should be able to meet its targets set for 2020 with the measures specified in the National Energy Efficiency Action Plan, including an EEO scheme.

10.3 Market preparedness

10.3.1 Description of Status quo

In order to define Lithuanian market preparedness for EEO schemes implementation certain indicators have been chosen:

- SME Access to finance index (SMAF)
- Structure of the energy market
- ESCO situation in Lithuania
- Stakeholders evaluation of technological capacity
- Qualifications and certification of energy operators

Energy market

As the obligation will be placed on the DSO of the energy market, the analysis will focus on the DSOs and not retailers. There is one major DSO (AB LESTO) and five smaller DSOs in electricity. In the gas distribution sector Lietuvos Dujos AB has a market share of 99%. Five

[87] Social issues of sustainable energy development in Lithuania, Energetika.

other companies were entitled to engage in distribution activities, but they provided distribution services only to a few regions and their total distribution market share was 1%. There are 31 district heating companies.

SME Access to finance index

The SME Access to finance index (SMAF) shows a considerable improvement in Lithuanian SMV's access to finance over six year period from 2007 to 2013. Prior to 2012 Lithuania was below the EU average but in 2012 there were considerable improvements and these improvements were maintained in 2013.

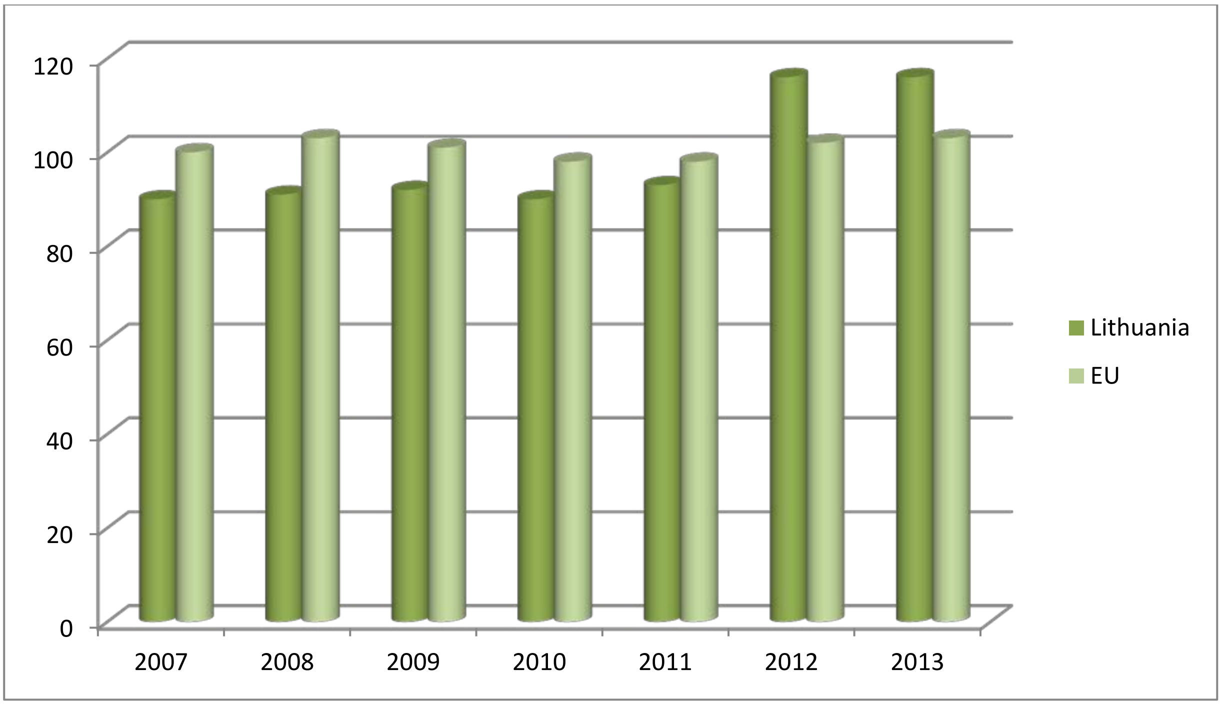


Figure 10.15: SME Access to finance index (SMAF) - index value 2007=100 in Lithuania and EU average.

Source: SME Access to Finance, the European Commission

ESCO Market development

A JRC-IE report (2010) characterized market development as slow growth. At the time ESCO type projects were primarily developed in the district heating, co-generation, and public buildings sector.

The situation hasn't changed much today and the EBRD-ELENA facility is funding a program running from May 2014 to May 2020 with the objective to enable (ESCOs) to scale up their commercial energy efficiency projects in Lithuania by improving efficient use of energy in buildings such as kindergartens, schools, hospitals, public offices and certain residential buildings. The need for such a program indicates that the ESCO market is still in the early stages of development and will continue to be so in the nearest future.[88]

EBRD estimates that there is considerable energy efficiency potential in the building environment. This includes public sector buildings such as schools, town halls, hospitals (and street lighting). Estimated potential energy savings range from 25% with few investments to as much as 60% provided there is a high standard of design and investments.

There are is no definition of ECSO in Lithuanian law and currently the government doesn't plan to make such legal definition. Instead the government plans to support the ESCO market by developing standard legal documents that can be used in ESCO projects.

There are different consultancy companies and various departments in different energy companies, which consult about energy efficiency improvements, make certain calculations, however it does not function as ESCOs. In order to implement EEO scheme, stakeholders believe that it is very important to define ESCOs business module, so they can start to fully function and increase energy savings, by signing contracts with households and companies.

Stakeholders' evaluation of technological capacity

A study suggest that only 60% of the blue collar work force in Lithuania needs additional training to be prepared for the construction of energy-efficient buildings. Expert evaluation results show that by the year 2020 between 35,211 to 39,548 blue collars will need additional training to meet demand for skills related to energy efficiency. This means that training programs need to be updated, supplemented with appropriate topics to acquire necessary knowledge and skills, training facilities must be prepared and teachers must be ready (where it is necessary to train them additionally)[89]. The type of skills and knowledge needed in the construction sector working-class occupations is widespread:

- Knowledge of construction sector legislation.
- Fundamental knowledge in thermal physics. Heat and moisture transfer techniques in different environments.
- Knowledge of air tightness, ventilation and air-quality requirements in buildings.
- Knowledge of energy efficiency and priority measures to reduce the energy consumption.
- Knowledge of mutual compatibility of new materials and technology.
- Knowledge in envelope air tightening technologies. Knowledge about the latest envelope sealing materials and products.

---

[88] Supporting The Development Of The ESCO Market In Lithuania, Devex.com.
[89] Build up skills – Lithuania Status Quo Analysis Report (2013).

- Knowledge of requirements for the work quality. Knowledge of envelope tightness quality control methods. Knowledge of quality control of envelope insulation system surface durability.
- The ability to install an airtight envelope and choose an effective wall insulation system by reducing the risk of cold bridging, choose appropriate materials and technologies.
- The ability to work with a new material and apply new technologies and equipment.
- The ability to install various energy efficiency systems and to determine which system is best suited for a variety of buildings.
- The ability to work with new equipment and properly install, balance and put them into operation for work correctly.
- Ability to perform proper sealing of partitioning design elements and engineering equipment joints (sockets, switches and other cavities).
- Ability to use the envelope sealing material or product.
- Ability to perform the quality control of envelope tightness.

Survey data showed that not all construction companies fully understand the importance of qualifications, as well as do not trust the external training valuing more work practice on construction site. Companies that acknowledge the need for training foresee that the effective length of training is up to 5 working days for workers to acquire the appropriate set of skills.

Qualifications and certification of energy operators

Since 2005 Lithuania has approved a number of Orders to set procedures for and conditions of conducting audits of energy consumption in buildings, installations and technological processes and as well as for the training and appraisal of specialists conducting audits of energy consumption in buildings, installations and industrial processes[90]. The following professionals can be appraised:

- specialists conducting energy audits in buildings, technological processes and installations;
- managers of the key areas of technical construction-related activity and spatial planning specialists;
- specialists conducting energy performance certification of buildings;
- specialists assembling, testing, fine-tuning, commissioning and operating energy installations and managers organizing these works.

[90] Lithuania's National Energy Efficiency Action Plan (NEEAP), European Commission.

The Energy Agency has granted certification to the following number of auditors to conduct energy audits in the past four years:

Table 10.1: Number of certified auditors

2010	2011	2012	2013
53	6	8	8

Source: NEEAP 2014.

In November 2014 the appraisal of specialists conducting audits of energy was updated. Information on the exact changes was unavailable to the authors at the time of writing.

Certificates issued to experts of energy performance certification of buildings (only experts' who have given consent to be part of the statistics):

Table 10.2: Certificates issued to experts of energy performance certification of buildings

2007	2008	2009	2011	2012	2013
123	85	113	17	107	121

Source: NEEAP 2014.

Note. No data for 2010

Certified experts have issued 2,325 energy performance certificates to buildings energy performance certificates in 2011, 4,078 in 2012, and 39,977 certificates in 2013 (no explanation to the significant increase in 2013 was available at the time of writing).

10.3.2 Evaluation of market preparedness – Identification of challenges

One of the biggest challenges, according to the stakeholders is the lack of precise tools on how to increase energy efficiency, meaning that there is a need for examples and shared experience from the other countries that have implemented the scheme. Furthermore an increase in ESCOs operating in Lithuania could speed up the process of improvements in households and industry and support the implementation of an EEO.

Looking at the overall technical capability of professionals in Lithuania there seems to be a considerable need to upgrade qualifications particularly in the building sector and also to some extent in the industrial sector where only a limited number of certified professionals exist.

10.4 Administrative preparedness

10.4.1 Description of Status quo

The main indicators to represent administrative preparedness:

- Government effectiveness
- Regulatory quality
- Experience against free-riders

According to a country report covering all sectors from 2014 published by the Sustainable Governance Indicators (SGI) project Lithuania has faced a fast process of transition and accession to the European Union and the Lithuanian government has had a narrow focus on this task resulting in a lag in policy implementation. The government's policy of fiscal consolidation represented one important success, but few major structural reforms occurred in Lithuania during the 2008 to 2012 period, with the exception of a higher-education reform and a restructuring of the energy sector. Coalition politics, disagreements between different power centres, resistance from interest groups, and a mismatch between government priorities and the allocation of resources during the budgeting process largely explain the failure to implement key policy objectives[91].

Lithuania's fragmented structure of agencies and other public-sector organizations undermines ministerial performance monitoring. While agencies subordinate to the central government or individual ministries can be monitored comparatively efficiently, autonomous organizations such as public non-profit institutions, foundations, and state-owned enterprises that carry out administrative functions are more difficult to control. Parent ministries and third parties acting on behalf of the ministries use a combination of ex-ante and ex-post oversight mechanisms, including the assessment of agency results. However, many Lithuanian ministries have no professional staff specifically assigned to monitor agency activities.

10.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

The Ministry of Energy has been in charge of the energy sector since 2009, a role which was previously performed by the Ministry of Economy. The State Enterprise Energy Agency promotes the efficient use of energy resources as well as the use of renewable energy. Their

[91] Sustainable Governance Indicators, Lithuania Report.

responsibilities include drafting the National Energy Policy and the preparation and implementation of measures to increase energy efficiency, for inclusion in national policy. The Ministry of the Environment is responsible for implementing statutes provided under the Energy Law[92]. The Ministry of Energy is in charge of the drafting and implementation of an EEO in Lithuania.

Lithuania, despite its relatively small size, is among the three countries in the European Union that had received the largest contributions from the Cohesion Fund and European Regional Development Fund for energy efficiency measures for the 2007–13[93]. Being able to administrate such a large influx of funding indicates relative strong capability to handle a variety of schemes and projects.

Lithuania has together with the two other Baltic states benefited from extensive cooperation with particularly the Scandinavian countries prior to entering the EU focused on strengthening institutional capacity and human resource development in public institutions, local and regional authorities through cooperation and transfer of knowledge with similar institutions in Scandinavia since the 1990. Two of the major focus areas have been environment and energy[94]. Though institutional capacity can still be improved, significant progress has been made in the past decades.

10.5 Legislative preparedness

10.5.1 Description of Status quo

In the summer of 2014 Lithuania changed its Minister of Energy from Jaroslav Neverovič to Rokas Masiulis as a result of internal disputes within the Lithuanian government. The change in Minister has among other factors resulted in delays in legislative implementation of laws making an EEO reality in Lithuania.

Judging from a country comparison report from SGI based on review of 41 states of the OECD and the EU Lithuania performs quite well, ranking as follows:

Policy Performance: 11

Democracy: 12

[92] Clean Energy Info Portal, Lithuania.
[93] Cost-effectiveness of Cohesion Policy Investments in Energy Efficiency, European Court of auditors.
[94] Environmental Projects in Lithuania, Danish Environmental Protection Agency.

Governance: 21

This ranking indicates that Lithuania is quite capable of implementing any type of legislation including what is required as a result of the EED article 7.

Looking at The Worldwide Governance Indicators, Lithuania's performance has increased slightly over the past decade. However, no significant jump in performance is traceable based on these indicators.

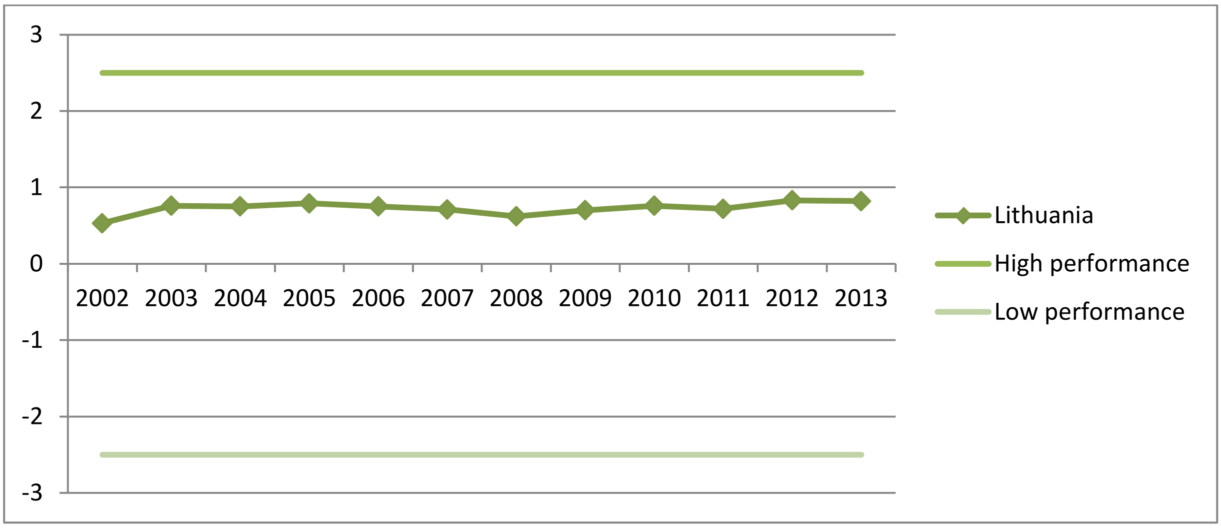


Figure 10.16: Governments effectiveness in 2002-2013 (ranges from -2.5 (low) to 2.5 (high)).

Source: The Worldwide Governance Indicators (WGI) project,

Another indicator is regulatory quality, which reflects governments' ability to formulate and implement policies and regulations that permits and promotes development of the private sector.

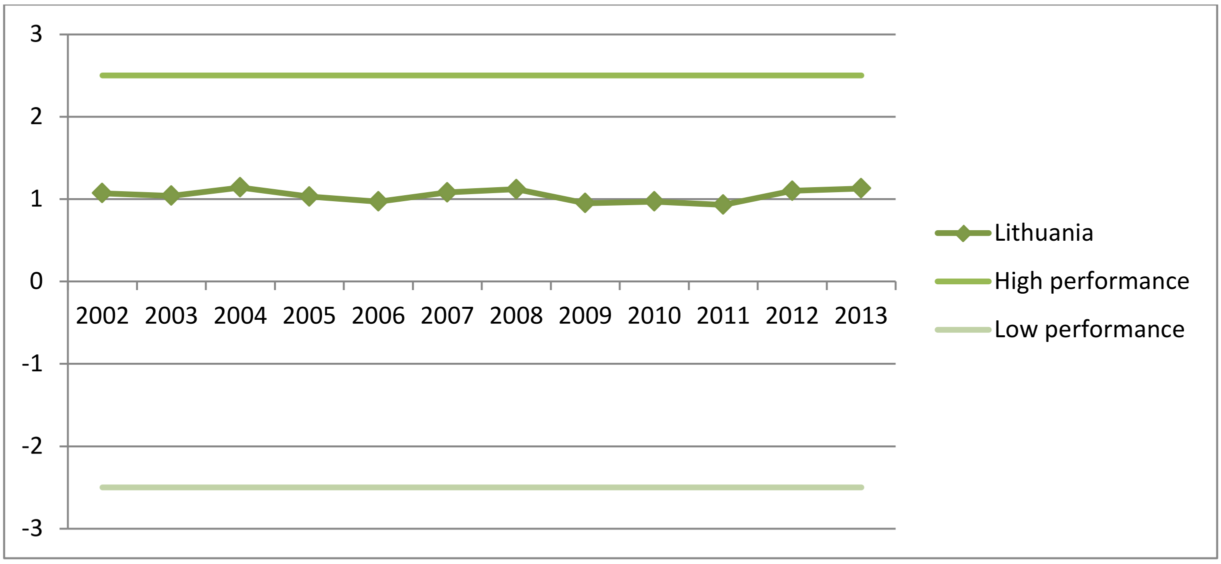


Figure 10.17: Governments regulatory quality in 2002-2013 (ranges from -2.5 (low) to 2.5 (high)).

Source: The Worldwide Governance Indicators (WGI) project

As is the case with Governments effectiveness the regulatory quality Lithuania is also stable over the past decade.

10.5.2 Evaluation legislative preparedness – Identification of challenges

Based on Lithuania's overall performance in an international perspective there seems to be no reason for concern about Lithuania's legislative preparedness. However, it does raise some concern for timeline for implementation in the short term that there have been some challenges internally in government resulting in changing ministers during the drafting of the EEO legislation. At the time of writing, it is difficult to assess the exact consequence as for the implementation of the EEO as the final draft of the EEO is not available. Hopefully it will be adopted in the spring of 2015.

10.6 Social & Political acceptance/feasibility

10.6.1 Description of Status quo

Social and political feasibility of the EEO schemes implementation in Lithuania is presented by following indicators:

- The European Market Performance Indicator
- Level of fuel poverty within the country
- Social stance
- View of the industry

According to the latest consumer rating from the European Commission Lithuanian consumers' rating for their electricity supplier are among the lowest in EU[95]. Contrary to the Electricity providers however, the retail gas market's rating is among the highest in EU with high scores on key aspect such as comparability of goods and services, trust and consumer satisfaction. The low ranking for the electricity suppliers might be a result of the structural changes the sector has been through since 2009.

The different stakeholders, interviewed for this review, express that the biggest trust issues in fact are with the distributors and suppliers of district heating. This sphere is very political, as people think that heating prices are too high and their apartments are not warm enough comparing with the paid heating price. Moreover people doubt about the components of the heating prices.

There are no official statistics on fuel poverty in Lithuania. However, as already mentioned, energy cost takes up 10 % of disposable income. 20-25 % of the workers in Lithuania receive the minimum monthly salary. 34 % of Lithuanians lived in inadequately heated houses. No doubt about the fact that poverty and fuel poverty is wide spread in Lithuania today.

Lithuanian legislation foresees heating cost subsidies for individuals and households depending on the income level. In early 2013, 7 % or 200 000 of Lithuanians received a subsidy from the state for heating and hot water supply services. Depending on the size of their households, the subsidy reaches even more people.

According to some studies, the renovation works have often been reported to be of poor quality. Quality control and supervision processes are often non-existent. As a consequence, the financial returns on energy renovations are not as big as expected, reducing the incentives and willingness for new renovation projects.

As far as Lithuanian industry is concerned, it seems that there are significant potentials for energy efficiency improvement. In general, Lithuanian industries and the energy sector base large part of their production on outdated technology with high consumption and operating costs. Improving energy efficiency could help industries in multiple ways increasing

[95] The Consumer Market Monitoring Survey, European Commission.

economic and productive efficiency as well by reducing energy consumption and its related costs but also reducing CO_2 emissions and subsequently, environmental penalties.

Lack of financial incentives and inadequate information on the benefits and measures of energy efficiency are main factors preserving this low efficiency performance. Moreover, industrial inefficiency may reflect policy failure and/or difficulties to implement and achieve the expected results through public policy strategies. Evaluation of social acceptance/feasibility – Identification of challenges

The European consumer survey and the stakeholder interviews indicate that there are legitimacy issues at last for part of the energy sector, raising concerns whether it will be possible to get public accept to an EEO scheme. It is important to establish a trust in the participating parties in particular the market players that address consumers directly.

Lack of trust in the quality of efficiency services could be a serious obstacle for deeper renovation and efficiency measures. An EEO is not any worse than any other alternative measure in that respect.

Another concern is costs. Fuel poverty and increase of energy prices for the final energy consumers influence the fact that society does not support EEO schemes implementation, which causes multiple challenges for different stakeholders and obligated parties. An EEO financed over the energy bill will burden large energy consumers relatively hard. On the other hand, these consumers are the ones to gain the most from improved energy efficiency. Poor households will also be hit because energy is a basic commodity that takes up a large part of disposable income. However, a lot can be solved by designing an EEO that takes into account special needs for certain costumer groups, energy poverty etc.

Even though people may have the funds and the understanding of the benefits of the renovation, they may not be willing to prioritize project over other investments. Similar barriers are seen in other European countries. Long pay back times in some cases make matters worse.

At the same time fuel dependency from especially Russia is of such concern that a strategy aiming at greater energy independence was adopted in 2011. Reduction in consumption and improved Energy Efficiency are important tools towards the goal that has prepared acceptance from the general public.

REFERENCES

Bank of Lithuania. Economic Outlook for Lithuania. (2014).
Bank of Lithuania. Lithuanian Economic Review (2014)
Danish Energy Agency. Østersøsamarbejde BASREC. (2013)
Danish Energy Association. Analysis of energy saving potentials in selected EU countries based on a sectorial best-practice approach. (2014).
Danish Environmental Protection Agency. Environmental Projects in Lithuania. (2001).
Devex.com. Supporting The Development Of The ESCO Market In Lithuania: Preparation Of Tender Documentation. (2014).
Ðtreimikienë, D., Zaikienë, J. Energetika. Social issues of sustainable energy development in Lithuania. (2004).
Energinisefektyvumas.lt. Build up skills – Lithuania Status Quo Analysis Report. (2013).
Energy Efficiency Watch Energy Efficiency in Europe – Assessment of Energy Efficiency Action Plans and Policies in Member States, Country Profile Lithuania. (2013).
Energy Charter Secretariat. In-depth review of the investment climate and market structure in the energy sector of Lithuania. (2013).
EUR-lex. European Energy Security Strategy [COM(2014)330]. (2014).
European Commission. The Consumer Market Monitoring Survey. (2013).
European Commission. Lithuania's National Energy Efficiency Action Plan (NEEAP). (2014).
European Court of auditors. Cost-effectiveness of Cohesion Policy Investments in Energy Efficiency. (2012).
European Investment Bank. Supporting urban development. (2015).
Government of Lithuania. National Energy Independence Strategy. (2012).
Lituanian Energy Institute. Annual Reports. (2013).
Nakrosis, V., Vilpisauskas, R., Jahn, D. Sustainable Governance Indicators, Lithuania Report. (2014).
Odyssee-Mure. ODYSSEE energy efficiency indicators and database. (2015).
Reegle.info. Clean Energy Info Portal, Lithuania. (2012).
Sustainable Governance Indicators Policy Performance and Governance Capacities in the OECD and EU. (2014).
The World Bank Group. The Worldwide Governance Indicators (WGI) project. (2013).

11 Luxembourg - ADEME

11.1 Economic profile

The Grand Duchy of Luxembourg was one of the six founding countries of the European Economic Community in 1957. In 1999, it also joined the euro currency area.

Today, this small Member States, both in size (2.586 km2) and population (549.680 habitants in January 1st 2014, among which over 45% of foreigners) shows a stable, high-income economy, benefiting from both from its solid growth, low inflation and limited unemployment, and from its direct proximity with Germany, France and Belgium, in the center of Western Europe. The country enjoys a GDP per capita ranking among the highest in the world (the highest in the euro zone) attracting workers from all other Europe and contributing to increase its population, energy consumption and the need for new buildings.

The economic structure of Luxembourg is based mainly on banking, insurance, and industry, the service sector accounting for more than 86.4% of Luxembourg’s GDP. Growth in the financial sector (now about 36% of GDP), stimulated by the world’s most highly ranked investment freedom, has more than compensated for the decline in steel industry over the last decade. At the same time, the government is supporting the development of new industrial and technological activities, such as ICT, in order to diversify the economy.

Because of the limited size of Luxembourg's market, foreign trade is essential to the country’s economic life. Over 80% of its production of goods and services is exported, 85% of which within the EU (July 2011).

The economy depends on a skilled, multilingual workforce: foreign and cross-border workers now account for about 70% of its labor force.

11.1.1 Description of Status quo

GDP, GDP per capita and growth evolutions

Luxembourg GDP increased by about 76 % between 1995 and 2009. It reached 45.5 billion euros in 2013.

In the same period, neighboring countries GDP grew between 16 % and 28 % (Germany: 16 %, Belgium: 29 % and France: 28 %).

In 2013, Luxembourg has by far the highest GDP per capita in the EU, with 80,700€ per inhabitant.

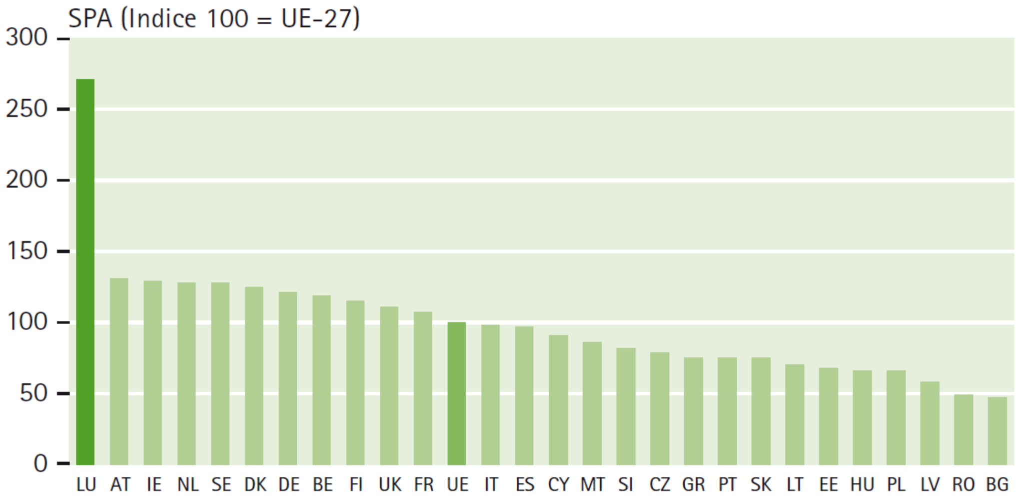


Figure 11.1: GDP per capita in Luxembourg and the EU in 2013 (indice 100=UE 27 in 2013)

Source: EUROSTAT

This is partially due to the significant number of inhabitants of the border zone whom, although contributing to the GDP, are not considered as being part of the resident population (which is used for the calculation of the GDP per capita).

Indeed, while Luxembourg's internal labor force amounts to 390.310 in 2013, about 161.712 workers are estimated to commute daily from France, Belgium and Germany to work in Luxembourg.

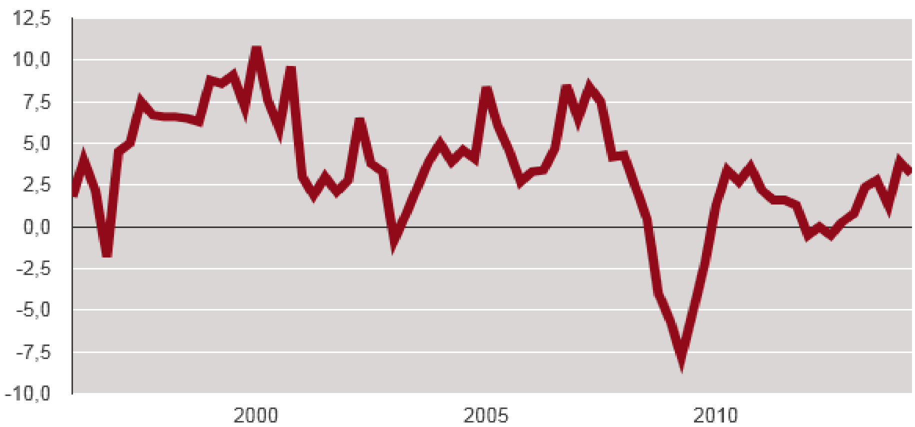


Figure 11.2: GDP annual growth in Luxembourg (indice 100=UE 27 in 2013)

Source: Les Echos from EUROSTAT data

Luxembourg did suffer from the financial crisis in 2009: after several years of strong expansion between 2004 and 2007, Luxembourg's economy contracted 3.6% in 2009. It has shown good signs of recovery since, with 2.1% growth in 2013 and an estimated growth of 2.7% in 2014. This is still far from the average 5% growth the country experienced between 1995 and 2007.

Central government debt as a % of GDP

Luxembourg central government's debt as a % of GDP has tremendously increased over the past 10 years, and more than doubled since 2007.

This can partly be explained by the government choice to inject capital in the banking sector and implement measures to stimulate the economy following 2008 financial crisis. These measures led to a 5% government budget deficit in 2009, increasing the need for debt financing.

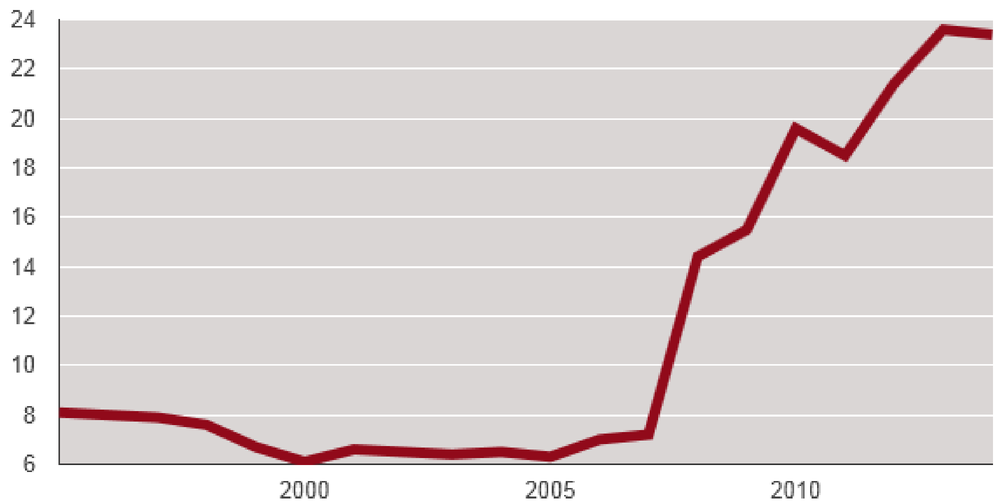


Figure 11.3: Luxembourg central government debt as a % of GDP (2013, %)

Source: Les Echos from EUROSTAT data

Even so, Luxembourg's public debt remains among the lowest of the region, public debt representing only 23.1% of its GDP in 2013, making Luxembourg the 3rd best Member States in the EU regarding its debt: GDP ratio.

Energy prices (domestic users)

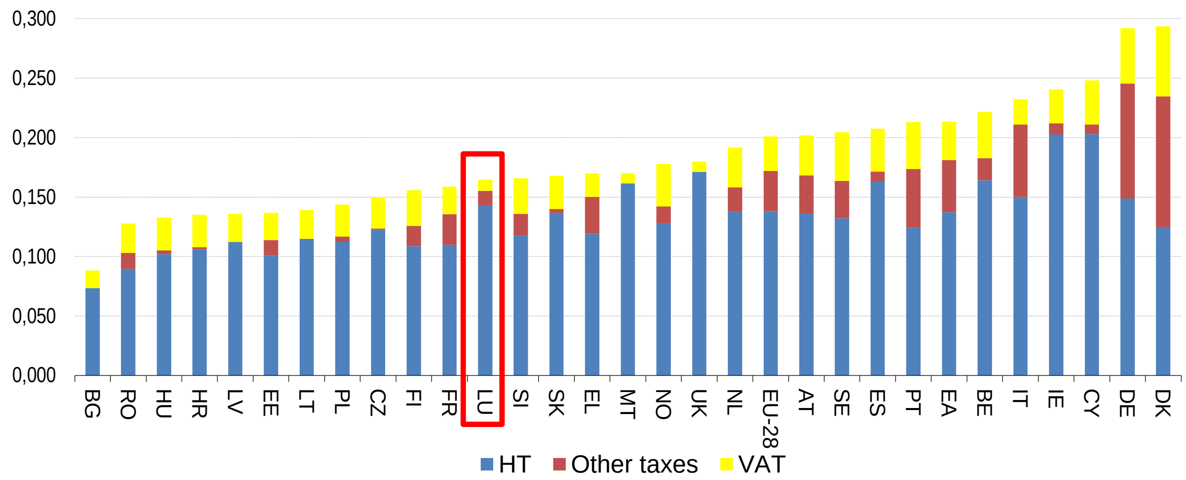


Figure 11.4: Electricity prices in Luxembourg and the EU for households (2013, €/kWh)

Source: EUROSTAT

Electricity prices for households are 18% lower in Luxembourg than the EU average, mostly because of the low taxation rates applied.

Since 2007 and the 2nd stage of the liberalization of the energy market, electricity prices have increased by 9% (2012 data).

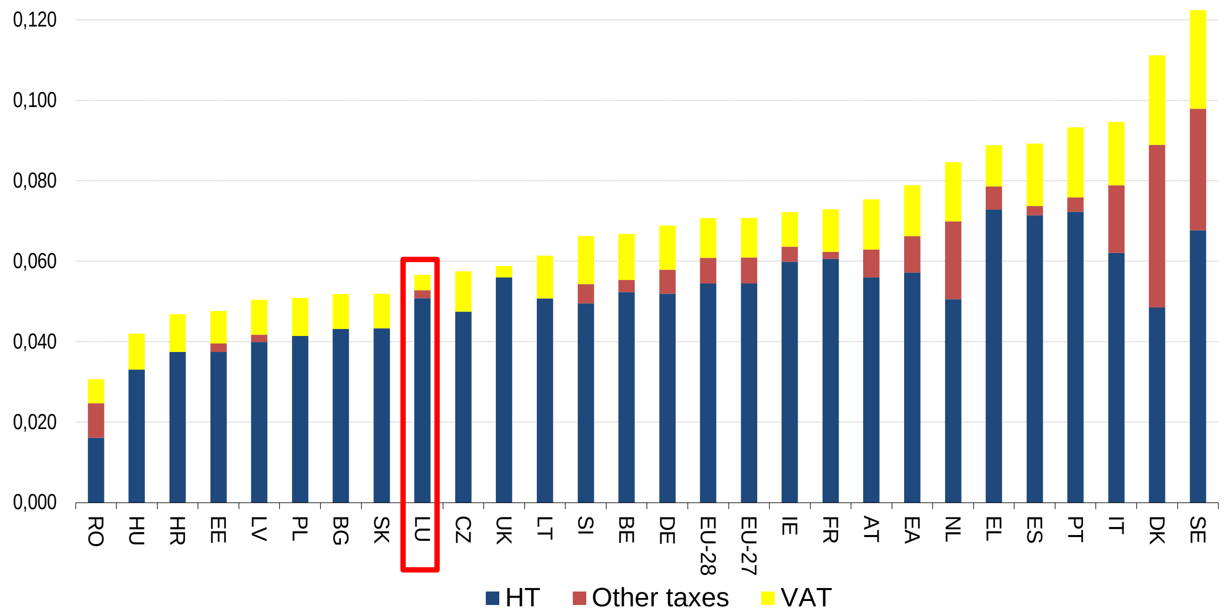


Figure 11.5: Natural gas prices in Luxembourg and the EU for households (2013, €/kWh)

Source: EUROSTAT

Natural gas prices for households are 22.5% lower in Luxembourg than the EU average, once again because of the low taxation rates applied.

These prices have increased by 9.2% between 2008 and 2012.

Energy dependence

Luxembourg energy dependence is one of the highest in the EU. Over the past decade, it stayed stable around 97%, exposing the country to energy security risks.

The lack of domestic sources of energy and the insufficient diversification of the energy mix (Luxembourg is dependent on single fuel types to meet its transport and heating needs, oil products and gas respectively) are the main causes of concern.

The share of renewables in Luxembourg's final energy consumption increases slowly, rising from 1.4% in 2006 to 2.9% in 2011. Luxembourg is committed to increase the share of renewables to 11% of final consumption and to 10% in the transport sector

Luxembourg is working hard in strengthening its energy supply security, developing sustainable energy supplies and integrating its markets into the Central-West European (CWE) region.

Efforts are being made to diversify fuel use in the domestic transport sector (deployment of alternative fuels and fuel infrastructure, notably electric vehicles) and promote public transport.

Energy efficiency is another way for Luxembourg to work on reducing its energy dependence.

11.1.2 Evaluation of economic preparedness - Identification of financial challenges

The economic situation of Luxembourg is quite enviable: AAA grade, first European country in terms of GDP per capita, low debt, government surplus of 0.1%. Still, its growth has been less strong in recent years and its unemployment rate keeps increasing (from 4% in 2007 to over 7% in 2013).

So far, energy prices in Luxembourg for households are rather low compared to EU averages, both for electricity and natural gas. These prices are not in favor of major investments in energy efficiency since these are not profitable enough (or at all for some options) so far compared to other investments.

These energy prices remain very low thanks to a low level of taxation. They have been increasing regularly over the past years even if the regulator still assesses them "reasonable".

11.2 Energy & Climate Change profile (Energy Savings' Potential)

11.2.1 Description of Status quo

Primary energy consumption (Mtoe)

2012 consumption: 4.4Mtoe
2020 target: 4.48 Mtoe

In the period 1995-2009, primary energy use grew by about 30 % in Luxembourg. Since approx. 2004/2005, primary energy use has stabilized and now shows decreasing trends.

The primary energy consumption target Luxembourg notified to the Commission to comply with the Energy Efficiency Directive is slightly above its current level.

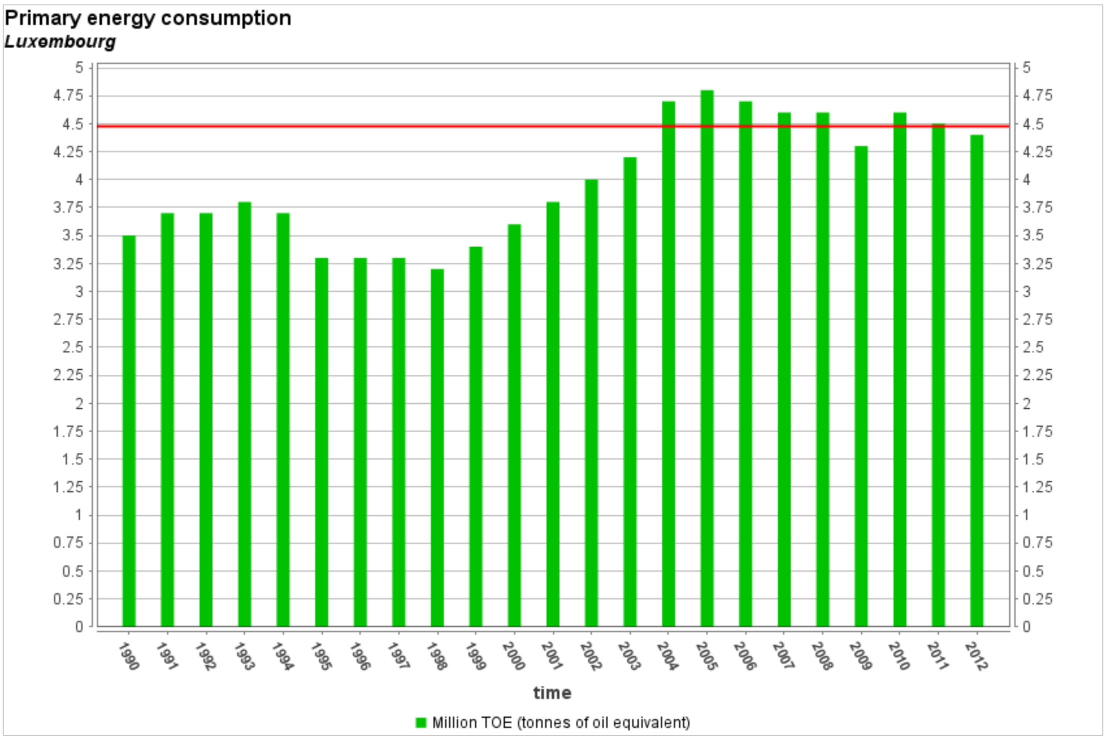


Figure 11.6: Evolution of primary energy consumption in Luxembourg (1990-2012, Mtoe)

Source: EUROSTAT

Energy intensity of the economy (kg of oil equivalent per 1 000 EUR)

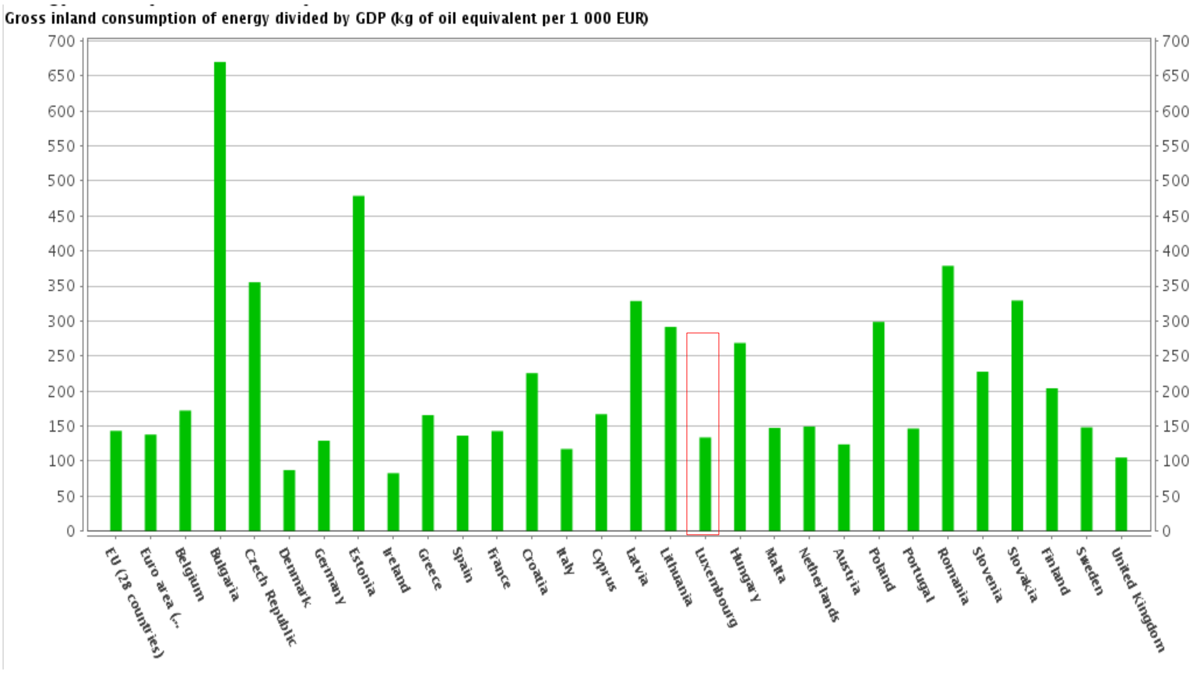


Figure 11.7: Energy intensity of the economy of Luxembourg and the EU (2012)

Source: EUROSTAT

In Luxembourg, the relatively low energy intensity of the economy masks the opposite performances of industry and transport, on the one hand, and of the household sector, on the other hand.

Source: European Commission, "Member States' Energy Dependence: An Indicator-Based Assessment", April 2013

Luxembourg energy intensity decreased by 5.2% in 2013. This reduction confirms the tendency observed over the last 2 years and lead for the years 2010-2013 to an average decrease of the energy intensity of the economy of 2.9% annually.

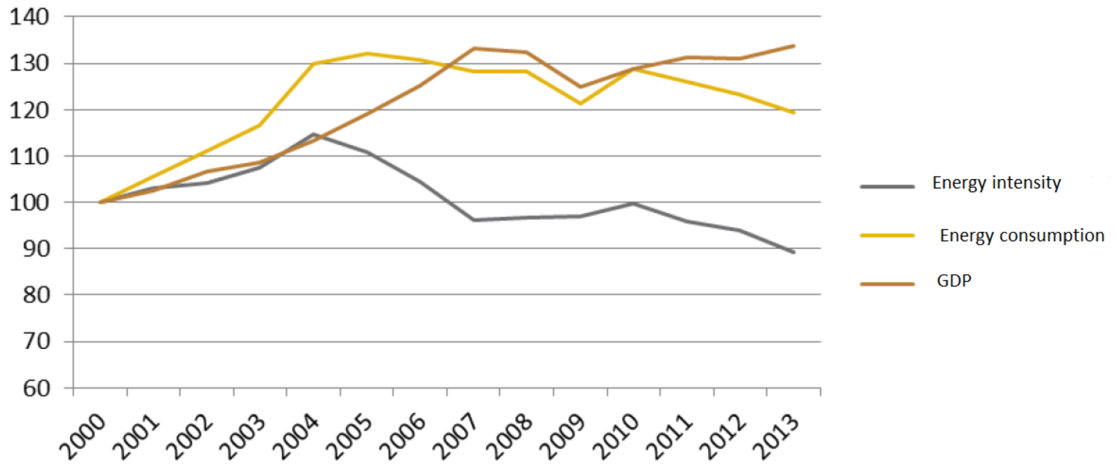


Figure 11.8: Evolution of energy intensity, energy consumption and GDP in Luxembourg (2000-2013, indice 100=2000)

Source: STATEC, 2014

Final energy consumption (Mtoe)

Luxembourg's final energy consumption increased by 20 % between 1990 and 2005. It then stabilized between 2005 and 2010 and now shows decreasing trends.

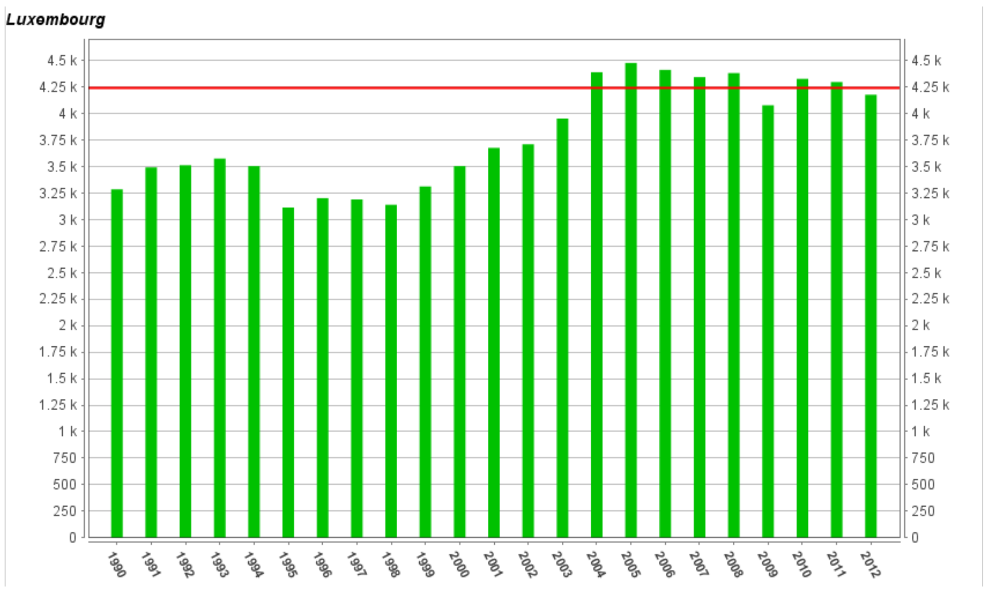


Figure 11.9: Evolution of Luxembourg's final energy consumption (1990-2012)

Source: EUROSTAT, 2014

With regard to energy efficiency, the country works towards energy savings of 14.06% by 2016 and 20% by 2020 compared to 2007 levels.

Table 11.1: Luxembourg's final energy consumption per energy and sector (2012)

Final consumption of energy

	2010	2011	2012	2012/11
			in 1000 tpe[1]	in %
By product				
Coal	67	58	54	-7.9
Natural gas (NCV)	675	600	608	1.2
Electricity	568	561	539	-4.0
Heat	76	78	76	-1.9
Oil products	2838	2896	2789	-3.7
Other (wood, biofuel)	108	105	112	6.4
By use				
Agriculture	8	8	8	-5.5
Industries	740	659	600	-8.9
Services	445	426	542	27.2
Transport	2628	2727	2596	-4.8
Households	511	478	431	-9.7
Total	**4332**	**4298**	**4177**	**-2.8**

[1] ton petroleum equivalent

Source: STATEC, 2014

The transport sector represents 62% of Luxembourg's final energy consumption, followed by the industry sector (14%), the service sector (13%) and the residential sector (10%).

As the seat of several EU and international institutions, Luxembourg has a lot of public buildings, compared to its residential park and lots of cross-border commuters' work in these institutions, which explain the high energy consumption the country experiment in the transport and service sectors, compared to other Member States.

The growing number of these cross-border commuters and the significant volumes of fuel sold to non-residents, because of the differences between taxation in neighboring countries, continue to strongly increase the energy consumption in the transport sector.

Regarding the consumption trends in energies covered by Luxembourg's EEO:

- Luxembourg's electricity consumption reached a peak in 2007, and has been slowly decreasing ever since, below its 2006 level;
- Its gas consumption known a peak in 2006, and was cut by 30% between 2006 and 2013, in spite of a rebound of consumption in 2010.

Final energy consumption of residential dwellings (Mtoe, with climatic corrections)

The final energy consumption of energy dwellings was quite stable between 2004 and 2009. It has decreased by 12% between 2009 and 2012.

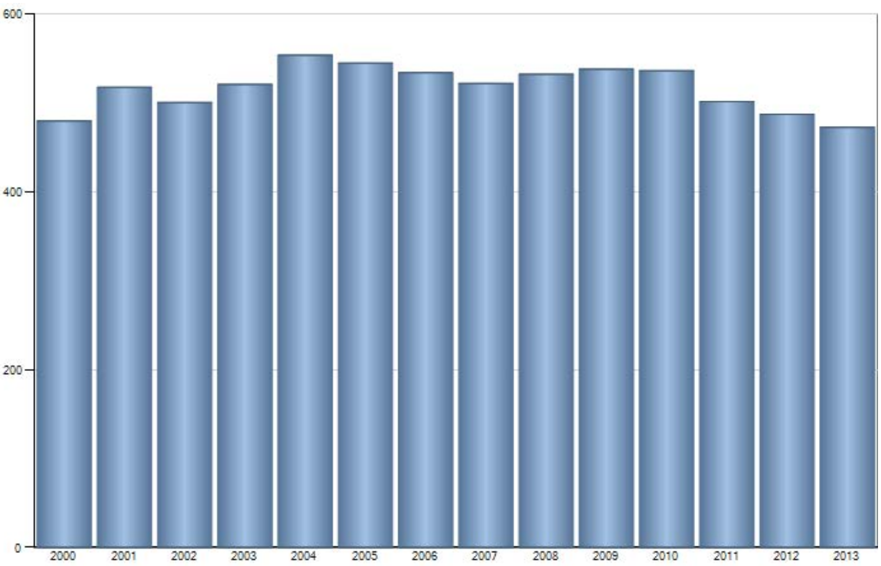


Figure 11.10: Evolution of Luxembourg's final energy consumption of residential buildings (2000-2013, Mtoe)

Source: STATEC, 2014

Energy efficiency gains (%)

In the area of energy efficiency, strong progresses have been observed over the past years, especially in the building sector.

In the building sector:

According to the ODYSSEE project calculations, Luxembourg households gained 19.5% of energy efficiency between 2000 and 2012, a little over the EU average gain of 18.7%.

Energy performance standards were strengthened over time for both residential and non-residential buildings; investment aid for renovation of residential buildings is depending on conformity with these standards.

In the industry sector:

The Luxembourg industry gained 28.3% in energy efficiency between 2000 and 2012, considerably above the EU average gain of 14.2%.

Sources: http://www.indicators.odyssee-mure.eu/online-indicators.html

The industrial sector, initially dominated by steel, has become increasingly diversified to include chemicals, rubber, automobile components, and other products, leading to a less energy-intensive industrial mix.

A voluntary agreement with industry, monitored by Myenergy, was reached to save 7% of energy during 2011-16.

11.2.2 Evaluation of energy savings' capacity - Identification of challenges

The main drivers behind the trend in Luxembourg energy consumption are the sharp rise in population figures (by 22 % or 88 000 inhabitants between 1995 and 2009) and a 76 % GDP growth in the same period.

A significant improvement in energy efficiency both in the industrial and residential sectors coupled to the redevelopment of the steel industry allowed final energy consumption to be reduced.

The rising energy intensity trend from the beginning of the century up to 2005 did not continue in the following years, and the 2000 level has been exceeded again or missed only in a marginal way as far as energy intensity is concerned. An uncoupling of energy consumption from economic development was then partly achieved in Luxembourg over the past decade.

11.3 Market preparedness

11.3.1 Description of Status quo

SME Access to Finance Index (SMAF):

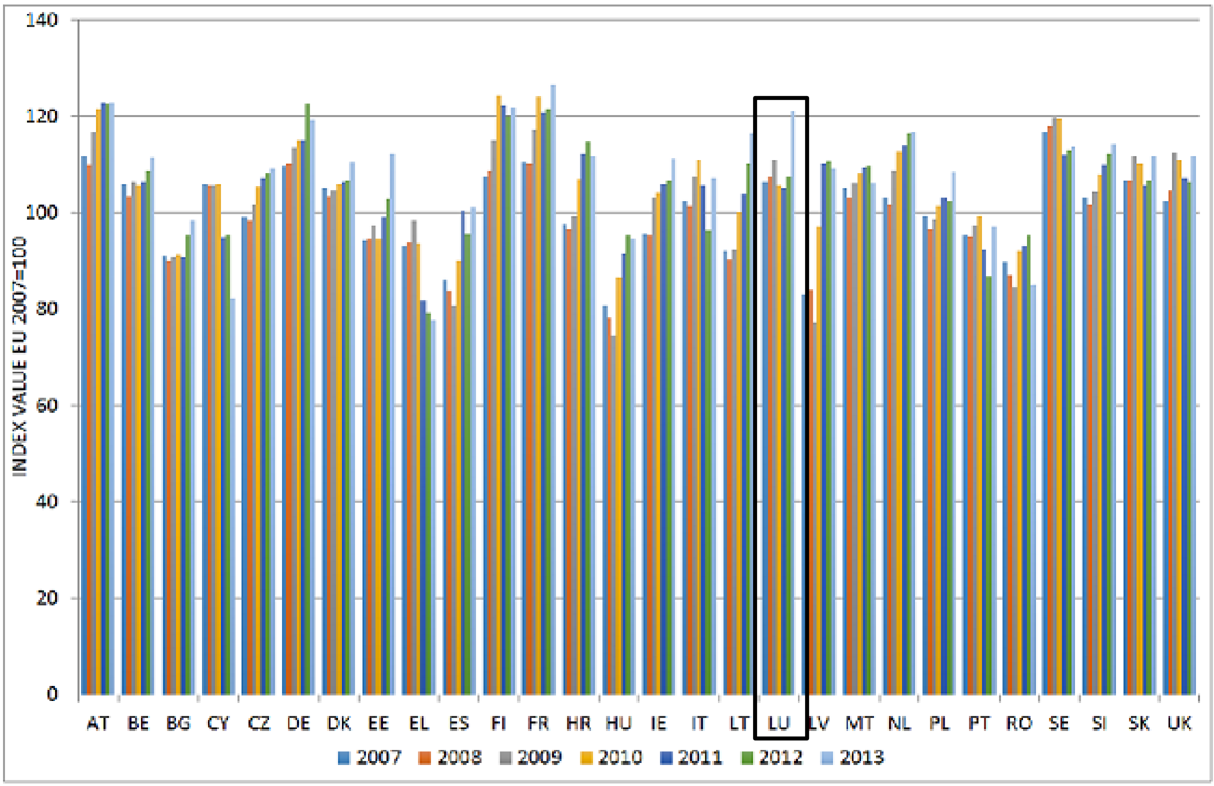


Figure 11.11: SMEs access to finance in Luxembourg and the EU (2007-2013, EU2007=100)

Source: http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/sme-access-to-finance-index/index_en.htm, 2014

In 2013, Luxembourg is the 4th highest performing country in terms of access to finance for SMEs.

Source: http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/sme-access-to-finance-index/index_en.htm

More generally, the regulatory framework facilitates entrepreneurial activity.

ESCO's market development

Detailed information and recent information on the ESCO market in Luxembourg is scarce. 3-4 local ESCOs and daughter companies of large multinational companies of French and German origin were present on the domestic market in 2007.

Source: JRC - Energy Service Companies Market in Europe - Status Report 2010

Market share of the largest generator in the electricity market

Luxembourg is one of the few Member States where the largest generator in the electricity market still holds over 80% of the electricity generation market. This share is very slowly decreasing.

So far, 28 electricity suppliers and 9 natural gas suppliers are active on Luxembourg's rather small energy market.

Source: EUROSTAT, Luxembourg article 7 notification to the EC

At the retail level, energy consumers are free to choose their suppliers since 2007.

In 2012, less than 0.1% of residential consumers of either electricity or gas switched suppliers, far below the rates of around 10% encountered in more competitive markets of the European Union, while 15.4% of industrial customers switched.

Luxembourg regulatory authority provides an increasing amount of information on energy offers and price comparison, and this low switching rate might be due to a limited interest in looking for alternative suppliers when the energy prices are reasonable.

Enovos Luxembourg is the main energy suppliers for both gas and electricity, and supplies:

- In electricity: 75% of the residential market, 60% of the professional market and 51% of the industrial market

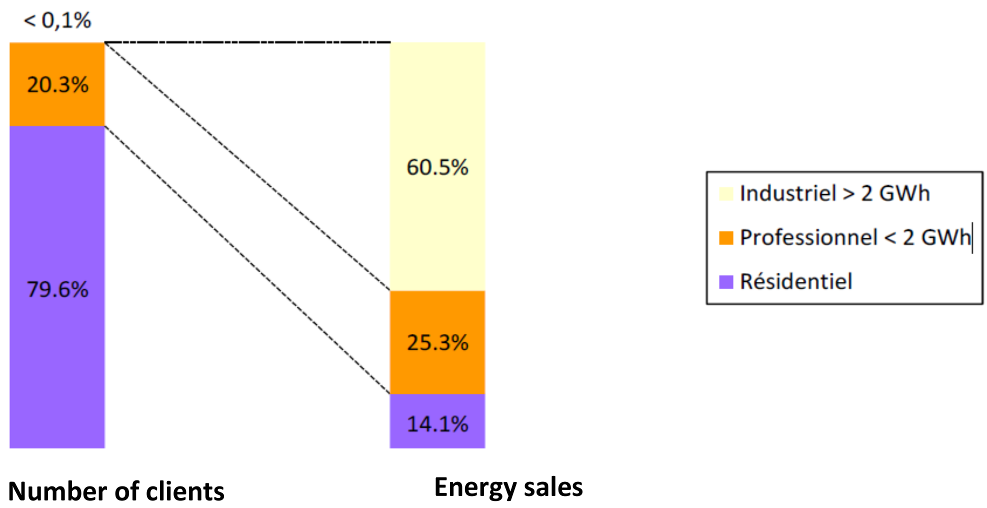


Figure 11.12: The electricity retail market per segment (2013)

Source: Institut Luxembourgeois de Régulation, 2014

- In gas: 88% of the electric utilities, 100% of industrial customers and 54% of residential customers.

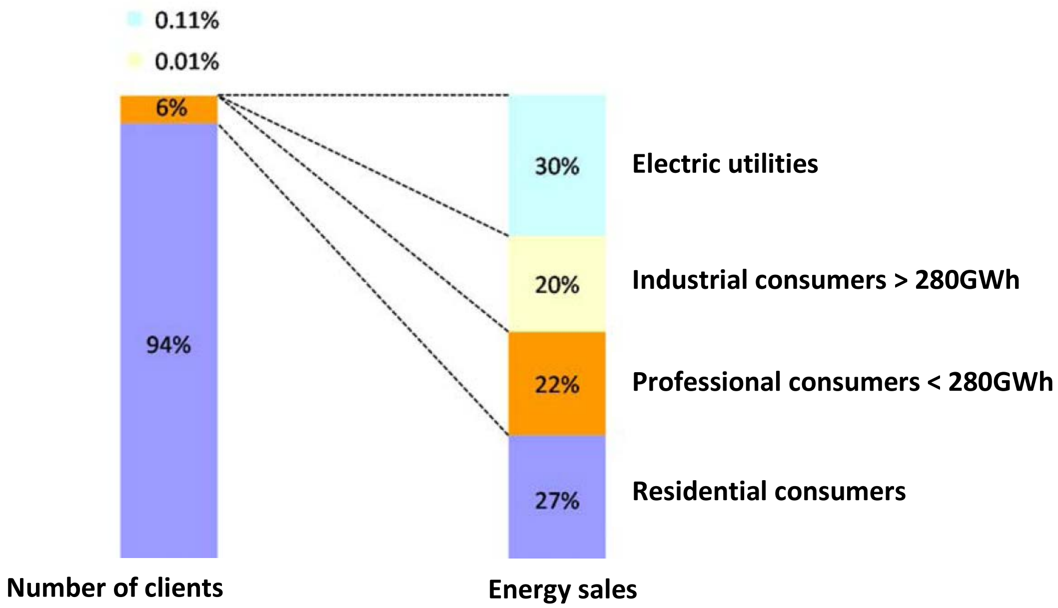


Figure 11.13: The gas retail market per segment (2013)

Source: Institut Luxembourgeois de Régulation, 2014

Experience in technology and technical capacity

According to recent exchange of information, Luxembourg seems to have the appropriate technology and technical capacity regarding energy management, advising, refurbishment, maintenance and support.

11.3.2 Evaluation of market preparedness – Identification of challenges

Following the 2nd stage of the energy market liberalization, the Regulatory Agency of Luxembourg noticed in 2013 that the suppliers of residential customers have very different approaches regarding the display of their respective offers. For that reason, residential customers have difficulties comparing the prices of the various suppliers limiting their ability to make an informed choice regarding their energy supplier.

11.4 Administrative preparedness

11.4.1 Description of Status quo

Government effectiveness:

Perceptions of the quality of public services, the degree of its independence from political pressures, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies have been slightly decreasing over the last 20 years, from 99.5% in 1996 to 94.3% in 2013. Still, these figures show a great trust in Luxembourg government's effectiveness, supported by the independence of the judiciary system and a legal framework that efficiently supports the implementation of the law.

Regulatory quality:

Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations have also been really high and quite stable for the past 10 years, above 95%.

Sources: http://info.worldbank.org/governance/wgi/index.aspx#home

Experience (measures) against free-riders

So far, no methodology has been prepared for accounting for free-riders within the frame of the future EEO, except for the fact that the scheme will only value actions that goes beyond business as usual.

11.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

Luxembourg's government effectiveness and regulatory quality are acknowledged by a very large portion of the population.

At the same time, the government can rely on an active energy regulator whose activity has got more and more important with the liberalization of the market. This energy regulator will be in charge of pronouncing future administrative sanctions in the frame of the EEO.

Finally, when setting up its EEO scheme, Luxembourg chose to benefit from the long experience of another country (Denmark) and prepared the scheme institutional set up and administrative process based on the best practices identified in this country.

The preparation of the administrative management of the scheme is at present in progress. So far, MyEnergy supported the Ministry regarding the methodology to process specific measures and elaborate the first version of the catalog of standardized measures.

11.5 Legislative preparedness

The legislative capacity of Luxembourg's government regarding the adoption of its EEO scheme is fairly good. It is based on a combination of legislation and Ministerial decrees.

Two similar law projects modifying the electricity and gas market were published and submitted for public consultation in July 2014. The article 48bis of these law projects introduces Luxembourg's EEO scheme and defines: the obligation scheme, the obligated parties, the obligation for the 2015-2020 period… and announces a regulation (Réglement Grand Ducal) that will detail the operational procedures of the scheme.

The project of Regulation was similarly published and submitted for public consultation in December 2014. It provides all the operational information needed for the scheme to start, including the type of operations eligible to the scheme (standard and specific actions, seen Luxembourg's planned scheme) and a catalog of standard actions.

If neither the Regulation nor the laws on electricity and gas projects have been voted so far, they were still provided in time for Luxembourg's EEO stakeholders to prepare for the beginning of the scheme on January 2015.

11.6 Social & Political acceptance/feasibility

Luxembourg is characterized by a stable political and social climate. Its high level of social peace relies on the 'Luxembourg model' of social dialogue: within tripartite meetings, equal numbers of employer, employee and government representatives try to resolve socio-economic problems and conflicts in a spirit of consensus based on the principles of responsibility and solidarity.

Level of Fuel poverty within the country

Fuel poverty is not well documented in Luxembourg. One way to approach the phenomenon is to consider the number of households eligible to receive the "heating subsidy" ("cost of living allowance" since 2009).

In 2009, 20,112 applications to the cost of living allowance were received and 17,040 granted representing 3.4% of the population. In 2010, the number of beneficiaries increased by 10.1%.

Source: http://www.ogbl.lu/ce-quil-faut-savoir/le-secretariat-social-informe/les-aides-sociales/#sthash.KeBzwws0.dpuf

According to Luxembourg Ministry for Economy and MyEnergy, even if fuel poverty does exist in Luxembourg, it does not know (yet) the same dimensions as the ones encountered in other countries. Several social measures are implemented to fight against fuel poverty (i.e. social offices in municipalities).

Luxembourg's EEO has not for primary purpose to address fuel poverty.

Social stance:

At this stage of the preparation of Luxembourg's EEO, it is difficult for the Ministry and MyEnergy to answer on the potential impact of the public opinion on the future implementation of the scheme. Like for the development of renewable energies, the promotion of energy efficiency has a cost. One of the main concern during the designing phase of the mechanism was to organize a system that would have an acceptable impact for the consumers of natural gas and electricity.

View of the industry[96]

According to the Ministry for Economy and My Energy, in charge of the set up and implementation of Luxembourg's EEO, the industry sector has so far expressed itself favorably with regard to the EEO scheme.

Regarding the obligated parties (suppliers of gas and electricity), the returns are mitigated: some are more reserved or reluctant whereas others are proactive and are already engaging into the new activities engendered by the implementation of such a mechanism. The design of the EEO, as a service delegated to obligated parties for which they will receive compensations, is less likely to cause tensions than other schemes where obligated parties can only pass their costs on the consumers.

[96] (i.e. energy intensive sectors such as the power sector, construction sector etc.)

REFERENCES

[1] Annual report from the Institut Luxembourgeois de Regulation (Luxembourg Energy Regulator) on electricity and gas prices for households in Luxembourg – Octobre 2014

[2] Statistics on electricity and gas consumption:

- Institut Luxembourgeois de Regulation (Luxembourg Energy Regulator) : http://www.ilr.public.lu/index.html
- STATEC : http://www.statistiques.public.lu/fr/acteurs/statec/index.html

[3] 2014 IEA review of Luxembourg's energy policies – Executive summaries – 2014

[4] Article 48bis (projet) de la Loi Electricité (Loi modifiée du 1er aout 2007 relative à l'organisation du marché de l'électricité) – July 2014

[5] Article 12bis (projet) de la Loi Gaz (Loi modifiée du 1er aout 2007 relative à I' organisation du marché du gaz naturel) – July 2014

[6] Projet de règlement grand-ducal relatif au fonctionnement du mécanisme d'obligations en matière d'efficacité énergétique

Interviews and feedbacks:

[1] Patrick Jung,
[2] MyEnergy,
[3] Luxembourg Energy Agency,
[4] Carla Oliveira,
[5] Ministry for the Economy,
[6] General Directorate for Energy

12 Malta - FIRE

12.1 Economic profile

Malta financial services authority overview on the economic and market situation in the country reports that Malta's economy managed to limit its contagion from the global financial crisis. In Figure 12.1: 12.1 the inflation rate from July 2012 exceeded that of the Euro Area, and this upward trend was consistent up to January 2013; after that, the rate started to decrease reaching 2.6 per cent in May 2013 (the EU27 inflation rate was 2.2 and 2.1 in the Euro Area in May 2013)[97].

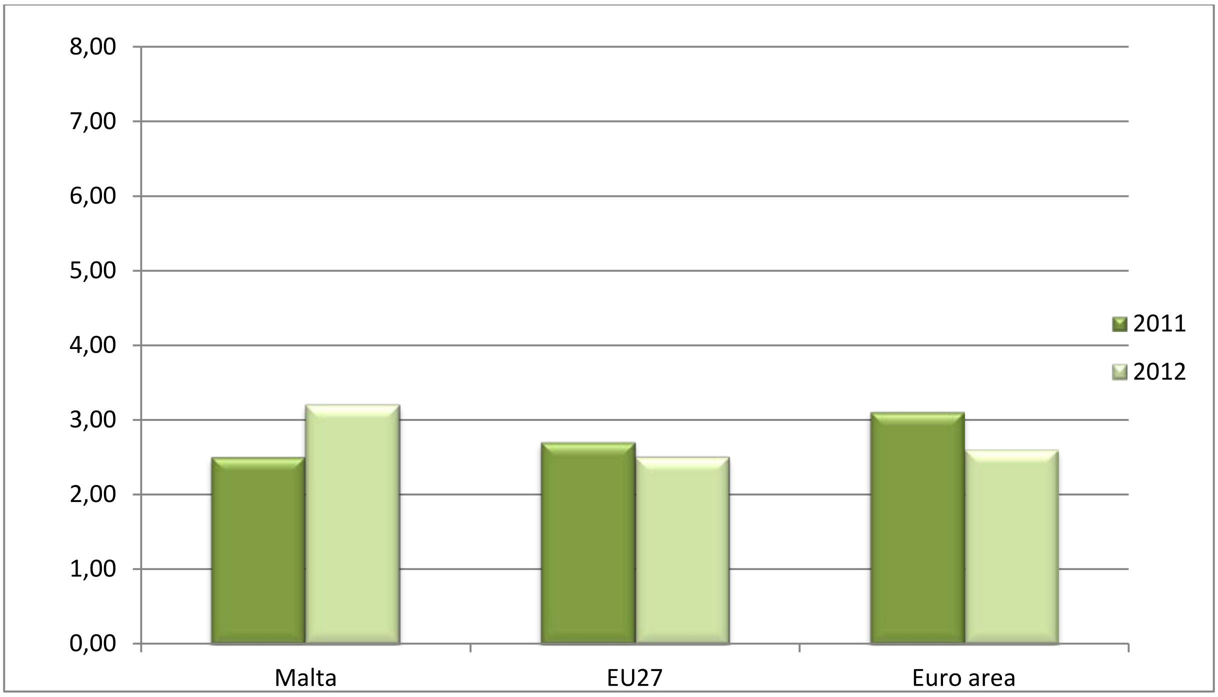


Figure 12.1: Inflation rate in Malta, EU27 and EU Area in 2011 and 2012

Source: "Economic and market overview" MESA – Malta financial service and authority, July 2013

[97] "Economic and market overview", MESA –Malta financial service and authority, July 2013.

Maltese employment rate has always been lower than the EU and Euro Area rate, even if it kept growing since 2010 (see Figure 12.2) reaching the level of 59.5% in the fourth quarter of 2012, while EU27 was 64,2% and Euro Area 63.7% in the same period of time.

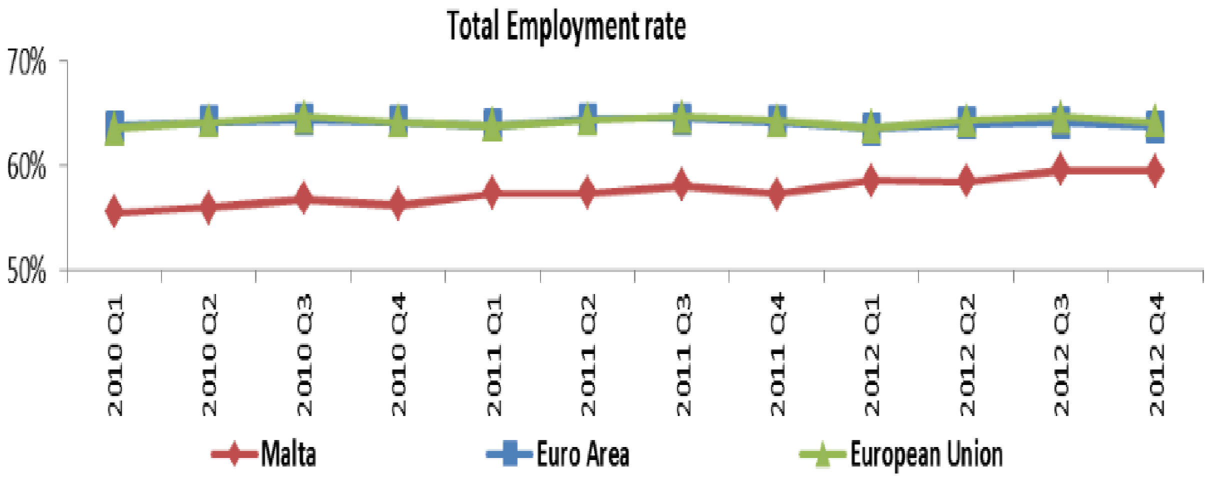


Figure 12.2: Malta employment rate trend

Source: Eurostat 2012

Malta GDP has been growing until 2007, even if with some ups and downs. Because of the world economic crisis, Maltese GDP level fell drastically in 2009 (as shown in Figure 12.3), recovered in 2010, and since then fell again, starting slowly its recovery only in 2013.

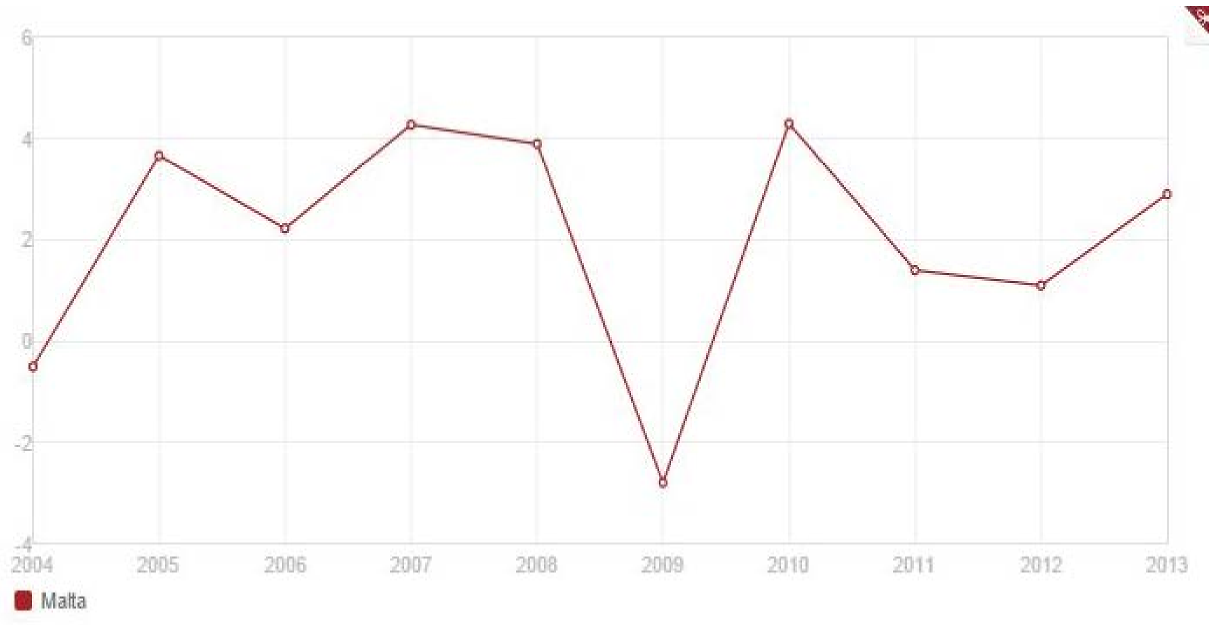


Figure 12.3: Maltese annual GDP growth, 2004 – 2013

Source: World Bank

In addition, Figure 12.4 shows how also electricity generation started falling in 2008, and recovered only in 2010. Figure 12.4 and Figure 12.5: 151 show how the economic crisis affected and had an impact on electricity generation trend similar to the GPD trend.

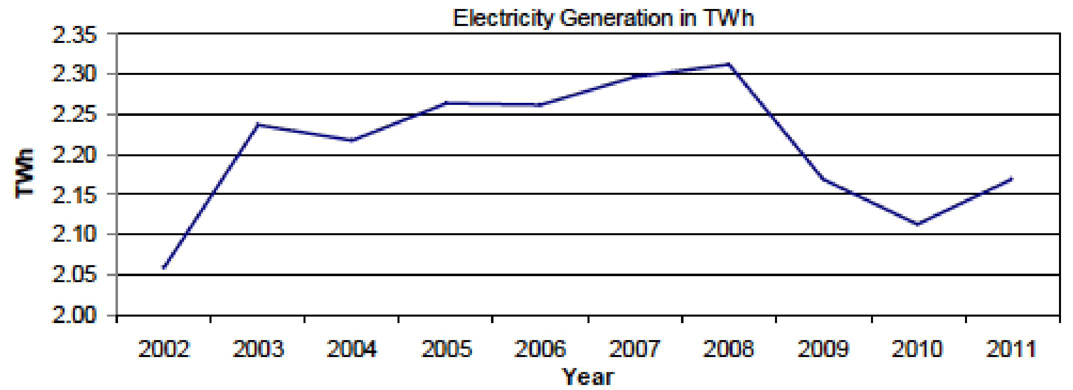


Figure 12.4: Annual electricity generation, 2013

Source: Malta resource authority

As shown in Figure 12.5 over the years 1990 – 2008 the total energy consumption increased, and started to fall between 2007 and 2008 because of the economic crisis, highlighting again the strong connection between GDP and energy consumption trends.

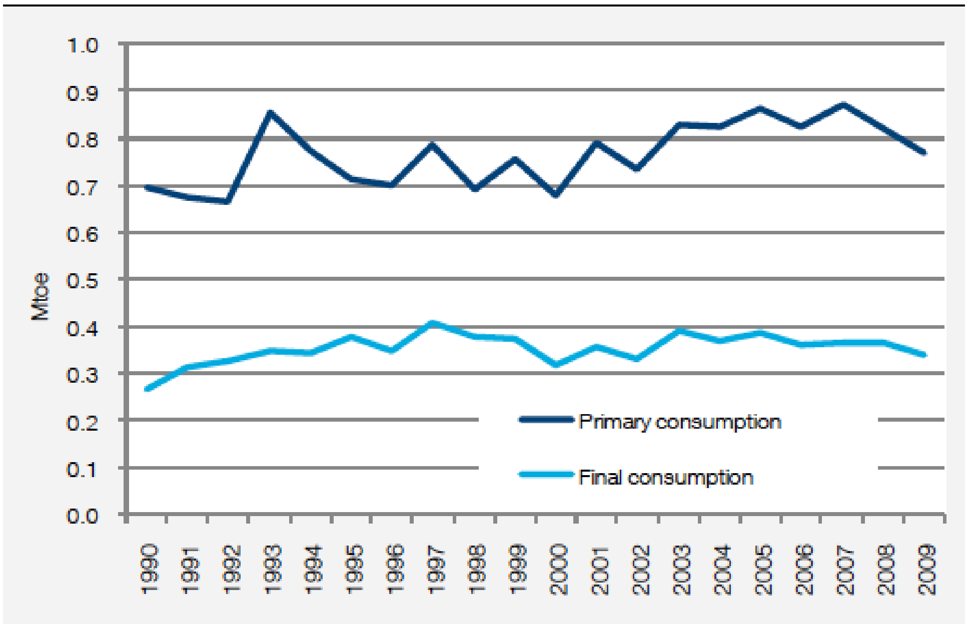


Figure 12.5: Total and final energy consumption trends, Malta

Figure 12.6 shows the energy dependence rate in Malta in 2011, the highest level in the European Union, followed by Luxembourg with a rate of 97%, Cyprus with a rate of 93% and Ireland with a rate of 89%. With this very high-energy dependence rate, Malta needs to implement energy efficiency policies and measures in order to decrease its consumption and consequently its dependence that reached 100.6% in 2011[98]. An EEO scheme can then be a desirable tool to facilitate the implementation of energy efficiency measures.

%	1995	2000	2005	2009	2010	2011
EU-27	43.2	46.7	52.4	53.8	52.6	53.8
Index 1995	100	108	121	124	122	125
BE	80.9	78.1	80.1	74.3	76.8	72.9
BG	57.2	46.5	47.5	45.3	40.1	36.6
CZ	20.6	23.0	28.3	27.1	25.6	27.9
DK	33.3	-35.3	-50.9	-20.4	-16.9	-8.5
DE	56.8	59.5	61.2	61.5	59.8	61.1
EE	32.4	32.0	25.4	21.4	13.1	11.7
IE	69.2	84.6	89.3	88.2	85.6	88.9
EL	66.7	69.5	68.6	67.8	69.1	65.3
ES	71.7	76.7	81.4	79.2	76.8	76.4
FR	48.0	51.6	51.7	51.0	49.1	48.9
IT	82.0	86.5	84.4	82.8	83.8	81.3
CY	100.4	98.6	100.7	96.3	100.7	92.4
LV	70.4	59.7	63.0	58.8	41.6	59.0
LT	63.4	59.8	57.0	50.3	82.0	81.8
LU	97.7	99.6	97.3	97.4	97.0	97.2
HU	48.0	55.2	63.2	58.7	58.3	52.0
MT	104.8	100.3	100.0	101.1	99.1	100.6
NL	18.3	38.7	38.4	36.5	30.7	30.4
AT	66.6	65.6	71.4	65.0	62.1	69.3
PL	0.0	10.6	17.6	31.7	31.6	33.7
PT	85.4	84.9	88.5	81.0	75.4	77.4
RO	30.8	22.0	27.6	20.2	21.7	21.3
SI	50.8	52.6	52.3	48.1	49.4	48.4
SK	68.9	65.0	65.4	66.4	63.0	64.2
FI	53.9	55.3	54.2	54.0	48.3	53.8
SE	37.6	39.2	37.7	37.1	36.7	36.8
UK	-16.2	-17.0	13.4	26.2	28.1	36.0

Figure 12.6: EU27 and Maltese energy dependence rate

Source: EU Commission, "EU Energy in figures", 2013

Regarding energy prices, as there is no natural gas consumption in Malta, electricity prices are considered as benchmark for energy price for this country. In Figure 12.7 it is possible to see how energy prices have had a growing trend, with the exception of 2007, for households. Industrial prices followed a slightly different trend, but reached the households ones in 2009.

[98] Eurostat, February 2013.

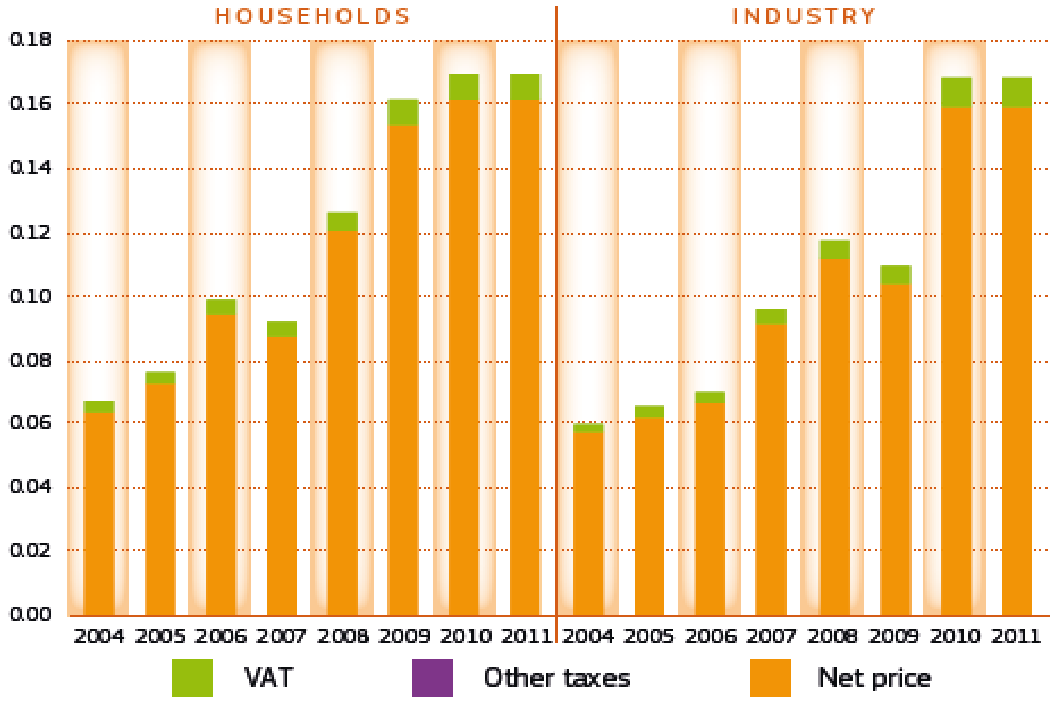


Figure 12.7: Retail prices in Malta

Source: Eurostat 2011

Another interesting economic data is the government deficit to GDP ratio in the last seven years. In fact, it declined steadily from 2008 to 2011, falling below the 3 per cent benchmark in 2011, but exceeded again the EU threshold by 0.3% in 2012. In the case of Euro Area and EU27, the government deficit to GDP ratio decreased as well, but remained at 3.7% and 4% in 2012, as shown in Figure 12.8.

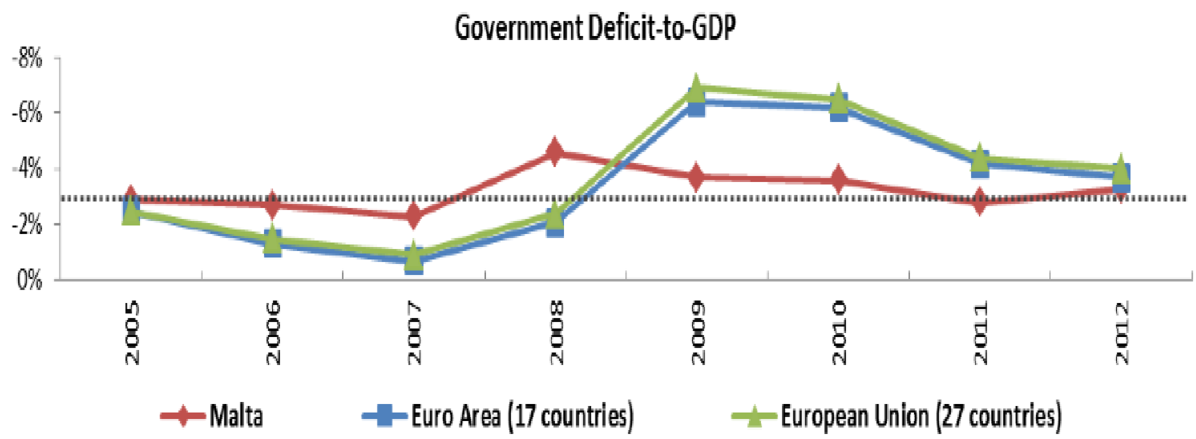


Figure 12.8: Government deficit to GDP, 2005 – 2012

Source: Eurostat

12.1.1 Evaluation of economic preparedness - Identification of financial challenges

Given the small size of the country, traditional energy efficiency obligation schemes (EEO) such as white certificates are not easy to introduce due to the potential impact on energy bills of the proposed measures in combination with the financial crisis. In fact the government chose a different approach, according to what has been set by art. 7 of EED, which requests each MS to set up an EEO scheme. The only EEO that has been imposed in Malta covers the smart meter roll–out and operations, and the design of the tariff which must include a mechanism that promotes energy efficiency. In this way, the Maltese approach has been based on smart metering and their capability to stimulate the implementation of specific energy efficiency measures if adequately sustained by other support funds (for example, energy efficiency in public bodies has been financed by cohesion and structural funds - used also in industries, as well as by EEEF and Horizon 2020[99]).

Throughout the past years a series of financial support initiatives have been taken by the government and local private banks to support energy efficiency measures. The government, directly and through its agencies, has in these last years made use of national and EU funds to promote renewable sources together with energy efficiency technologies. An energy efficiency fund exists to give economic and financial support for energy efficiency. EU structural funds of 15 million euros have been allocated to energy efficiency for the years 2007-2013. Energy efficiency support schemes, as the introduction of double glazing and roof insulation, were supported by national funds, and since 2009 433 households applied and used this fund[100]. Such schemes will support the EEO scheme in reaching the energy efficiency targets. Considering the peculiarity of the Maltese EEO their effectiveness is particularly important.

Among all the energy efficiency measures, also actions concerning the building sector seem to be very effective, followed by those ones regarding transport and government owned industries. Furthermore, banks and financial institutions have launched many financial programs to incentivize energy efficiency and renewable sources actions and technologies.

---

[99] Malta NEEAP 2014.
[100] Idem.

12.2 Energy & Climate Change profile (Energy Savings' Potential)

12.2.1 Description of Status quo

Maltese energy policy has been designed following three main goals[101]: the security of supply (as seen before, its level of energy dependence is the highest of the EU), competitively priced energy services and environmental responsibility. The policy addresses these goals in many areas such energy security and stability in energy supply, decreasing the emissions from the energy sector and delivering energy efficiently and effectively.

According to the Odyssee – Mure 2010[102] report, three of the most innovative measures for energy efficiency set in the country were the incentives for the up-take of micro-RES Systems (with a feed-in tariff scheme), ECO-Gozo (a Local Sustainable Development strategy for the Island of Gozo adopted by Government in 2009)[103] and the passenger vehicle scrappage schemes (to incentivise the removal of some of the most polluting private passenger vehicles). Even if some of them are probably not under art. 7 of the EED directive, they show how Malta tries to conjugate energy efficiency in end-uses with renewables on buildings, households, and transports.

Figure 12.9 shows the percentage of average final residential energy consumption per dwelling in the EU27 in 2011: Malta registered the lowest level in 2011 even if with a slight increase in the period 2000 – 2011. In the figure it is also possible to see the countries who registered a decrease of consumption between 2000 and 2011 (on the left side) and the countries (Malta included) who registered an increase of consumption (on the right).

---

[101] "Energy Efficiency Policies and Measures in Malta", Monitoring of EU and national energy efficiency targets, Odyssee – Mure 2010, Malta Resources Authority, September 2012.

[102] Malta Resources Authority (MRA) 2012

[103] According to this strategy, the island of Gozo will become an eco-island by 2020, supported by a keen and committed sustainable community. More information available at http://www.ecogozo.com/index.php?lang=en

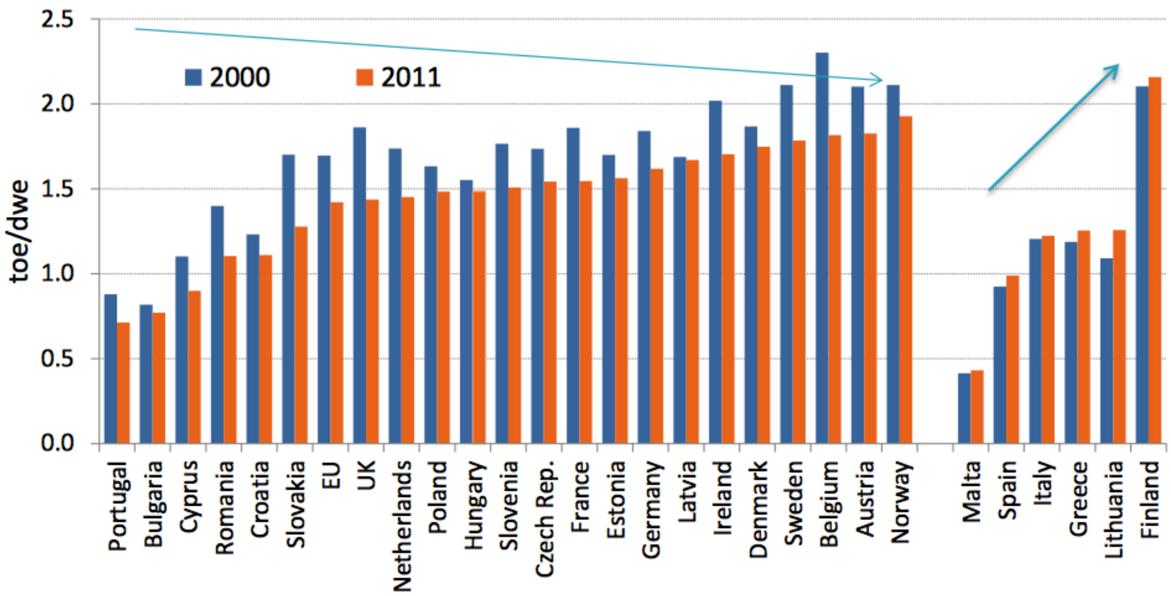


Figure 12.9: Average consumption per dwelling

Source: Enerdata

Figure 12.10 shows Malta energy intensity per sector; the national energy efficiency report stated that the total energy consumption per unit of GDP (energy intensity), measured at purchasing power parity, was 24% lower than the EU average in 2011. On average, between 2000 and 2011, total energy intensity increased by over 0.5 percent/year. Power generation and industry contributed to more than half of the increase in energy intensity[104].

[104] Malta energy efficiency action plan, April 2013.

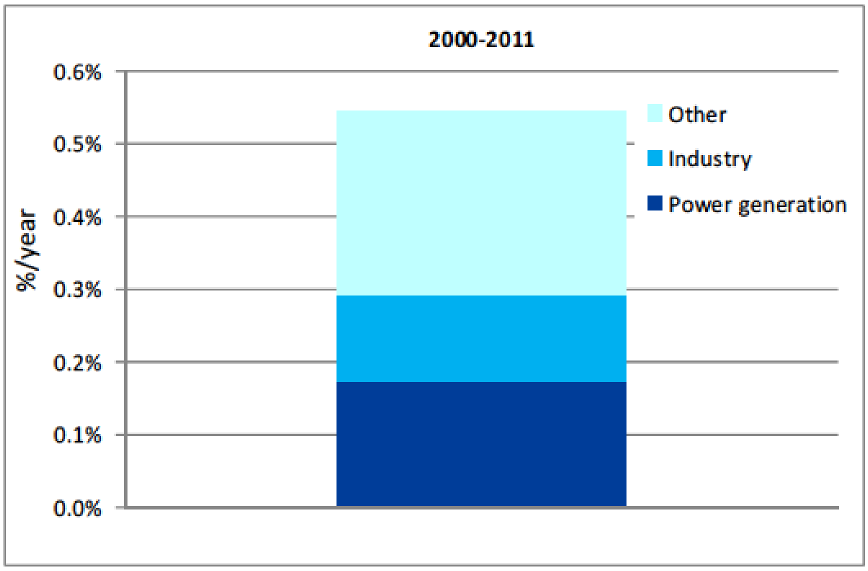


Figure 12.10: Malta energy intensity. Source: Malta energy efficiency action plan 2013

In Figure 12.11 the energy efficiency index for the whole economy - ODEX[105] shows how energy efficiency improved by 10%, in line with other EU Member States.

[105] The ODEX index is used in the ODYSSEE-MURE project to measure the progress of energy efficiency by main sector (industry, transport, households) and for the whole economy (all final consumers). More information on the projet are available at http://www.odyssee-mure.eu

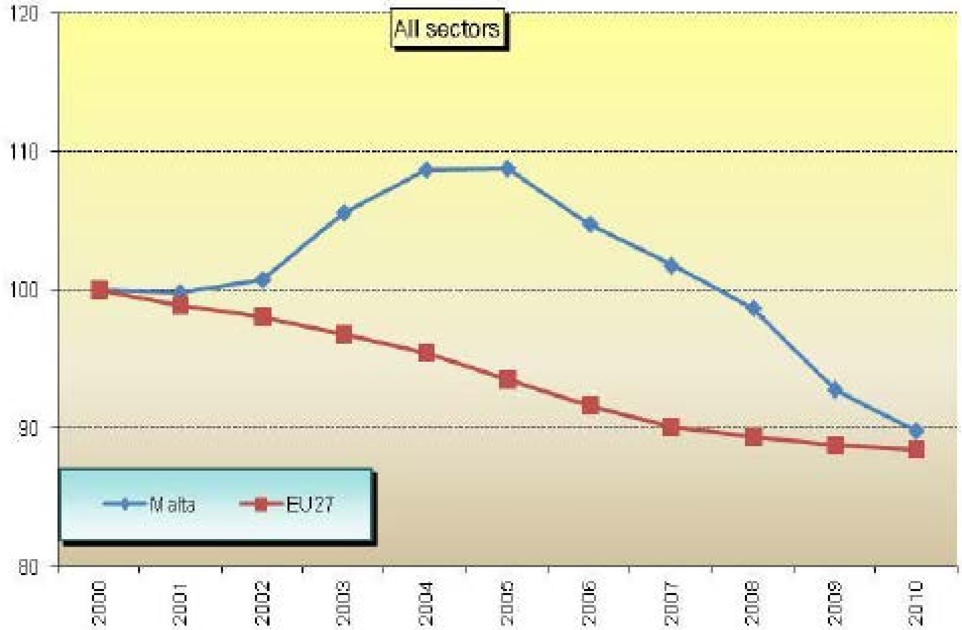


Figure 12.11: ODEX index of Malta between 2000 and 2010

Source: Odyssee MURE project, 2012.

The energy efficiency of the industrial sector did not show any improvement between 2000 and 2010 (as shown in Figure 12.12)[106]. Concerning the households sector (Figure 12.13), in the same period of time the technical energy efficiency of households improved by 10% (the energy demand for cooling is significantly on the increase). The transport sector (Figure 12.14) registered an increase in energy efficiency by 18%. This development is mainly due to the efficiency improvements in vehicle engines[107].

[106] A significant difference between the EU evaluation and Malta measurement of ODEX is that in Malta the value added are used as a proxy for sectoral production for each industrial branch.

[107] Energy efficiency profile: Malta, Odyssee – Mure project, October 2012.

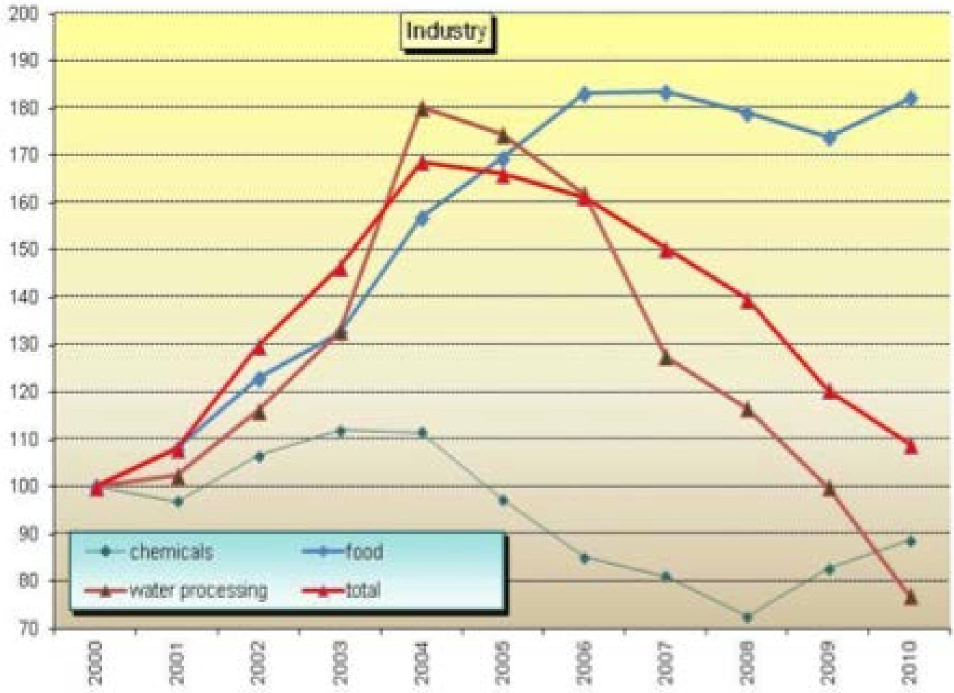


Figure 12.12: ODEX index of Maltese industries between 2000 and 2010

Source: Odyssee MURE project, 2012

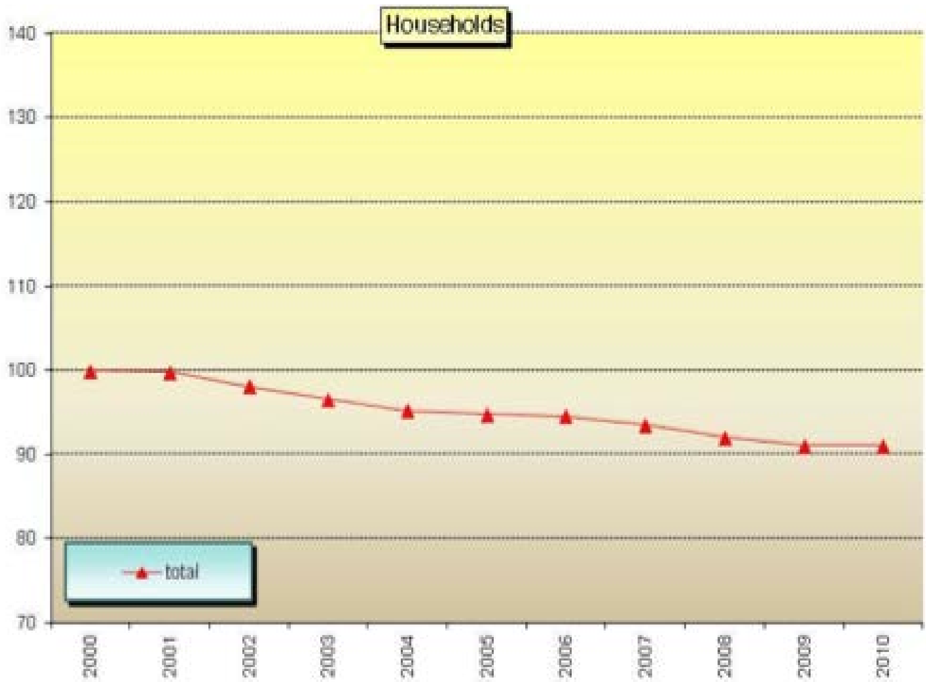


Figure 12.13: ODEX index of Maltese households between 2000 and 2010

Source: Odyssee MURE project, 2012

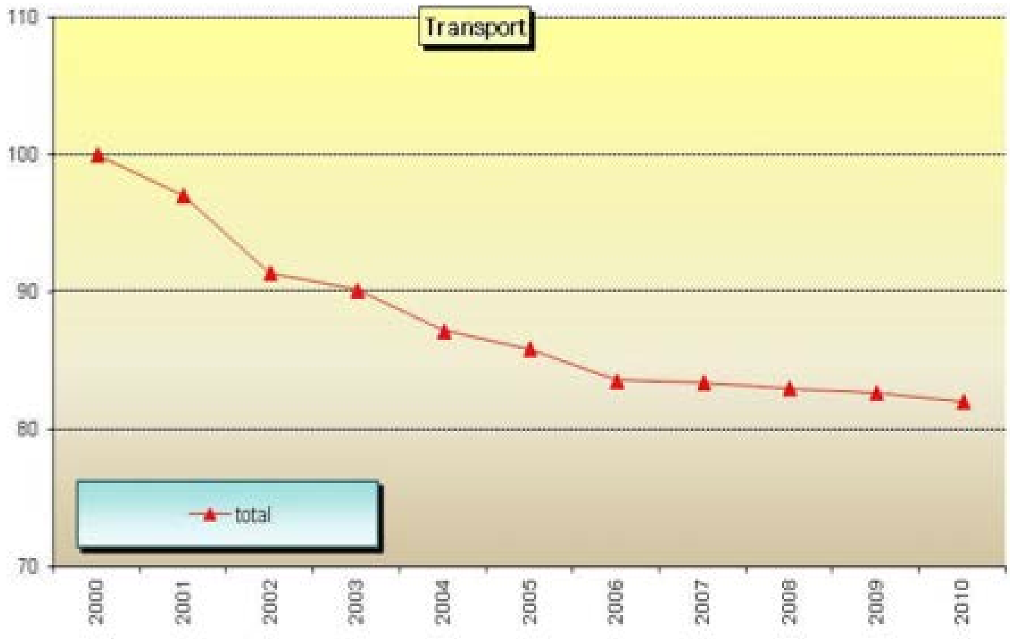


Figure 12.14: ODEX index of transport in Malta between 2000 and 2010

Source: Odyssee MURE project, 2012

Concerning the energy savings target, the goal of 3% for 2010 (23,321 toe) has been successfully achieved and marginally exceeded. According to the Malta Indicative National Energy Efficiency Target for 2020, the results have been mainly achieved by the industrial sector (including early actions in the water sector), the domestic sector (due to schemes to replace appliances, change lighting systems and install solar water heaters) and transport sector (due to changes in the fleet composition that brought about changes in the vehicle registration system)[108]. According to the Indicative national energy efficiency target for 2020 (Table 12.1) as required by Article 3(1) of the EED, the indicative Maltese target for 2020 is based on primary energy consumption (capped for aviation as agreed with the EC)[109].

Table 12.1: Overview of 2020 Target and Projections, Malta Indicative National Energy Efficiency Target for 2020 in accordance with Article 3 of Directive 2012/27/EU.

Year	Primary energy projections in absolute terms (toe)		Final energy projections in absolute terms (toe)	
	Savings	Consumption	End-use savings	Consumption less

[108] Malta Indicative National Energy Efficiency Target for 2020 in accordance with Article 3 of Directive 2012/27/EU Report, 2013

[109] Assuming that the new interconnector with Sicily is commissioned by end of 2014 and that a new gas-fired 215MW CCGT plant comes online by 2015.

				end-use savings
2020	237,019	825,492	30,358	493,473

MS	Indicative national energy efficiency target for 2020	Absolute level of energy consumption in 2020 [Mtoe]	
		Primary	Final
MT	27% or 264,282 toe savings target by 2020	0.726	0.547

Figure 12.15: Expected impact of the target on primary and final energy consumption in 2020

Source: NEEAP 2014

12.2.2 Evaluation of energy savings' capacity - Identification of challenges

As said before, the country has set energy efficiency target in its national energy efficiency action plan. The plan establishes 9% end-use energy savings by 2016 (378 GWh). The interim target of 3% by 2010 has been achieved.

Industrial energy consumption has been increasing since 1993 and electricity has been the main energy source consumed.

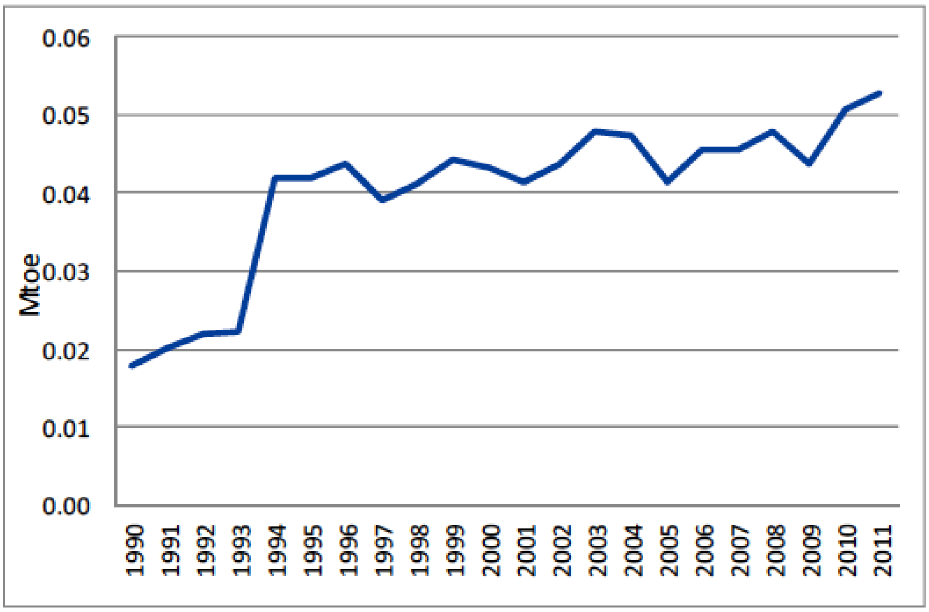


Figure 12.16: Trends in energy consumption of industries

Source: Malta energy efficiency action plan 2013

12.3 Market preparedness

12.3.1 Description of Status quo

Maltese ESCO market does not exist, as no energy service company has been located by the EU ESCO market report of JRC 2013 in 2014, also because the potential of the energy efficiency services market for the ESCOs has been estimated as € 1.6-1.8 million annually, the smallest in Europe[110].

Banks and financial institutions offer economic support and programmes to invest in energy efficiency actions. For example, APS Bank with EcoPlus for Renewable Energy Sources, enables domestic end users and businesses to finance their investment in solar water heaters, energy efficiency appliances, photovoltaic panels, wind turbines and eco-vehicles. It is a loan able to finance 100% of a total investment up to 50,000 euros with a repayment time of 8 to 10 years[111].

[110] ESCO market report 2013, P.Bertoldi , B. Boza-Kiss, S. Panev and N. Labanca , JRC 2014.
[111] More information available at http://www.apsbank.com.mt

Also Banif Bank set a specific instrument, the Green Energy Loan, for specific products such as amongst others solar panels, photovoltaic systems and energy efficient appliances. The loan of between 1,000 and 35,000 euros can be repaid over a period of 10 years (and an interest rate of 5.5%), or 7,000 euros over 6 years[112].

The Bank of Valletta offers the Eco Personal Loan to finance the purchase between 500 and 40,000 euros of solar water heaters, solar lamps, solar collectors, photovoltaic systems, electric/hybrid cars, electric motorcycles/bicycles and products/systems which save on electricity consumption. The repayment period is up to 10 years, depending on the amount and lifespan of equipment.

The HSBC Bank Malta launched the Green Loan[113] to finance a range of environmentally friendly initiatives and energy saving products, such as energy audits, double glazing, thermal insulation, energy efficient appliances and renewable sources such as wind power, photovoltaic cells, etc. The financing amount is between 600 and 30,000 euros, and loans of 600-2,300 euros can be repayable over a maximum period of 5 years (over 2,300 euros over a maximum period of 8 years)[114].

Figure 12.17: 12.17 shows the 2013 SMAF index scores for EU28. In comparison with the average index level of the EU (108), countries such Austria and Finland are the highest performing countries in terms of access to finance for SMEs, while Greece, Cyprus and Romania have the lowest scores (index values of 78, 82 and 85 respectively). Malta registered a score on line with the EU28 average. In the case of financing energy efficiency actions, it is likely that other financing schemes can work also for this kind of investments, overcoming the ESCO absence in the Maltese energy market.

[112] More details available at http://www.banif.com.mt/banif_green_energy_loan?l=1

[113] Malta resource authority, more information about the specific banks' offers available at: http://mra.org.mt/support-schemes/

[114] More details available at https://www.hsbc.com.mt/1/2/mt/en/business/finance/green-loan

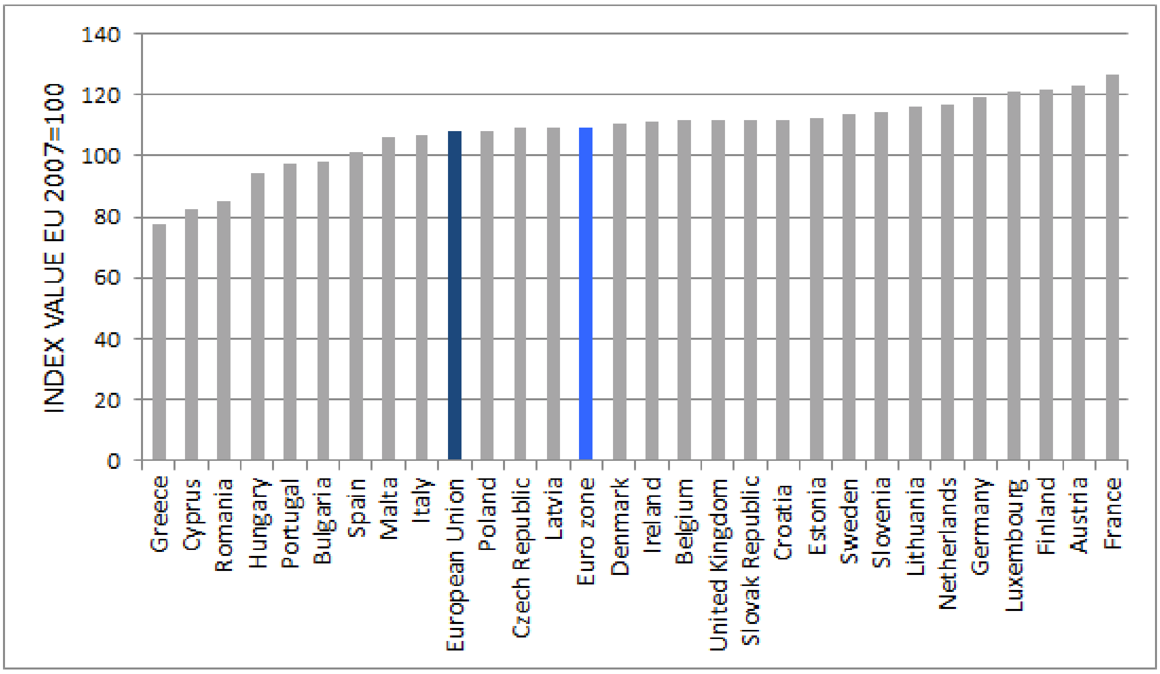


Figure 12.17: SME Access to Finance Index (SMAF), 2013

Source: European Commission

Figure 12.18:12.18 shows the market share of the largest generator in the electricity market: it is clear the situation of Malta (and Cyprus) where there is only one energy sales company in a monopoly situation that generates and distributes all the electricity of the country. The peculiarity of the Maltese energy market does not make economically sustainable the introduction of a white certificate scheme. Enemalta has a specific energy efficiency obligation that are explicated in the following chapters. The particular case of Malta requires policies that are quite different from the rest of the European countries. The mix of introduction of smart meters, audits, and dedicated funds and loans, together with the actions required to Enemalta should allow the achievement of the targets. It is worth noticing that an active role of the national energy utility in such a small country should be much more effective that a bottom-up policy aimed at market operators.

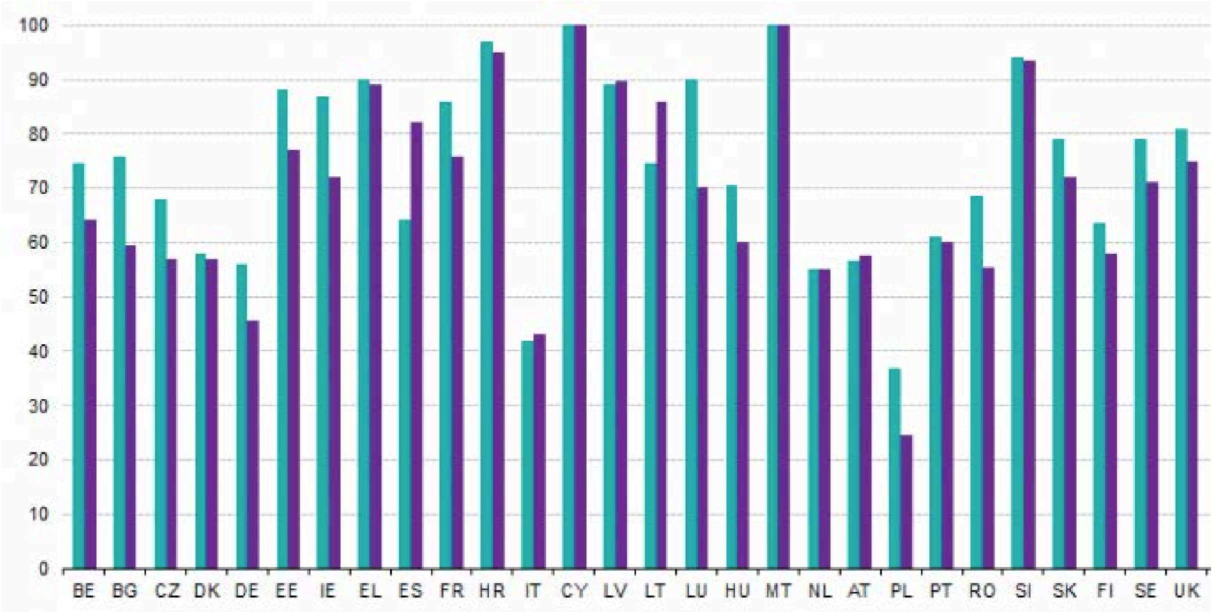


Figure 12.18: Cumulative market share and installed capacity share, 2012

Source: Eurostat

According to the Ministry for energy and health, with regard to the certification of auditors and constructors, energy auditing has been a practice for a number of years, as enterprises make energy a primary item on their agenda. Different enterprises tackled energy efficiency in a different manner, where some enterprises even opted to create an in house expert within their own establishment to continuously assess energy saving actions. Furthermore it was decided that the energy regulator, the Malta Resources Authority, co-ordinates with stakeholders to establish accredited training courses in ISO 50001 and ISO 50002 for the certification of energy auditors and energy mangers as requested in the EED directive.

The list of registered RES installers is available from the website of the Malta Resources Authority. The site will also host the information on energy auditors once the courses are undertaken. A certification procedure for PV installers began to be implemented in 2011.

The Maltese market has graduate engineers who are capable of performing energy audits, but in general training and certification processes need to be empowered, as noted by EU funded project Build Up Skills. In particular, results from this project have shown a lack of data about the green construction industry and low levels of awareness about RES and EE systems and the advantages of their use. Although the benefits are widely understood, the lack of awareness has caused companies to be cautious in investing in the relevant training. A sector composed of micro companies further aggravates this issue, as training would cause considerable strain on their human resources and financial capacities.

Energy efficiency is a subject that is tackled by various entities. The obligations under Article 7 describe actions in various public corporations and companies, public building and the private sector. The Ministry is in contact with the various entities implementing EE obligations to monitor the progress and audit the results.

12.3.2 Evaluation of market preparedness – Identification of challenges[115]

At the moment, Malta set an EEO scheme in order to achieve its targets on the only distribution system operator and the only licensed electricity supply company (as said before, Enemalta). According to art. 7 of the EED, the government established that the company is obliged to: roll out a smart meter scheme that covers 100% of consumers connected to the national grid, and including monitors for effective communication with consumers in due course; use these smart meters in innovative ways; maintain a tariff for electricity consumption designed to promote energy efficiency amongst its consumers; without prejudice to the provision of electricity at the most competitive rates.

Moreover, the energy efficiency obligation scheme is supplemented by other measures, such as:

- financing schemes or instruments and fiscal incentives;
- training and education, including energy advisory programmes;
- government leading by example;
- direction to the public sector through the budgeting process;
- regulation.

Malta calculated its obligation according to the provisions in sub-paragraphs (a) and (d) of paragraph 2 of Article 7, such that the target to be achieved resulted in 673GWh over the period 2014 to 2020. Moreover, two intermediate periods were identified as follows:

- Intermediate period 1 – January 2014 to December 2017 - during which 45% of the target should be achieved; and
- Intermediate period 2 – January 2018 to December 2020 - during which the remainder should be achieved. Together with this EEO scheme, some national banks and financial institutions foresee "ad hoc" support schemes for energy efficiency and renewable sources.

In addition, it has been recently adopted in June 2014 the transposing document of the EED directive, requiring large enterprises (employing more than 240 employees) to implement in-house energy efficiency programmes starting in 2015, by undertaking energy audits and

[115] EED implementation in Malta, Concerted Action for energy efficiency directive, March 2014.

implementing actions to improve energy efficiency. These actions, which are also linked to art. 8 of the EED directive, shall support the achievement of the EEO scheme.

12.4 Administrative preparedness

12.4.1 Description of Status quo

12.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

Chapter 4 of the National Energy Efficiency Action Plan[116], forwarded to the Commission in April 2014 described the methodolgy Malta will be using to meet its target under Article 7 of the Energy Efficiency Direcitve. These actions are listed in the Annex to the report forwarded to the Commission as part of Malta's obligation under the Energy Efficiency Directive.[117]

The local energy market, apart from Enemalta, is made up of a large number of individual small operators. It is clear that any obligation imposed upon these operators will be difficult to co-ordinate, organise and implement effectively and efficiently. It will also entail disproportionate costs and effort. For this reason the following aspects characterize the Energy Efficiency Obligation Scheme and the decision to indicate Enemalta as the obliged party.

Enemalta Plc is the only electricity distribution system operator and the only licensed electricity supply company in Malta.

Enemalta Plc is therefore the designated entity obligated to:

(i) Roll out a smart meter scheme that covers 100% of consumers connected to the national grid, and including monitors for effective communication with consumers in due course.
(ii) To ensure that the Smart meter system is maintained up-to-date.
(iii) Use these smart meters in innovative ways:
- to instruct consumers in wise energy use in the home through appropriate activities and messages;
- to interact intelligently with consumers by means of user friendly graphic information on energy consumption patterns, prompting reflection towards energy efficiency;

---

[116] http://ec.europa.eu/energy/efficiency/eed/doc/neep/2014_neeap_en_malta.pdf
[117] http://ec.europa.eu/energy/efficiency/eed/article7_en.htm

- to use the smart meter as a tool to overcome consumer complacency towards energy efficiency in the long term and to maintain the momentum towards energy efficiency;
- to control fraud in electricity consumption, which is usually accompanied by waste and avoidable use.

Enemalta Plc has also been obligated to:

(iv) Adopt a tariff for electricity consumption designed to promote energy efficiency amongst its consumers. In the effective period of the obligation, Enemalta adopts a rising block tariff. It also incorporates in its tariff measures such as the current 'eco-mechanism' that rewards consumption by households that is lower than a stipulated level. The tariff is designed to yield the target revenue (cost-recovery, return on capital investment, etc.) and so higher consumption is relatively penalised. This is without prejudice to the Corporation providing electricity at the most competitive rates.

(v) Enemalta is to mobilize in order to offer (i.e. on a voluntary basis on the part of consumers) energy services at least in the form of free energy audits to domestic consumers. To this end Enemalta will be restructuring a small section of its engineering and technical division within the distribution workforce to come up with the setup to cater for such, including :
- training and local accreditation of audit team members;
- providing printed guidelines on energy efficiency practices that will be made available to households;
- necessary advertising on the media of this service including the appropriate information on its website.

12.5 Legislative preparedness

12.5.1 Evaluation legislative preparedness – Identification of challenges

According to the Build Up Skills project an important observation is related to inadequate enforcement of existing legislation. If enforced effectively, particularly Energy Performance certificates, this system could have a pronounced positive impact on the industry. Increases in both employment and economic activity would take place, together with a reduction in the energy demand of buildings.

Accreditation of the current workforce and the creation of a licensing system to easily regulate training of tradesmen could also be very beneficial to the industry. These would simplify the employment process, ease the comparison of skills and ensure attendance to continuous vocational education and training (CVET) if required for the reissuing of the license.

On the basis of the outcome of the status quo report, it is estimated that between 523 and 698 workers per year over seven years will need to receive some form of training related to energy efficiency or renewable energy sources. This is considered essential to better enable Malta to meet its energy targets. Most of the training will be for the occupational profiles identified as part of the BUILD UP skills project but there will also be other occupational profiles which will receive some form of training at least on cross-cutting generic green skills.

Even if the observations from the Build Up Skills project are focussed on training and qualification, in a small country people tend to play a significant role, if compared with larger countries, then it is fundamental to invest in qualification and certification programs.

Following the change in Government in March 2013, a Ministry with Energy as its main portfolio was established in order to tackle this much vital resource of any healthy economy. The new Government had promised lower electricity tariffs for all sectors of the economy, the closure of the old power utility and petroleum storage sites, a new natural gas power utility and the conversion from residual fuel oil to natural gas of a recently installed plant. On all fronts the Government has been successful, especially with a reduction of electricity prices of 25% for domestic users in March 2014 and the commercial sector planned for March 2015.

Also the Government established an Energy Agency; the Sustainable Energy and Water Conservation Unit, within the Ministry for Energy and Health. This Agency was established in April 2014 and has the responsibility for:

a) the design, development and cohesive coordination of conventional and alternative energy policies and measures together with water policy and secure governance across and within Ministries, Departments and government entities;
b) the monitoring, reviewing and updating of conventional energy, alternative energy and water conservation in accordance with European Union and international requirements;
c) leading and coordinating co-funded projects relating to conventional energy, alternative energy and water across Ministries;
d) the design, development and management of a sustained knowledge, education, information and communications framework directed to influence behaviour with regard to alternative energy use;
e) the drawing up of legislative proposals in support of national policies as necessary;
f) any other initiative or activity that is complementary and conducive to the fulfilment of the responsibilities of the Unit;
g) the general regulation of its own procedures, provided it does not violate the provisions of any other law.

Till now the Ministry for Energy and the Agency have delivered upon their responsibilities and thus the reply to 'government effectiveness' i.e. the quality of policy formulation and implementation, and the 'regulatory quality' i.e. the ability to formulate and implement sound policies and regulations that permit and promote private sector development, should be the as 'strong'.

12.6 Social & Political acceptance/feasibility

12.6.1 Description of Status quo

Criteria	Indicators	Description - Relevance with an EEO scheme	Unit/ Measurement Scale	Data sources
Social & Political Acceptance/ Feasibility	Consumers' trust in their energy supplier	Proxy measure: levels of complain.		http://ec.europa.eu/consumers/consumer_research/editions/docs/8th_edition_scoreboard_en.pdf
	Level of Fuel poverty within country	According to the Maltese Ministry for Energy and Health there is practically no fuel poverty in the islands.	Very low	Maltese Ministry for Energy and Health
	Coverage: The percentage of fuel poor households covered by the policy, EEO. (also called horizontal efficiency)	The EEO upon Enemalta PLc does not specifically include policies to counter fuel poverty as consumers in the Maltese society having financial difficulties are already given specific subsidies on their electricity and water bills. To note that this set of households will also be supplied with smart meters and hence will be part of the EEO.	No	Maltese Ministry for Energy and Health
	Leakage: The proportion of support going to households that are not fuel poor (also called vertical efficiency)			Maltese Ministry for Energy and Health

	Social stance	Discussion between the SEWCU and Enemalta plc have already stated. And the public utility is all in favor of the implementation of 'smart metering'.	In favor	Maltese Ministry for Energy and Health
		According to the Ministry, it is always essential that the customers of the entity have the EEO to participate.	Yes-to a great extent	Maltese Ministry for Energy and Health
	View of the industry[118]	According to the Ministry, industry favors the introduction of the EEO scheme	In favor	Maltese Ministry for Energy and Health
		According to the Ministry, industry will support the government in implementing the EEO scheme	Yes-to a great extent	Maltese Ministry for Energy and Health

12.6.2 Evaluation of social acceptance/feasibility – Identification of challenges

Figure 12.19 shows fuel poverty in all EU countries and the indicators used to measure it take into consideration the inability of people to keep their home adequately warm, to pay their utility bills and to live in a dwelling in good conditions (leakages, damp walls, etc.) and in Bulgaria, Hungary, Greece and Cyprus its percentage is quite high.

[118] That is energy intensive sectors such as the power sector, construction sector, etc.).

Country	Arrears on utility bills (%)	Inability to keep home adequately warm (%)	Dwellings with leakages & damp walls (%)	Country	Arrears on utility bills (%)	Inability to keep home adequately warm (%)	Dwellings with leakages & damp walls (%)
Bulgaria	50.7	70	29.5	Estonia	20	9.6	30.3
Hungary	58.8	33.9	53	Belgium	14	18.8	26.2
Greece	54.4	47.6	21	Ireland*	27.5	12.5	16.2
Latvia	39.5	35.1	43.3	France	17.8	15.2	22.1
Cyprus	25.9	50.6	34.6	Czech Rep.	19.4	15.3	20
Slovenia	37.5	17.3	46.1	Spain	17.9	18.2	17.9
Italy	24.5	44.1	30.1	Slovakia	18.3	13.6	19.7
Romania	41.5	25.4	30	Netherlands	8.6	8.7	27.4
Lithuania	22.8	38.2	28.6	Germany	8.6	14.8	21
Portugal	14.5	43	28.4	Denmark	5.5	7.1	25.3
Croatia	40.9	21.8	19.9	Luxembourg	6.6	2.2	28.9
Poland	30.1	27.6	20	Austria	11.3	7.7	15.2
Malta	19.4	32.1	12.4	Finland	13.7	3.8	8.6
UK	20.3	19.4	21.4	Sweden	10.3	3.5	11

Figure 12.19: Percentage of people at risk of poverty affected by fuel poverty as reflected by three related indicators

Source: "Alleviating fuel poverty in the EU, investing in home renovation, a sustainable and inclusive solution", BPIE 2014, data based on Eurostat data 2012

According to Eurostat the EU-27 average expenditure for electricity, gas and other fuels as percentage of total household final consumption expenditure for 2010 was 4.5% and the lowest share was recorded by Malta (2.8%). Of course, differences such as climate, GDP rate and energy prices can influence the reading of these results.

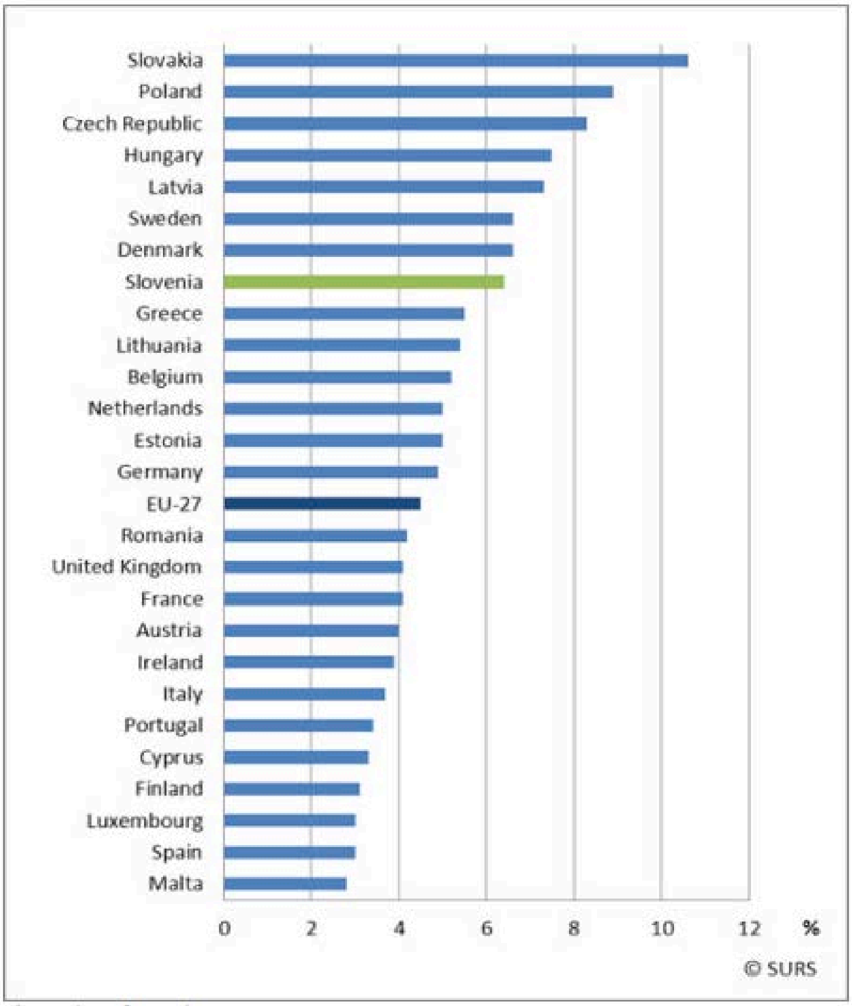


Figure 12.20: Expenditure for electricity, gas and other fuels as percentage of total household final consumption expenditure

Source: EU-27, Eurostat 2012

13 Poland – KAPE

13.1 Economic Profile

This report describes the general ecological, economic, market and socio-political Polish background in light of the recent adaptation of the Polish Energy Efficiency Obligation with the use of macro-economic indicators.

Annual GDP growth

Despite current difficulties, compared to other EU countries, the economic situation in Poland is favorable. GDP in Poland in 2012 was 12,8% higher than in 2008 (the year in which majority of the EU countries experienced the first negative effects caused by the economic crisis).

The stable and sustainable character of its economic growth has allowed Poland to remain the only EU country, which did not experience a decrease in GDP during the last global crisis which took place in years 2008-2009.

After 2011 a decrease in GDP growth caused by the effects of the economic crisis has been observed [source: Report on the status of the economy 2013*, Ministry of Economy*].

On the graph below the annual GDP (gross domestic product) growth in 2009-2013 has been presented.

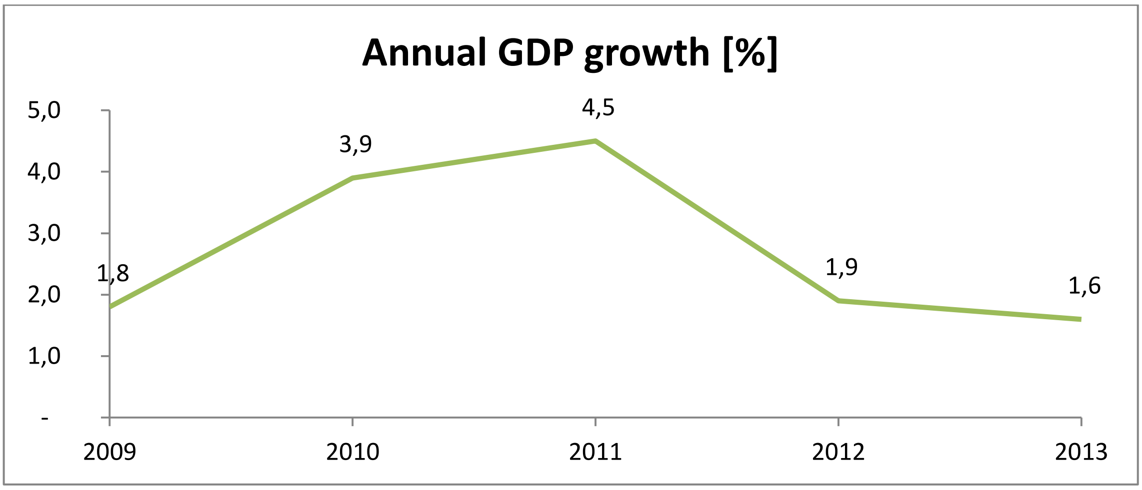


Figure 13.1: Annual GDP growth (%) in 2009-2013

Source: World Bank: http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG]

GDP per capita

The nominal GDP value in 2012 was 1.635,75 mld zł. Taking into account money's purchasing power the GDP per capita increased from 51% of the average for EU-27 countries in 2005 to 66% in 2012. According to Eurostat estimates in 2012 Poland's GDP per capita with respect to purchasing power parity increased by 1,8%, while in the entire EU it increased by 0,6% [source: Report on the status of the economy, *Ministry of Economy*].

Figure 13.2 presents GDP per capita in 2009-2013.

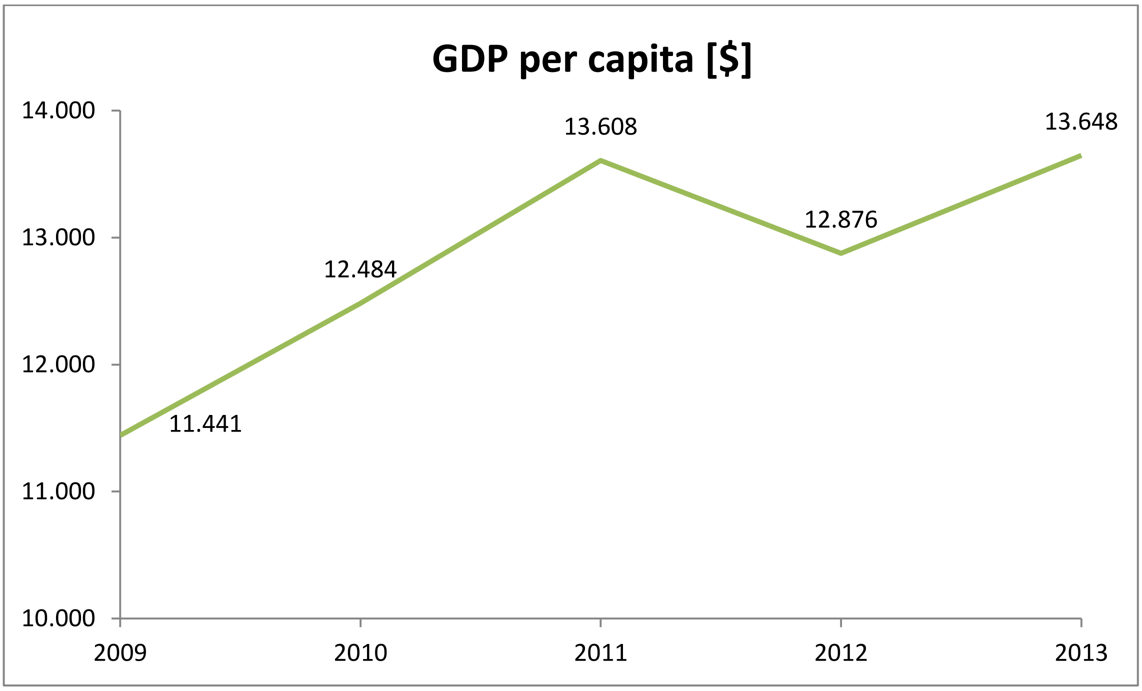


Figure 13.2: GDP per capita in Poland in 2009-2013 ($)

Source World Bank: http://data.worldbank.org/indicator/NY.GDP.MKTP.CD]

Government debt

Improving the state of public finance is currently a significant challenge for Polish economic policy. Above all a key aim is to limit all spendings in the public finance sector and to decrease its deficit. A long term and continuing budgetary deficit leads to accumulating public debt and negatively affects the country's economic situation.

In 2011 public debt was 53,4% of the GDP. In 2012 it was lowered to 52,7%. This means that the first threshold written in the public finance regulation (50%) has been exceeded [source: Report on the status of the economy 2013*, Ministry of Economy*].

In Table 13.1 the government debt and link with the deficit has been presented.

Table 13.1: The government debt and link with the deficit (in % of GDP)

Year	2010	2011	2012
Government deficit (Net landing (+)/net borrowing (-) under EDP)	-7,9	-5,0	-3,9
Change in Government Debt	6,6	5,4	1,7
Stock flow adjustment (SFA)	**-1,3**	**0,4**	**-2,2**
Net acquisition of financial assets	-1,1	-1,3	-0,1
Incurrence in liabilities not in the Government debt	-0,3	<0,1	-0,3
Valuation effects and other changes in volume in Government debt	<0,1	<0,1	<0,1
Statistical discrepancies	<0,1	<0,1	<0,1
Government debt (nominal value)	**54,9**	**56,2**	**55,6**
- Currency and deposits	-	-	-
- Securities other than shares	46,8	46,9	46,3
- short terms	1,8	0,8	0,3
- long term	45,0	46,1	46,0
- Loans	8,1	9,3	9,3
- short term	<0,1	<0,1	<0,1
- long term	8,0	9,3	9,2
of which, Intergovernmental lending	-	-	-

Source: Eurostat: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-EK-13-002/EN/KS-EK-13-002-EN.PDF

Electricity prices (domestic users)

In the entire EU the prices of electricity for household users increased by 6,6% between the second semester of 2012 and the second semester of 2011. In the previous years it increased by 6,6%. The fall from 2012 to 2013 is a result of competition between energy companies.

The price of electricity in Poland is lower than the average of the EU, however if we take into account the differences in purchasing power of EU citizens from different countries, it appears that Poland has some of the highest energy prices in Europe, which stimulus energy efficiency improvements The price of 100 kWh in Poland according to the purchasing power parity (how much energy can we buy for the average salary in each country) in 2013's second semester was 25,9 PPS (Purchasing Power Standard), similar to Germany. Only citizens of Cyprus pay more (32,9 PPS). The energy prices in Portugal (25,7 PPS) and Hungary (25,5 PPS) are also high [source: Forsal.pl, The prices of electricity and gas in Europe: Poles pay some of the highest bills in the EU (based on Eurostat data):

http://forsal.pl/artykuly/707125,ceny_pradu_i_gazu_w_europie_polacy_placa_jedne_z_najwyzszych_rachunkow_w_ue.html?]

On figure 13.3 the electricity prices for domestic users is presented.

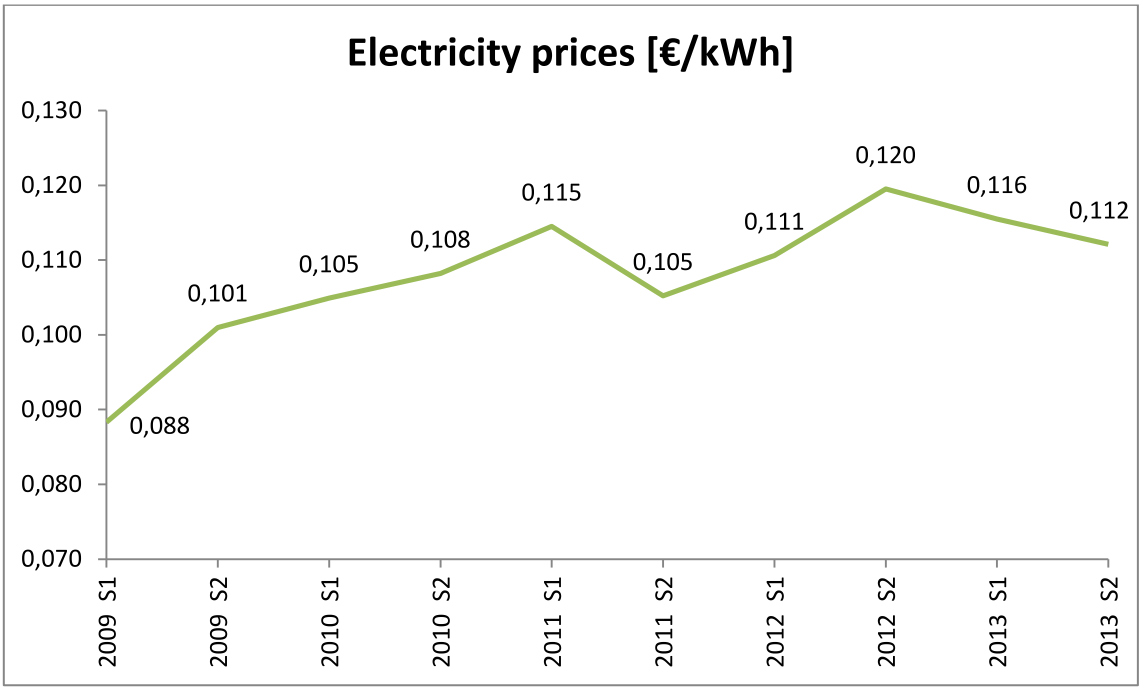


Figure 13.3: Electricity prices for domestic users (€/kWh)

Source: Eurostat: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_pc_204&lang=en

Gas prices (domestic users)

Between the second semester of 2011 and 2012 the price of gas for household users increased by 10,3% in all of Europe, while it has also increased by 12,6% during the previous year.

During the same period of time (second semester of 2011 and 2012) gas prices increased by 10,7% in Poland. The price of gas for household users in Poland is not that much higher than in other countries. However after taking into account the purchasing power of Poles, this nation pays more than Slovaks, Swedes, Czechs or Italians, but less than Spanish, Lithuanians or Hungarians [source: Forsal.pl, *The prices of electricity and gas in Europe: Poles pay some of the highest bills in the EU* (based on Eurostat data): http://forsal.pl/artykuly/707125,ceny_pradu_i_gazu_w_europie_polacy_placa_jedne_z_najwyzszych_rachunkow_w_ue.html?]

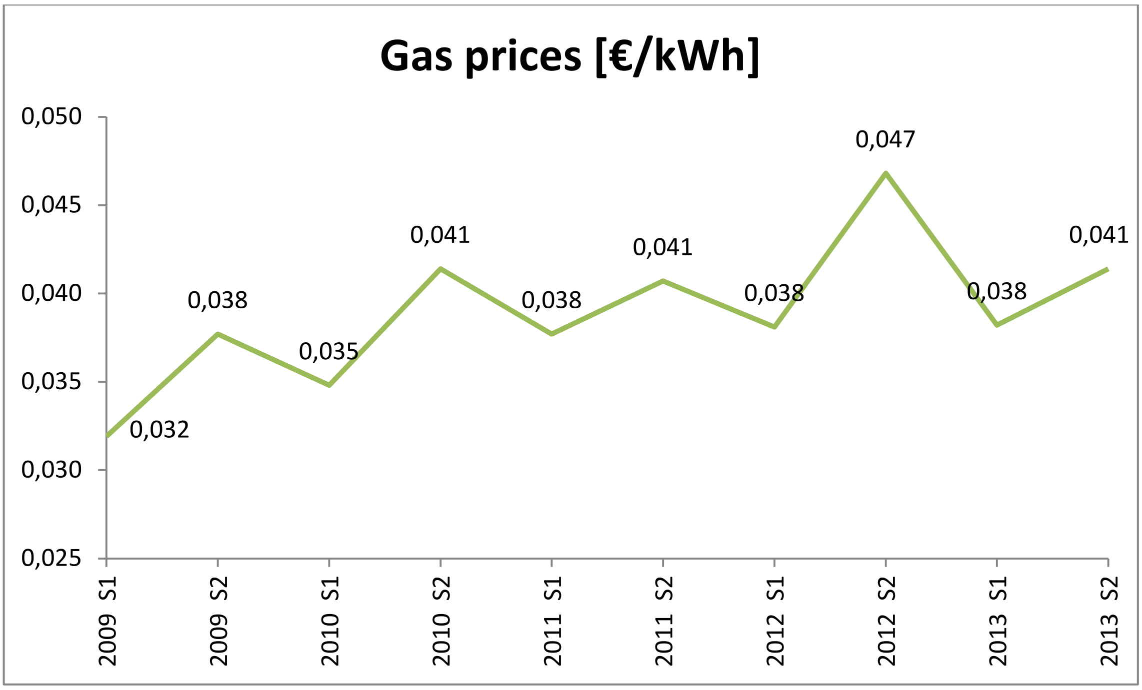


Figure 13.4: Gas prices for domestic users (€/kWh)

Source: http://knoema.com/zietjob/gas-prices-for-domestic-consumers-from-2007-onwards-bi-annual-data

Vulnerability to energy supply – Energy Dependence (>0 = net export)

Poland is the sixth least energy dependent country in the EU, which means that it has to import some part of the primary energy. The EEO Policy can cause a decrease in use of this energy. Eurostat data also shows that between 2008 and 2011, while most European countries experienced a decrease in energy use as a result of the crisis, Poland along with three other countries experienced growth [source: Forsal.pl. *Eurostat: Poland as the sixth least energy import dependent country in the EU*: http://forsal.pl/artykuly/680555,eurostat-polska-szostym-najmniej-uzaleznionym-od-importu-energii-krajem-ue.html].

Figure 13.5 presents the energy dependence in the years 2005-2012.

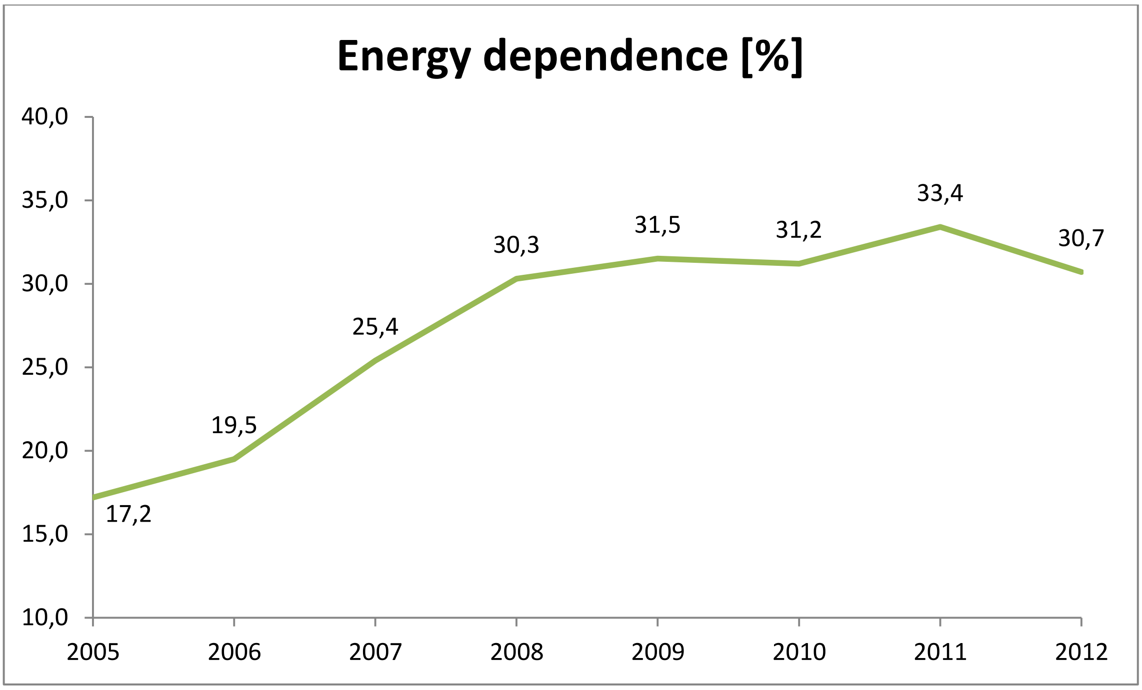


Figure 13.5: Energy dependence [%} from 2005 to 2012

Source: Eurostat: http://ec.europa.eu/eurostat/en/web/products-datasets/-/TSDCC310

Evaluation of economic preparedness

In general the annual GDP doesn't influence the Energy Efficiency Obligation scheme, however its growth can be influence by the number of investments realized in order to fulfill the energy savings commitments, which come from the EEO. The same conclusion applies to the GDP per capita.

While realizing the energy savings investments some of the energy suppliers may increase (but just a little bit – not significantly) the prices of electricity or gas – the increase will cover some part of the amount of money spent for the investments.

Thanks to the energy savings investments, which will be realized, the energy dependence of Poland may decrease a little bit.

Overall, the current economic situation, although it's complex and multi-faceted may positively influence the development of the EEO scheme and meanwhile itself will benefit from it.

Gas prices (domestic users)

Between the second semester of 2011 and 2012 the price of gas for household users increased by 10,3% in all of Europe, while it has also increased by 12,6% during the previous year.

During the same time period of time (second semester of 2011 and 2012) gas prices increased by 10,7% in Poland. The price of gas for household users in Poland is not that much higher than in other countries. However after taking into account the purchasing power of Poles, this nation pay more than Slovaks, Swedes, Czechs or Italians, but less than Spanish, Lithuanians or Hungarians [source: Forsal.pl, *The prices of electricity and gas in Europe: Poles pay some of the highest bills in the EU* (based on Eurostat data): http://forsal.pl/artykuly/707125,ceny_pradu_i_gazu_w_europie_polacy_placa_jedne_z_najwyzszych_rachunkow_w_ue.html?]

Figure 13.6 presents the gas prices for domestic users.

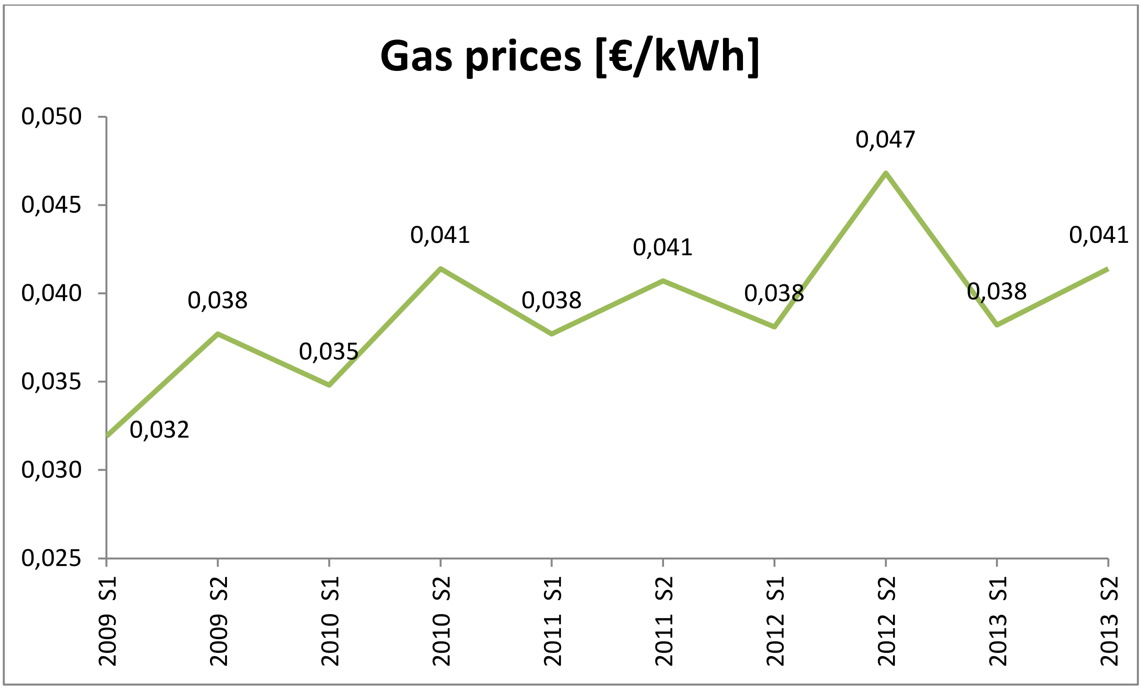


Figure 13.6: Gas prices for domestic users (€/kWh)

Source: http://knoema.com/zietjob/gas-prices-for-domestic-consumers-from-2007-onwards-bi-annual-data

Vulnerability to energy supply – Energy Dependence (>0 = net export)

Poland is the sixth least energy dependent country in the EU, which means that it has to import some part of the primary energy. The EEO Policy can cause a decrease in use of this energy. Eurostat data also shows that between 2008 and 2011, while most European countries experienced a decrease in energy use as a result of the crisis, Poland along with three other countries experienced growth [source: Forsal.pl. *Eurostat: Poland as the sixth least energy import dependent country in the EU*: http://forsal.pl/artykuly/680555,eurostat-polska-szostym-najmniej-uzaleznionym-od-importu-energii-krajem-ue.html].

Figure 13.7 presents the energy dependence in the years 2005-2012.

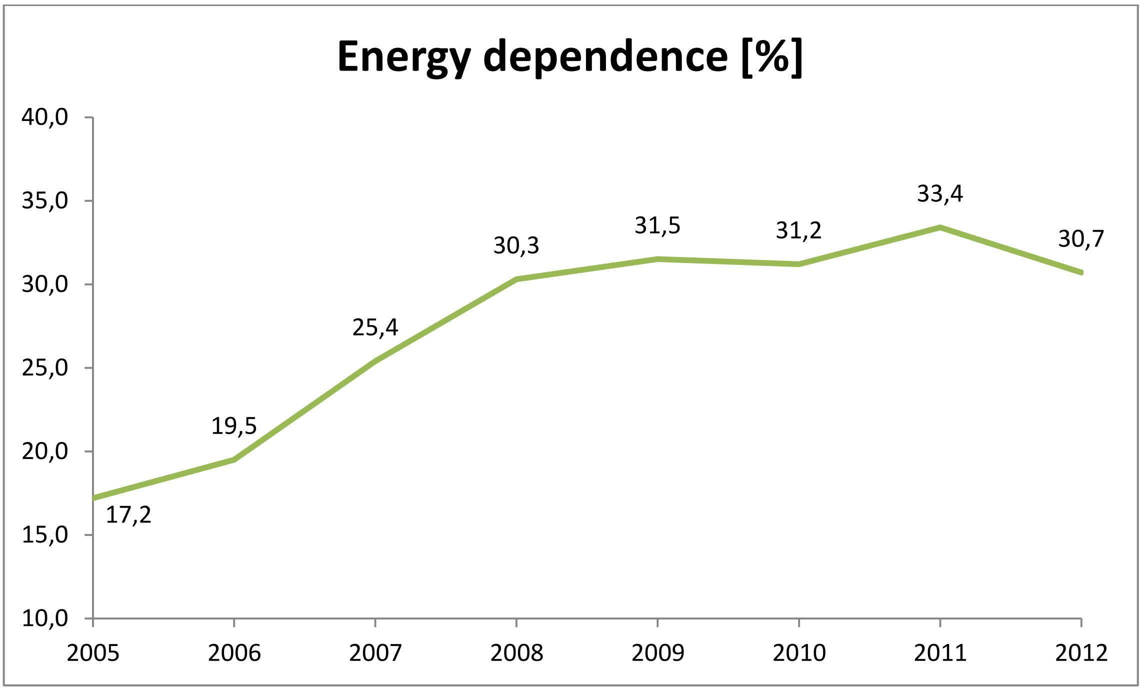


Figure 13.7: Energy dependence [%} from 2005 to 2012

Source: Eurostat: http://ec.europa.eu/eurostat/en/web/products-datasets/-/TSDCC310

13.2 Energy and Climate Change (Energy Savings' Potential)

13.2.1 Description of Status quo

Presented below is a range of indicators which allow the evaluation of energy savings' potential and present the current energy use trends with regard to national (Polish) targets for 2020.

Gross national energy consumption

Probably like most formerly socialist countries in Eastern Europe, Poland experienced a rapid decline in economic activity at the beginning of the nineties. Energy consumption peaked in 1987 at 133 million toe, followed by a significant decline, at around 90 mln toe at its lowest (see Figure below). This decline wasn't caused solely by the change in the political system and limited economic activity. Changes in the structure of the economy and improvements in energy efficiency also played a role [source: Fortum Corporation, *Energy in Poland*:

http://www.fortum.com/SiteCollectionDocuments/Public_affairs/FortumEnergyPolicyReview_polish_web.pdf].

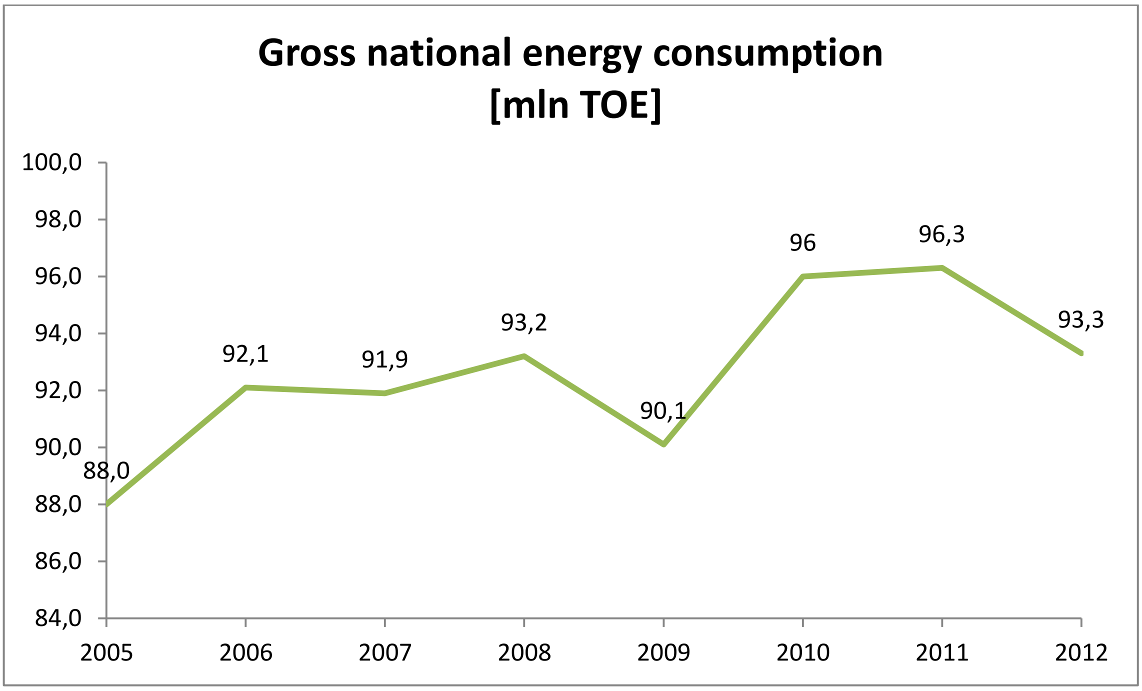


Figure 13.8: Gross national energy consumption [mln TOE] between 2005 - 2012

Source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdec360&plugin=1

Energy intensity of the economy

Structural changes of final energy consumption in the economy's key sectors reflect the direction of its development. Restructuring industry and companies' aiming to decrease energy intensity (rationalizing energy consumption connected to the rising prices of energy carriers), has driven a decrease in the energy consumption of the sector. Stable development of road transport connected with the growing role of transporting goods, as well as personal transport with privately owned cars and the service sector were translated into an increase of these sectors' contribution to the national energy consumption. In the domestic sector the introduction of better insulation and the increased efficiency of heating systems led to a decrease in energy consumption [source: Report on the status of the economy 2013, *Ministry of Economy*].

The figure below presents the energy intensity of the economy from 2005 to 2012.

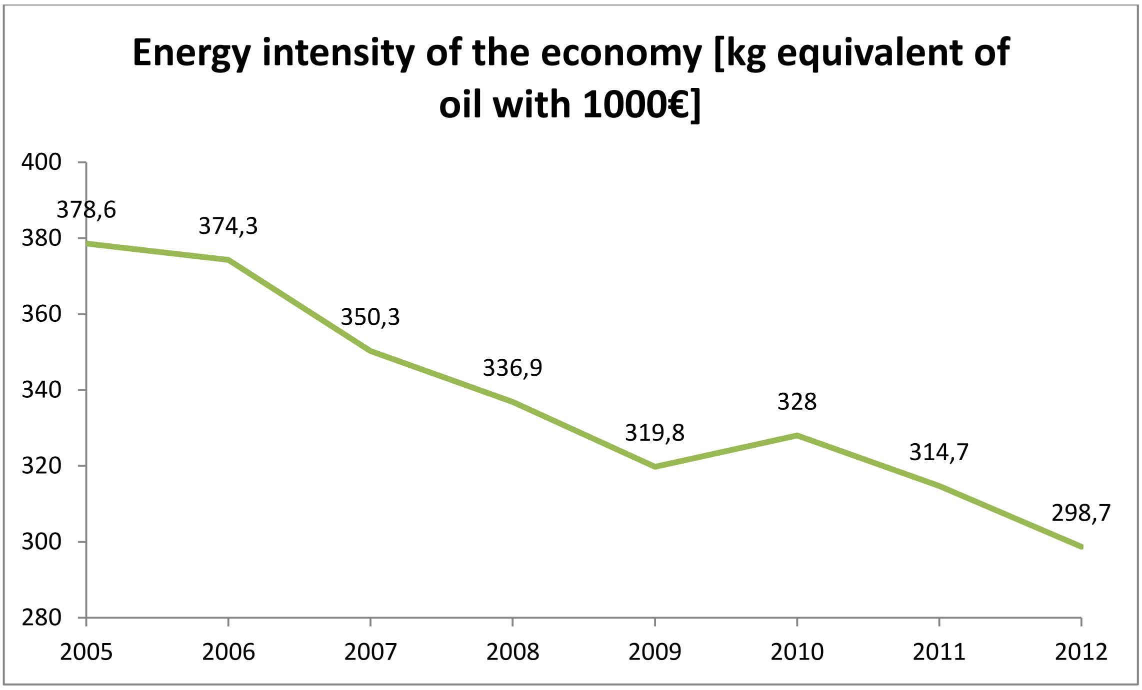


Figure 13.9: Energy intensity of the economy between 2005-2012

Source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdec360&plugin=1

Final consumption of residential dwellings (with climatic corrections)

The decreasing share in final consumption of heating is connected to the installation of modern gas and electric heating equipment, as well as an effect of thermo-modernization measures and more restrictive building standards. An increase in electrical appliances and changes in user behaviors (changes in the intensity of using appliances – washing machines, dishwashing machines, TV, computers) contributed to a twofold increase in energy consumption by electric appliances between 1993 and 2012 [source: Report on the status of the economy, *Ministry of Economy*].

On figure below the final consumption of residential dwellings (with climatic corrections) from 2000 to 2011 has been presented.

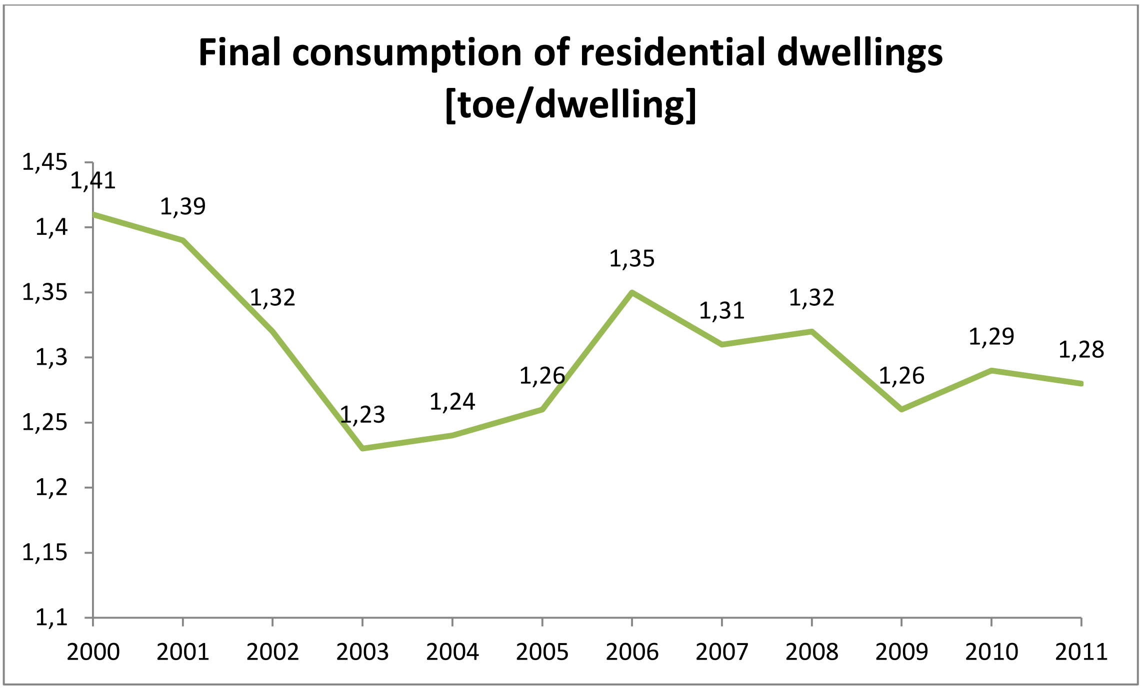


Figure 13.10: Final consumption of residential dwellings between 2000-2011

Source: Odyssee-Mure: http://www.indicators.odyssee-mure.eu/online-indicators.html

Final energy consumption by sectors

Services

The service sector is the most energy efficient sector generating national income. Its energy intensity positive value has shown small fluctuations and in 2011 was only slightly above 0,05 kgoe/euro. Between 2001 and 2011 the energy intensity of the service sector increased by 0,5% annually. The energy intensity positive value increased by 1,0% annually on average. The largest potential in an EEO lies in the branch of industry. [Source: Report on the status of the economy, *Ministry of Economy*].

The figure below presents the final energy consumption according to sectors from 2005 to 2012.

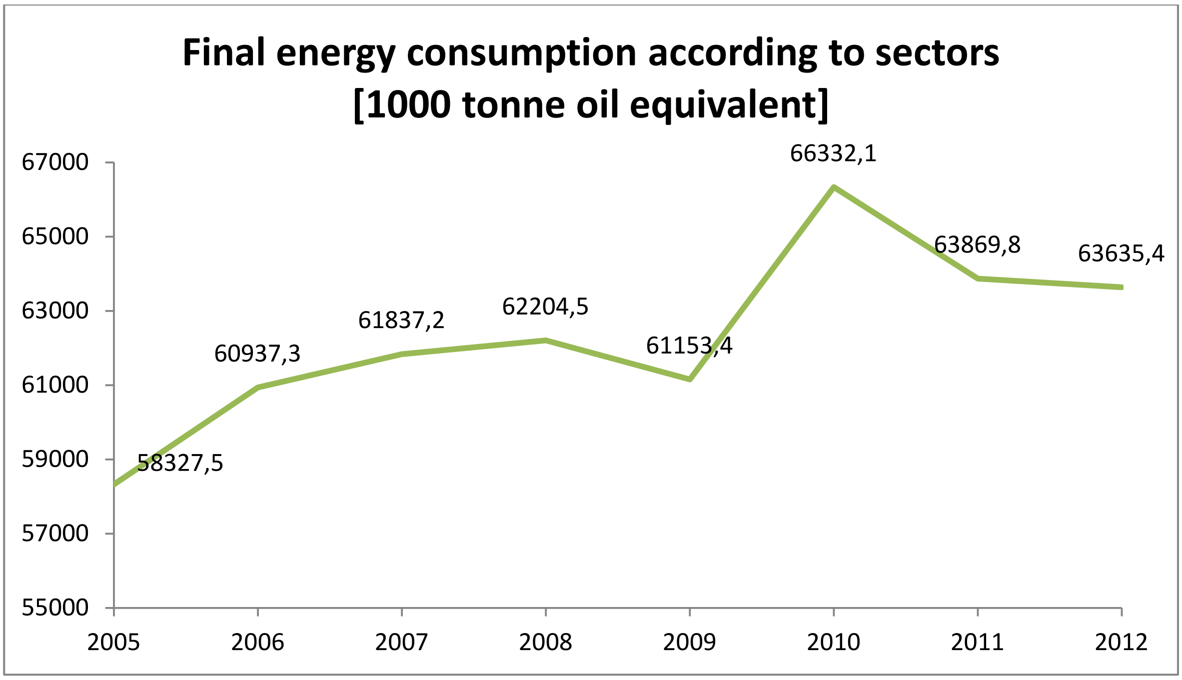


Figure 13.11: Final energy consumption according to sectors between 2005-2012

Source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tsdpc320]

Energy efficiency gains in households

The figure below shows the energy efficiency gains in households between 2000-2011.

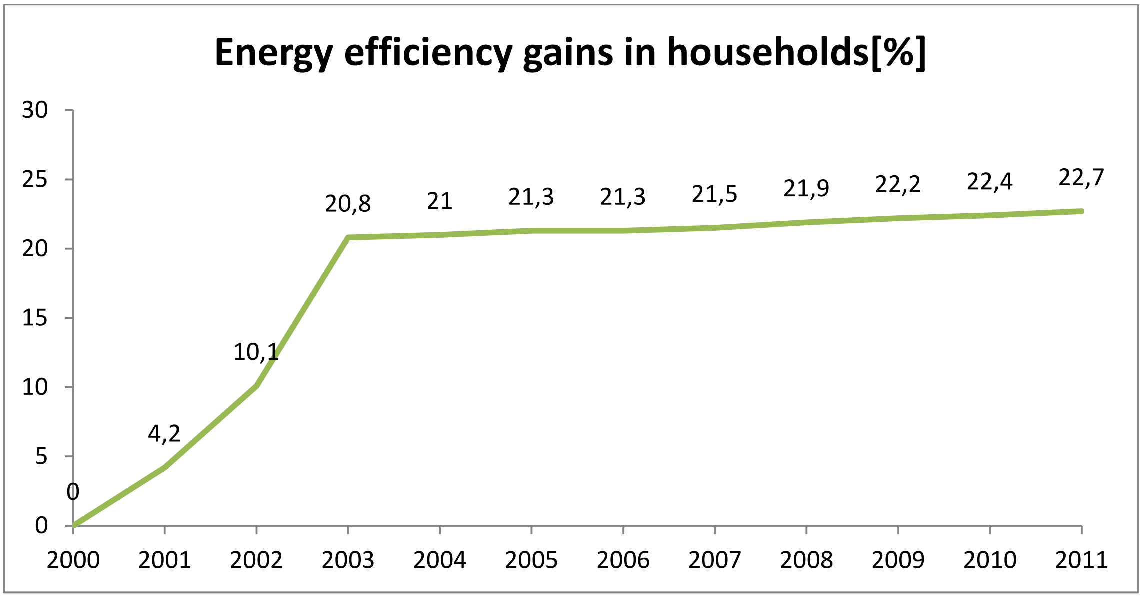


Figure 13.12: Energy efficiency gains in households between 2000 and 2011

Source: Odysee-Mure

Energy efficiency gains in industry

Final energy consumption in the industrial sector underwent irregular fluctuations between 2001 and 2011.

Consumption reached the highest level in 2007, and after a decrease to 14 Mtoe in 2009 it increased again up to over 15 Mtoe in 2011. Broken down into energy carriers we can note a decrease in the use of coal and liquid fuels and an increase in natural gas, electricity and the remaining carriers. Heat consumption remained the same. About 60% of the energy is used by the metallurgy, chemical and mineral industries. The biggest decrease, almost 8%, in energy consumption compared to 2001 occurred in the iron and steel industry, while the textile and machine industries also noted a decrease in their contribution to the structure of energy consumption. An increase was noted by the lumber, paper, chemical, mineral, as well as other industries.

The highest dynamic of improving energy efficiency was noted by the machine, food, textile and transport industries [source: Report on the status of the economy, *Ministry of Economy*]. The figure below demonstrates the energy efficiency gains in industry from 2000 to 2011.

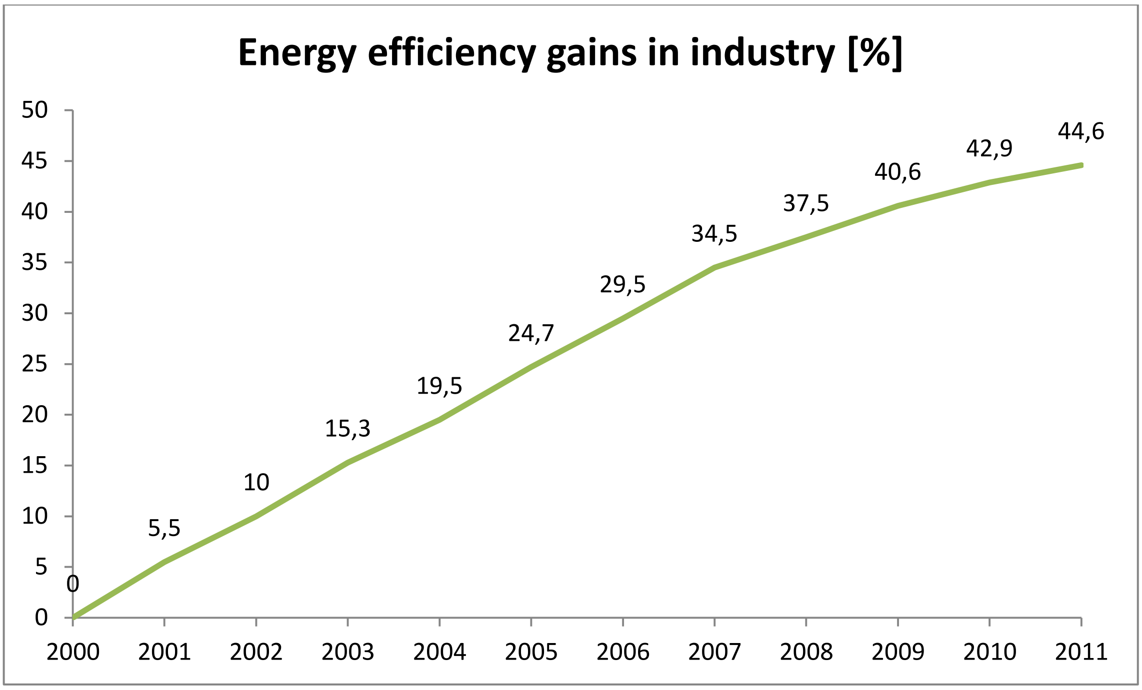


Figure 13.13: Energy efficiency gains n industry between 2000-2011

Source: Odysee-Mure: http://www.indicators.odyssee-mure.eu/online-indicators.html

Distance to target (2012 versus 2020 target): primary and final energy [mln toe]

In Table below the primary and final energy in 2012 and 2020 has been presented.

Table 13.2: Primary and final energy in 2012 and 2020 [source: Poland's energy policy until 2030]

Year	Primary energy	Final energy
2020	**101,7**	**72,7**
2012	**93,3**	**63,6**
Difference	**8,4**	**9,1**

Source: Poland's energy policy until 2030]

The highest forecasted final energy consumption increase is about 29%, with the largest increase of 90% in the service sector. This increase will be about 15% in the industry sector.

The forecasted increase in primary energy demand in 2030 is about 21%, which will occur primarily after 2020, due to a higher predicted increase in GDP. Therefore it is possible to maintain zero-energy economic growth up to 2020, after which moderate increase in primary energy demand is to be expected [source: Poland's energy policy until 2030].

Changes in final consumption (2005-2012)

The figure below presents the changes in final energy consumption from 2005 to 2012.

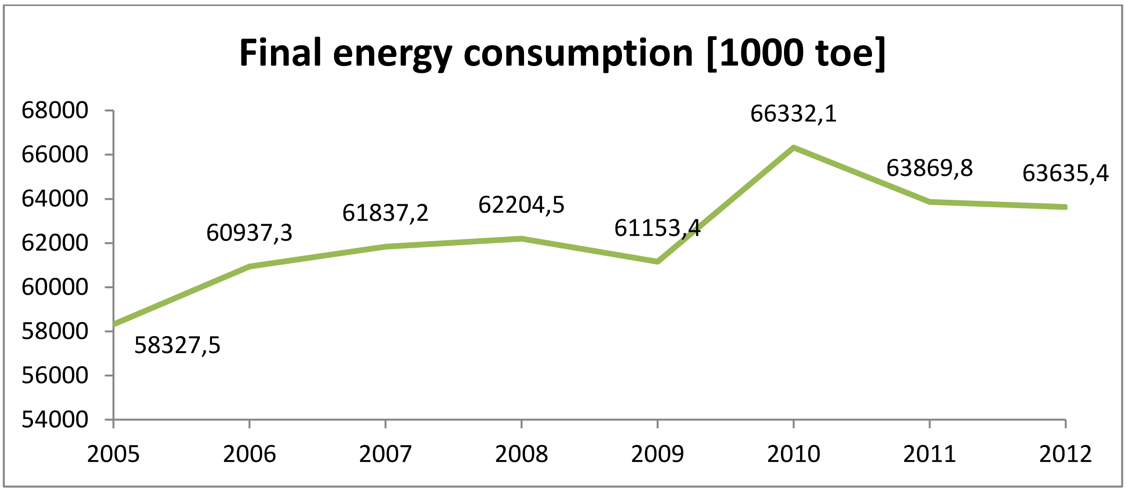


Figure 13.14: Final energy consumption between 2005 and 2012

Source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=ten00095&plugin=0

Primary energy consumption [mln toe]

On the graph below the primary energy consumption from 2005 to 2012 has been presented.

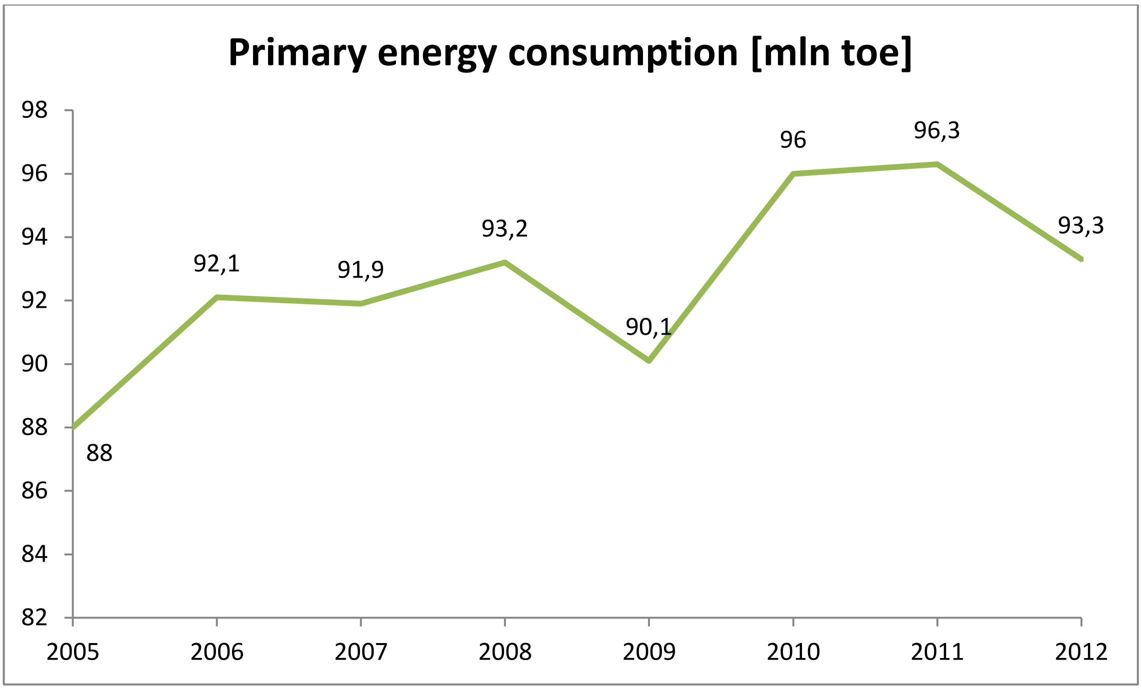


Figure 13.15: Primary energy consumption between 2005-2012

Source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=t2020_33&plugin

Total primary energy consumption increased between 2001 and 2011. A decrease was noted twice in 2002 and 2009, and the average primary energy increase was 1,3%. With regard to final energy consumption, after small fluctuations, its slow increase began at the start of the decade. Its average rate of increase between 2001 and 2011 was 1,5%. Taking into account climatic changes, that is including changing varied weather conditions, the rate of increase was 1,8% [source: Report on the status of the Economy, *Ministry of Economy*].

Evaluation of energy savings' capacity

The gross national energy consumption, as well as the energy intensity of the economy, might decrease in some part thanks to the realization of the energy savings investments. Climate and weather have significant influence on the amount of energy consumed (for example: a mild winter will result in a lower demand for energy). The increase of energy efficiency in the industry shows that in that branch still lies a significant potential for energy savings'.

13.3 Market preparedness

SME Access to Finance Index (SMAF)

According to information from the Small Business Act (SBA) Fact Sheets, Poland presents a mixed picture in terms of framework conditions for the creation and growth of SMEs. While the Polish economy is still reeling from the consequences of the 2008-09 crisis, Polish SMEs should be able to recover to pre-crisis levels in the foreseeable future. The business demography outlook for 2013 is positive and dynamic with high numbers of exits but also of new companies entering the market. This is partly due to substantial progress achieved in SBA policy areas such as entrepreneurship and responsive administration, leading to the removal of many administrative burdens for start-ups, and a sharp decrease in registration costs for businesses. Despite these targeted efforts, as recognized in the World Bank report 'Doing Business 2013' — which ranked Poland as the top improver for 2012 — Polish SMEs continue to chronically underperform in some crucial areas, such as skills and innovation and exploiting potential foreign markets (single market and third countries). Moreover, SMEs are suffering also from a lack of recent policy initiatives to address the weaknesses of the Polish SME sector, which is still struggling to take up loan and credit financing [source: *Enterprise finance index – situation in member states – Poland*]. The figure below presents the SMAF index from 2007 to 2012.

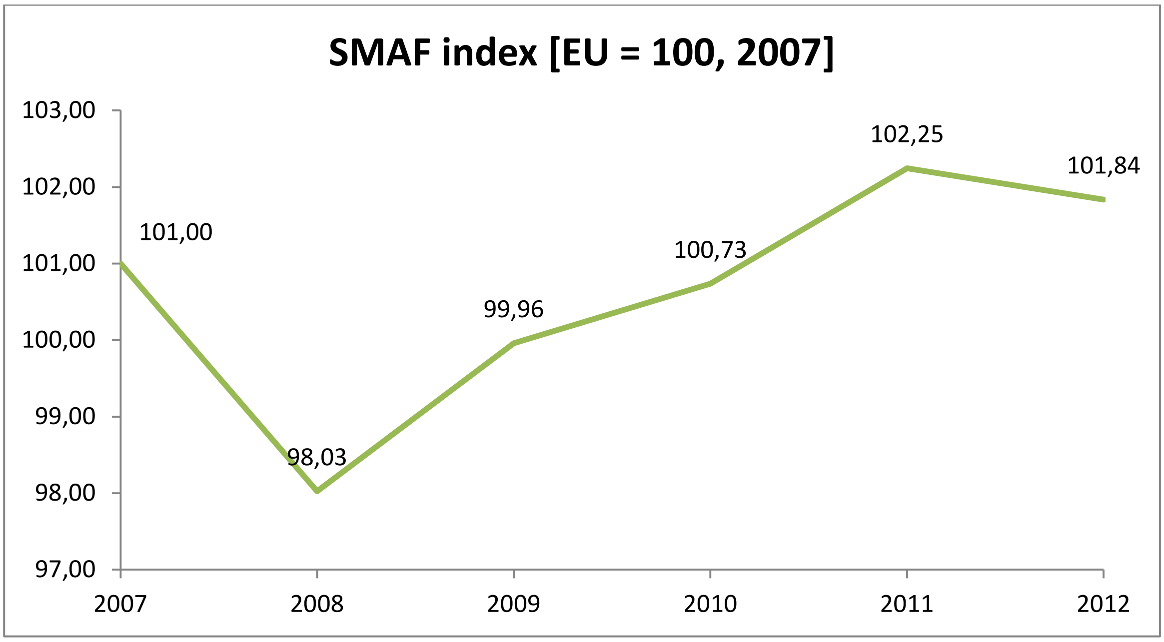


Figure 13.16: SMAF Index between 2007-2012

Source: European Commission: http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/index_en.htm

ESCO's market development (date from 2013)

Market size : 40-100 M€ annually.

ESCO number (List of companies offering ESCO services): 29.

Due to a lack of a system monitoring of ESCO contracts a precise estimation of the turnover in the Polish market is a difficult task. Despite that, it is agreed that the market turnover of the ESCO market was no smaller than 40 mln zł last year, which means that it should be considered as a minimum value. Representatives of companies specializing in investments in lighting and electricity estimate that the turnover of ESCO contracts, including electricity contracts, is 50 mln zł annually. This would confirm the thesis that using 40 mln zł with regards to the entire market is a significant underestimation of its size, and its turnover boundary is much higher. Therefore for the sake of preliminary estimates using 100 mln zł as last year's top market boundary should be allowed.

The ESCO market in Poland has substantial potential and is on the verge of further development, where the number of players, including both ESCO companies and their customers, could still be considered to be small. Experts agree that while the market has been continuously developing over the last couple of years, taking into consideration the potentially favorable circumstances such as rising energy prices or EU policies aimed at increasing energy efficiency, its growth should increase. At the moment around 90 ESCOs are operating [source: Institute of Environment Economy, *The ESCO market in Poland – Status quo and perspectives of development*: http://www.iee.org.pl/?a=text&b=32].

Market share of the largest generator in the electricity market [% of total energy]

The market shares of particular energy groups, as well as the structure of these entities have not changed much in 2012. The three largest capital groups produce about 2/3 of the country's electricity. The share of the nation's largest energy producer PGE Polska Grupa Energetyczna SA in 2012 was around 38%. At the same time TAURON Polska Energia SA's share was 13%, and EDF's 10%. The remaining energy producers are: ENEA SA, ZE PAK SA, GDF SUEZ, PGNiG, Dalkia, CEZ, Fortum, RWE [source: *Report of the National Chief of the Energy regulatory Office 2013*]. The figure below presents the market share of the largest generator in the electricity market from 2004 to 2011.

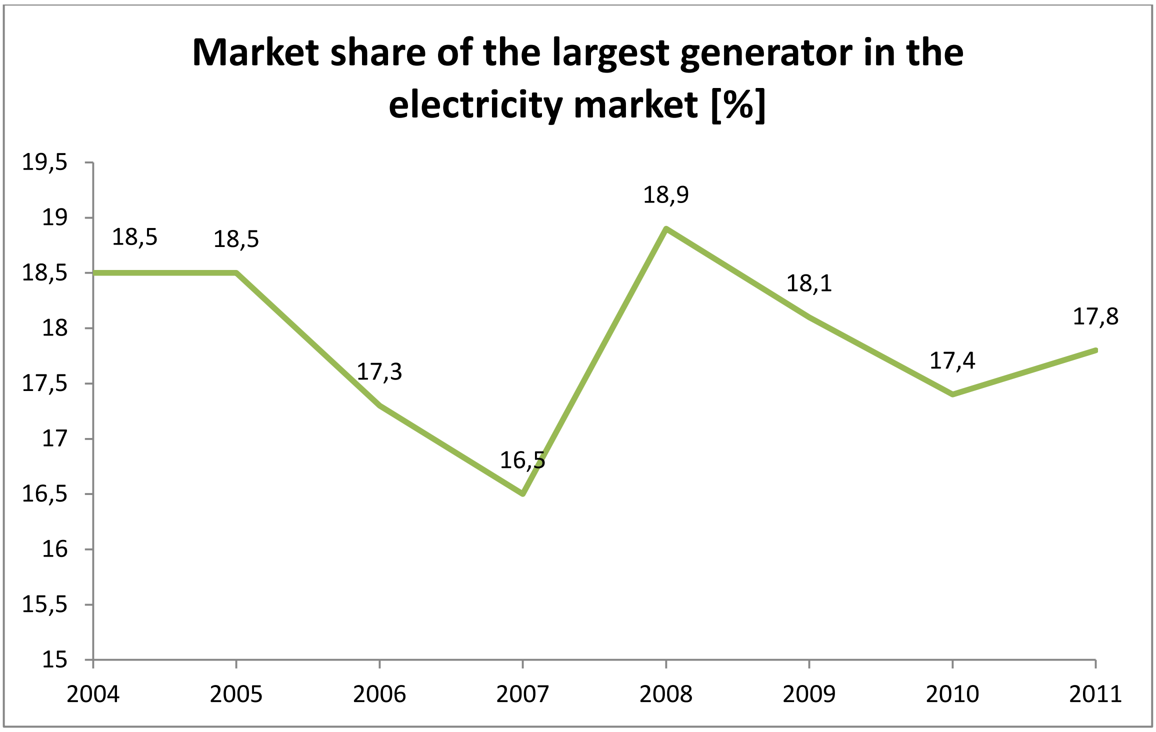


Figure 13.17: Market share of the largest generator in the electricity market between 2004-2011

Source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=ten00119&plugin=1

Experience in technology

Technical capacity

The procedure of certification for the auditors doesn't exist. There is a list of authorized auditors by KAPE and ZAE, which is not available on the government websites, but on the websites of KAPE and ZAE.

The auditors could be educated during the postgraduate studies at the technical universities (such as Warsaw University of Technology). There are also workshops organized by the companies considering energy efficiency and renewable sources of energy. The financial support for that comes from National Fund as well as from European funds.

Unluckily there is a lack of reliable information about introduction of the energy efficiency. In 2014 the new law introduced obligatory registration in database for energy certification of buildings.

Evaluation of market preparedness

SMEs in Poland are very likely to recover to pre-crisis levels (financial crisis of 2008) in the near future. They're also suffering from the lack of recent policy initiatives to address the weaknesses of the Polish SME sector, which is still struggling to take up loan and credit financing. There is a great need for changes in the law which will increase interest of SMES in EEOs scheme (work in progress).

The ESCO market in Poland has a substantial potential for development. Unluckily there is no such thing as a system monitoring of ESCO contracts that could help to precisely estimate its turnover in the Polish market. Nowadays in Poland there are several dozens of enterprises in ESCO formula.

The largest generators in the electricity market are likely to have big potential to benefit from the EEO scheme, however in the current system the EU ETS installations are excluded from the EEO scheme (in the new it will be changed).

Unluckily there is a lack of reliable information about introduction of the energy efficiency. In 2014 the new law introduced obligatory registration in database for energy certification of buildings.

13.4 Administrative preparedness

Presented below is a range of indicators evaluating the national administrative preparedness (e.g. **institutional structures**, **adequately stuffed services, competence and experience, monitoring system**) with respect to introducing the modified Energy Efficiency Obligation System after 2016.

Government effectiveness

Table 13.3: The government effectiveness in 2002, 2007 and 2012

Year	Government evaluation [-2,5 – 2,5]
2002	0,49
2007	0,4
2012	0,66

Source: World Bank: http://info.worldbank.org/governance/wgi/index.aspx#home

Quality of regulation

Table 13.4: Quality of regulation in 2002, 2007 and 2012

Year	Government evaluation [-2,5 – 2,5]
2002	0,75
2007	0,77
2012	0,96

Source: World Bank: http://info.worldbank.org/governance/wgi/index.aspx#home

Experience (measures) against free-riders

Clear methodology of minimization and calculation of free-riders will strengthen trust in declared energy savings.

Evaluation of administrative preparedness

The overall evaluation is included in the evaluation of legislative preparedness.

13.5 Legislative preparedness

The indicators presented below are meant to show information on possible legislative changes with respect to implementing the adapted Energy Efficiency Obligation System.

Legal authority

Properly selected combination of legislation and regulations, as well as the Governmental and administrations procedures should proceed, to allow the creation, introduction and maintenance of EEO. Right now exists law concerning EEO in the Energy Efficiency Act, however it's now in the process of changing.

Evaluation of legislative preparedness

Properly selected combination of legislation and regulations, as well as the Governmental and administrations procedures should proceed, to allow the creation, introduction and maintenance of EEO. Right now exists law concerning EEO in the Energy Efficiency Act, however it's now in the process of changing.

13.6 Social & Political acceptance/feasibility

Consumers' trust in their energy supplier

It's essential that the customers trust their energy supplier, so they could live without risk of the unexpected cut off the energy. The approximate measure of consumer's trust might be considered as the level of complaints from the customers. Complaints (concerning the prices or quality of the service) are considered by Energy Regulatory Office.

The most trusted energy supplier brand in 2012 was ENEA S.A

[Source: http://www.enea.pl/news/1/komunikaty-handlowe/2012-05-23/enea-marka-godna-zaufania-996.html].

Level of Energy Poverty

Poland lacks a precise definition of energy poverty. This is a problem in defining its current level. Taking into account the definition used historically in the UK (energy poverty is a state in which more than 10% of total household spending would be needed for energy to deliver adequate energy services) this could be a large problem. Average energy spending is over 10% (it continuously increases – in 2009 it was 11,2%)

[Source: Energy poverty and energy efficiency – problem analysis and recommendation of the Institute of Sustainable Development, Aleksandra Stępniak, Agnieszka Tomaszewska

The Institute for Sustainable Development has recently conducted a questionnaire aimed at municipalities concerning energy poverty. Preliminary results show that only 39% of municipalities have responded. Therefore it can be concluded that currently there is no data to confirm the level of energy poverty. The Central Statistical Office of Poland (according to the year of 2008) stands that more than 40% of household spend more than 10% of their income on heating [source: own – questionnaire results (no report has been published on this topic – it is being prepared)].

Percentage of fuel poor households covered by the policy, EEO (i.e. also called horizontal efficiency).

The probable number of households which qualify as covered by the EEO policy is around 250 thousands. This number represents households, which obtain the housing allowance. A part of it includes a lump sum for purchasing the fuel by the households, which don't have central heating systems, DHW (domestic hot water) or natural gas from the source outside the house.

Social stance

It's possible that the energy poverty might positively influence introduction and implementation of EEO on a large scale in the country. Some people might consider it as not easy from the social point of view (for ex.: higher prices of energy) unless the government allows to give back some amount of money. On the other hand if the EEO is implemented in procedures and schemes the customers might support its implementation. One of the important aspects to be considered is global climate change.

View of the industry

The industry supports the implementation of EEO scheme without any doubt. It's one of the most important means for introducing the energy efficiency investments in the branch of industry.

13.6.1 Evaluation of social acceptance/feasibility

The customers' trust in their energy supplier is important when there is also something more than simply energy supply. The enterprises must sell a certain number of EEO – which can result in a thermo modernization of the households if the homeowners sign up a long time contract with the energy supplier. The EEO scheme may develop such kind of services.

Energy poverty (currently there is no data to confirm the level of energy poverty) may affect implementing the EEO to a great extent. If the EEO is implemented in procedures and schemes the customers might support its implementation. The increase of energy efficiency by EEO policy might result in an energy poverty decrease as well as it may lead to the situation when people who didn't pay the bills regularly will be able to afford it.

The probable number of households which qualify as covered by the EEO policy is around 250 thousands.

Importance of a wider support from the industry in the procedure of introducing the revised EEO scheme is limited to some extent, because the existing system is focused only on the large industrial companies, which are its beneficiaries.

REFERENCES

[1] source: Report on the status of the economy 2013*, Ministry of Economy*

[2] source: World Bank; http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG

[3] source World Bank: http://data.worldbank.org/indicator/NY.GDP.MKTP.CD

[4] source: Eurostat: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-EK-13-002/EN/KS-EK-13-002-EN.PDF

[5] source: Forsal.pl, *The prices of electricity and gas in Europe: Poles pay some of the highest bills in the EU* (based on Eurostat data): http://forsal.pl/artykuly/707125,ceny_pradu_i_gazu_w_europie_polacy_placa_jedne_z_najwyzszych_rachunkow_w_ue.html?

[6] source: Eurostat: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_pc_204&lang=en

[7] source: http://knoema.com/zietjob/gas-prices-for-domestic-consumers-from-2007-onwards-bi-annual-data

[8] source: Forsal.pl. *Eurostat: Poland as the sixth least energy import dependent country in the EU*: http://forsal.pl/artykuly/680555,eurostat-polska-szostym-najmniej-uzaleznionym-od-importu-energii-krajem-ue.html

[9] source: Eurostat: http://ec.europa.eu/eurostat/en/web/products-datasets/-/TSDCC310

[10] source: Fortum Corporation, *Energy in Poland*: http://www.fortum.com/SiteCollectionDocuments/Public_affairs/FortumEnergyPolicyReview_polish_web.pdf

[11] source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdec360&plugin=1

[12] source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdec360&plugin=1

[13] source: Odyssee-Mure: http://www.indicators.odyssee-mure.eu/online-indicators.html

[14] source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tsdpc320

[15] source: Odysee-Mure: http://www.indicators.odyssee-mure.eu/online-indicators.html

[16] source: Odysee-Mure: http://www.indicators.odyssee-mure.eu/online-indicators.html

[17] source: Poland's energy policy until 2030

[18] source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=ten00095&plugin=0
[19] source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=t2020_33&plugin
[20] source: *Enterprise finance index – situation in member states – Poland*
[21] source: European Commission: http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/index_en.html
[22] source: Institute of Environment Economy, *The ESCO market in Poland – Status quo and perspectives of development*: http://www.iee.org.pl/?a=text&b=32
[23] source: *Report of the National Chief of the Energy regulatory Office 2013*
[24] source: Eurostat: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=ten00119&plugin=1
[25] source: World Bank: http://info.worldbank.org/governance/wgi/index.aspx#home
[26] source: World Bank: http://info.worldbank.org/governance/wgi/index.aspx#home
[27] source: http://www.enea.pl/news/1/komunikaty-handlowe/2012-05-23/enea-marka-godna-zaufania-996.html
[28] source: own – questionnaire results (no report has been published on this topic – it is being prepared) stakeholders: Institute for Sustainable Development, Polish Foundation for Energy Efficiency, Energy Regulatory Office; http://samorzad.pap.pl/depesze/redakcyjne.srodowisko/125993/Klimat-dla-powiatow---Programy-wspierajace-termomodernizacje-adresowane-do-najubozszych

Stakeholders list

Stakeholders contacted during the process of development of the document:

[7] Ministry of Economy
[8] Energy Regulatory Office
[9] Polish Power Exchange
[10] NAPE - Polish National Energy Agency
[11] SAPE - Polish Energy Agency Association
[12] NOT Polish Federation of Engineering Associations
[13] ZAE Energy Auditors Association
[14] Institute of Environmental Economics
[15] Institute of Sustainable Development
[16] PGNiG (energy supplier)
[17] ENEA (energy supplier)
[18] PGE (energy supplier)
[19] IGCP Polish District Heating Chamber of Commerce
[20] SPIUG Association of Heating Appliances Manufacturers and Importers
[21] Forum OEEiG
[22] Polish Confederation Lewiatan association of employers and trade unions

The main issues of the analysis have been discussed mainly during face-to-face meetings and phone calls.

14 Slovenia - JIN

14.1 Economic profile

Slovenia is a recent EU Member State with a GDP per capita at 88% of the EU27 average. It was the first new member of the European Union to adopt the euro as a currency in January 2007 and it has been a member of the Organization for Economic Co-operation and Development since 2010. The main industries of agriculture, forestry, and fishing comprise a comparatively low 2.5% of GDP and engage only 6% of the population. Almost two-thirds of people are employed in services, and over one-third in industry and construction. In terms of energy situation, the electricity production was 14.144 GWh and the consumption was 12.602 GWh (2011). The electricity production is generated from the main three sources: hydro 3.361 GWh, thermal 4.883 GWh, and nuclear 5.899 GWh. Projections indicate that from 2008 to 2020 the primary energy supply will fall at an average rate of -0.5% a year and based on the NEEAP, the expectations are that in 2020 the value of 302 PJ will be attained, this being 5.7% less than in 2008 (NEEAP) [9].

14.1.1 Description of Status quo

Slovenia had experienced a high 5% average GDP growth during the period 1993-2007, with a very steep decline in 2009-2013 due to the economic and financial recession, which influenced its economy in all sectors (including also the traditional industries). Nevertheless, from 2013 and for the coming two years there are expectations of stabilization and gradual increase of GDP up to 1%, following the EC projections for average GDP growth in all EU MS.

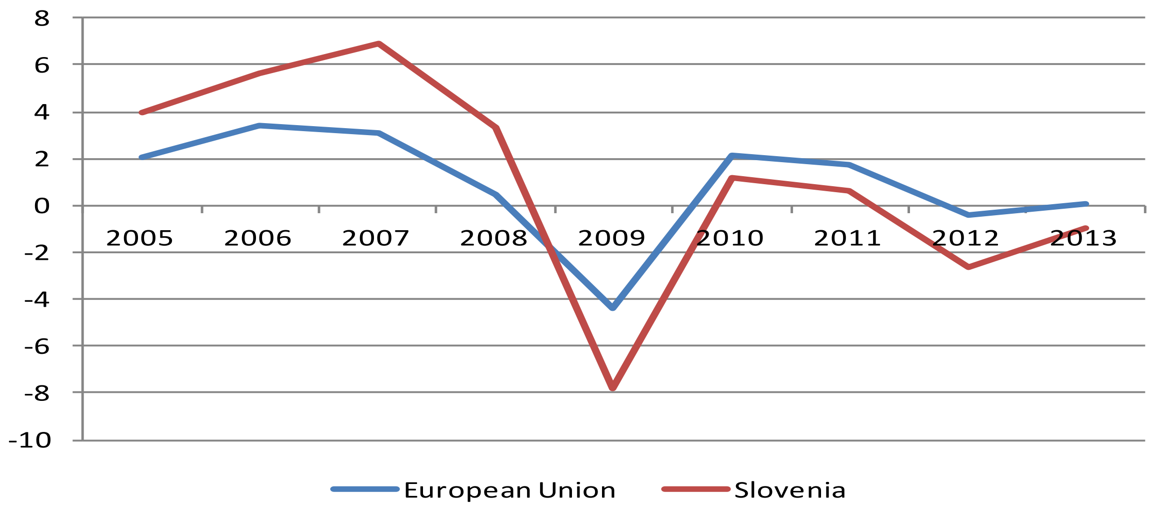


Figure 14.1: Annual GDP growth in %. Annual percentage growth rate of GDP comparing Slovenia and EU (%) based on local currency

Source: The World Bank

The GDP per capita in Slovenia has experienced a steady increase over the last years, significantly lower than the average EU GDP per capita though, but despite the economic and financial crisis this upward trend could lead to a higher energy use, provided that no clear decoupling is taking place and there are no structural reforms in the production.

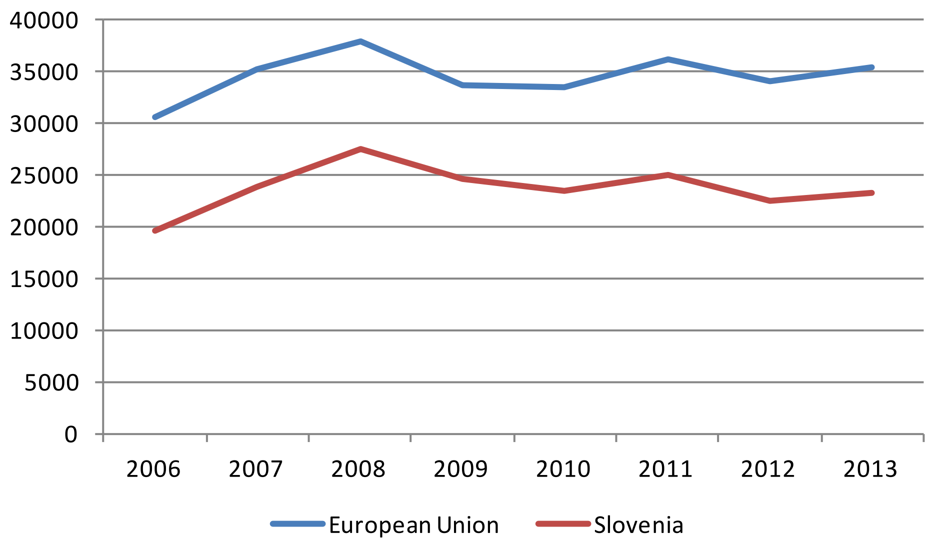


Figure 14.2: Annual GDP Growth Slovenia and EU per capita (US$)

Source: The World Bank

Despite the growing GDP per capita, Slovenia is experiencing a growing proportion of central government debt to the GDP, which is due to the financial crisis, and this can in fact reduce its possibilities for future public investments in energy efficiency. Nevertheless, the current proposed policy of EEOs in combination with the Eco-Fund [5], where the financing originates from a levy on fuels, electricity and gas could eventually facilitate such investments. Similar and much larger figures are also present in various Eurozone countries that are required to cut down public budget spending.

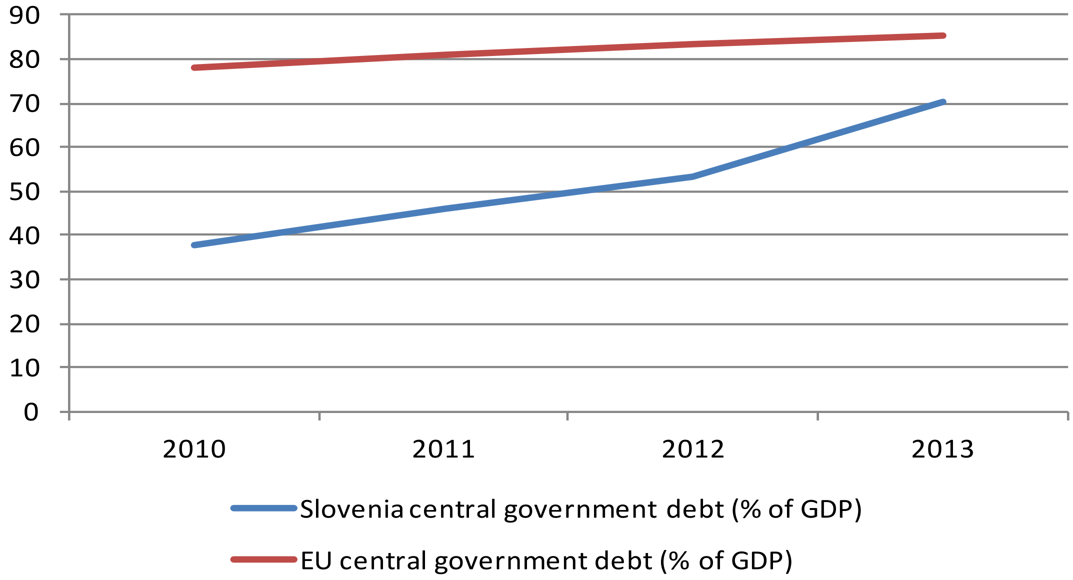


Figure 14.3: General Government Debt (% of GDP)

Source: Eurostat

In the final electricity prices for domestic users (residential, commercial, tertiary and industry sectors) there has been stabilization in these prices over the last years, after a 0.01 E/kWh increase since 2010, remaining still lower than the average retail prices of the EU 27. Eight state owned electricity suppliers have a market share of over 5% and there is a high market concentration at the retail level. The share of the network costs within the household prices was 47%, while energy and supply costs accounted for the remaining 53%. There is no regulation in end-use prices, and the switching rate among retailers is quite low (around 1.9%). The increase of the prices was also due to the increase in taxes and levies that took place and amounted to 0.16 E/kWh (including market price and taxes).

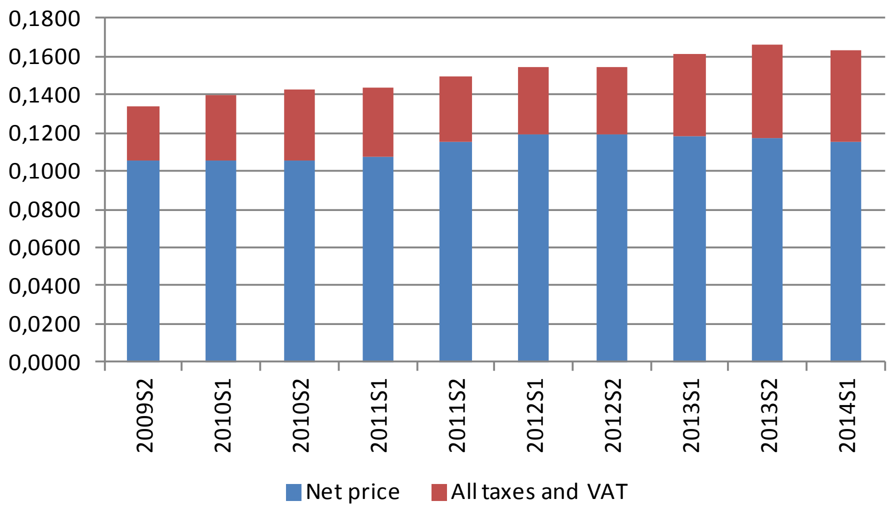


Figure 14.4: Electricity prices for domestic users in euro/kWh (including taxes and levies)

Source: EUROSTAT

Contrary to electricity end-use prices, the gas prices over the last couple of years have decreased and are at the same level with the average EU 27 retail prices. The market concentration in the retail market is quite high (60-65%) with one main supplier and 20 smaller ones, while the number of switches among different suppliers has increased with still a very low proportion of 0.1%. The volatility of gas prices is also a result of the average energy price changes as the end-use gas prices are not regulated. The levies and taxes imposed on the final gas prices increase the total price by 0.02 E/kWh equivalent. Still, Slovenia is ranked among the most expensive countries above the EU average in gas prices including taxes and levies.

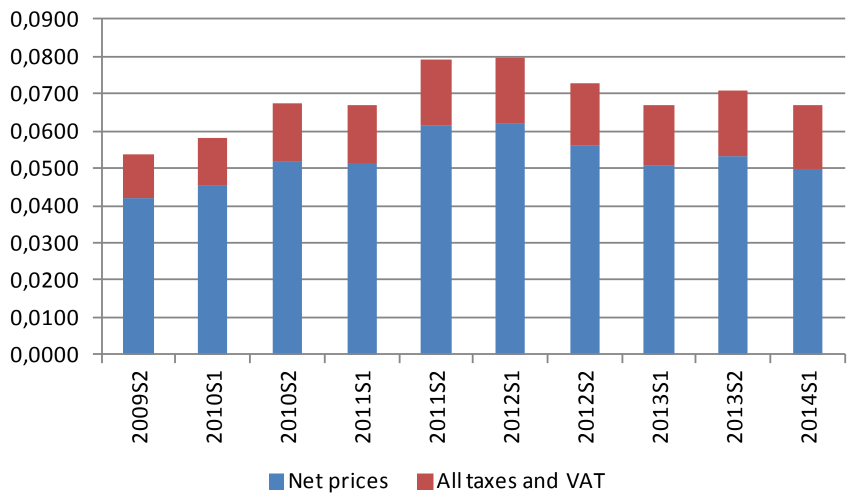


Figure 14.5: Gas prices for domestic users in euro/kWh (including taxes and levies)

Source Eurostat

As far as the energy dependence of the country is concerned, in 2013, 3.6 million toe of primary energy was produced in Slovenia, which is 0.4% more than in 2012. In comparison with 2012 the production of hydro energy increased by 18%, of geothermal and solar energy by 8% and of renewable energy by 4%. In the same period the production of solid fuels decreased by 2% and of nuclear energy by 4%. In the structure of supplied energy in 2013, , petroleum products prevailed with 33%, followed by solid fuels and nuclear energy with 20% each, renewable energy sources and natural gas with 10% each, hydro energy with 6% and geothermal and solar energy with 1%.

In 2013 less than half of supplied energy in Slovenia was imported, more specifically 47%. In the period from 2000 on the energy dependency reached the highest value in 2008 with 55%; it was the lowest in 2013. This range of changes in energy dependence, which is still above the medium, guarantees that energy efficiency policies should play an important role in the energy strategy of the country.

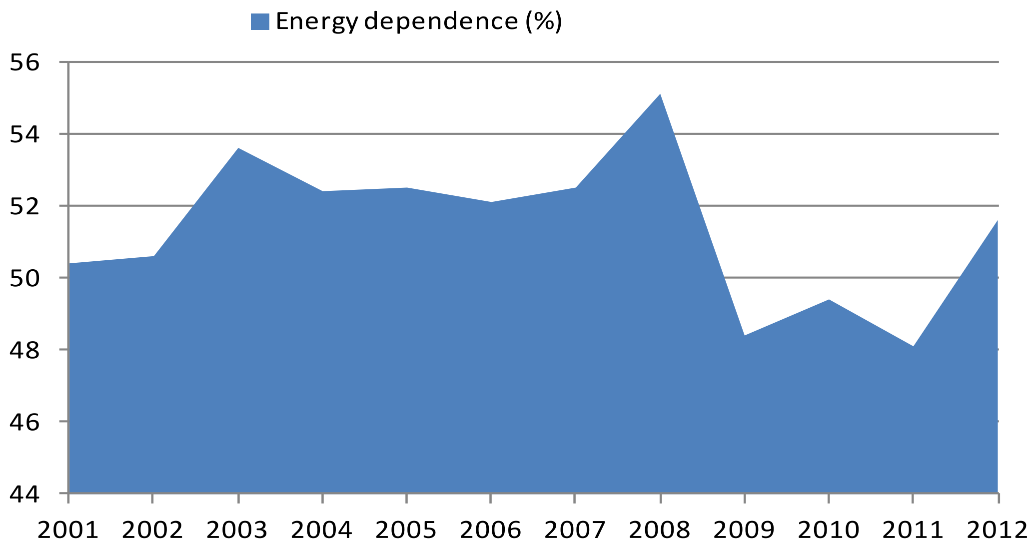


Figure 14.6: Energy dependence of Slovenia (%)

Source: Eurostat

Departing from the relatively high energy dependence, the electricity consumption in Slovenia has been decreasing up to 2009 with a steep increase over the last years, which also signifies the increase of the GDP (relative to energy use) and the lack of decoupling.

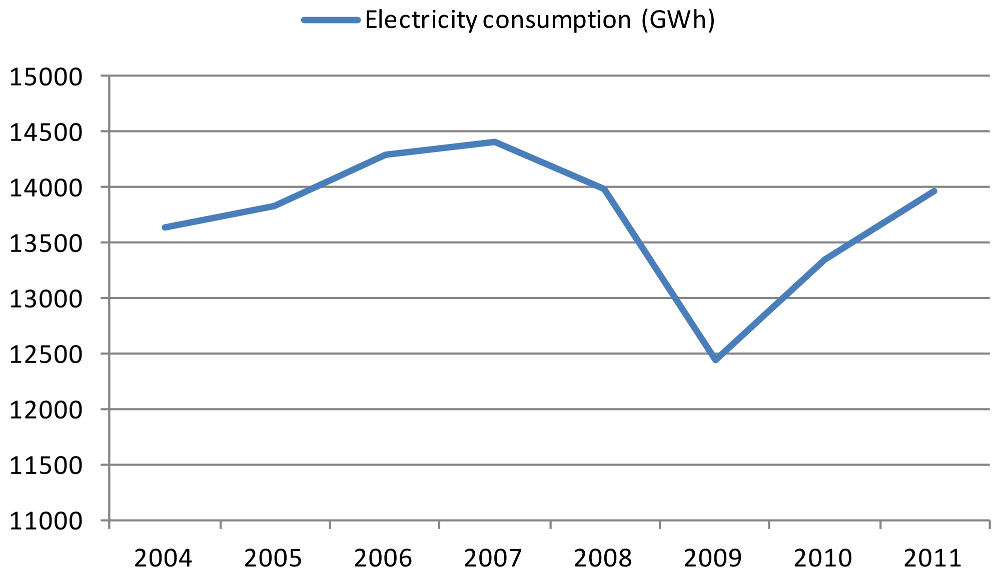


Figure 14.7: Electricity consumption (GWh)

Source: Eurostat

14.1.2 Evaluation of economic preparedness - Identification of financial challenges

Slovenia's economy can be considered as an average too weak within the EU28, with a GDP below the EU average. After the economic crisis the economy slightly recovered but it followed the same pattern of the EU Member States. The government, due to its increasing debt ratio might face issues in increasing the size of financing scheme via the Eco Fund in the future period [4]. If also an EEO scheme takes place, lots of the actions involved require large investments (such as retrofitting) and these need to be supported by the end users or via the government Eco Fund. The most important barrier has been the financial incapacity of the market, which was previously overcome by support programmes. The public sector – used to subsidies – has not found a practical way and trust in the ESCO solution to get really engaged, although there could be financial solutions available (JRC 2013).

Moreover it is not clear at this stage what proportion of costs will be finally passed on to customers from obligated parties. Cost recovery is thus not regulated in the Energy Act. The financing of measures as well as the cost recovery is up to the obligated parties. Since there is no real documentation on the effect of increased prices or costs to changing behavior or energy savings in Slovenia, the effects should rely mainly on the functioning of both schemes themselves. The growing energy dependence over the last years demands a larger share of the government budget for guaranteeing the energy security, and this signifies that energy efficiency policies can play a major role for achieving benefits in a cost effective manner.

14.2 Energy & Climate Change profile (Energy Savings' Potential)

In order to screen the profile of Slovenia in terms of energy and climate, we evaluate the general energy and climate state of Slovenia in relation to the EEO and the Eco-Fund schemes, by exploring the energy saving's potential under these schemes. The main indicators considered in this part of the analysis involve:

- Primary energy consumption
- Energy intensity of the economy that measures the energy consumption of an economy and its overall energy efficiency.
- Final energy consumption both by sector and in residential dwellings
- Energy efficiency gains in households and industry which is a metric for energy efficiency progress in each sector.

14.2.1 Description of Status quo

In this section we present Slovenia's state in terms of its Energy Savings potential with relation to the evolution of energy consumption trends and to the national targets set for 2020. Slovenia had a growing primary energy consumption expressed as a gross inland energy consumption excluding all non-energy use of energy carriers (e.g. natural gas used not for combustion but for producing chemicals) till 2011 and from then on the consumption is dropping. The increase (during the peak period) though in terms of primary energy is not so steep as in the case of electricity consumption itself. Overall, Slovenia has higher primary energy consumption than the EU average.

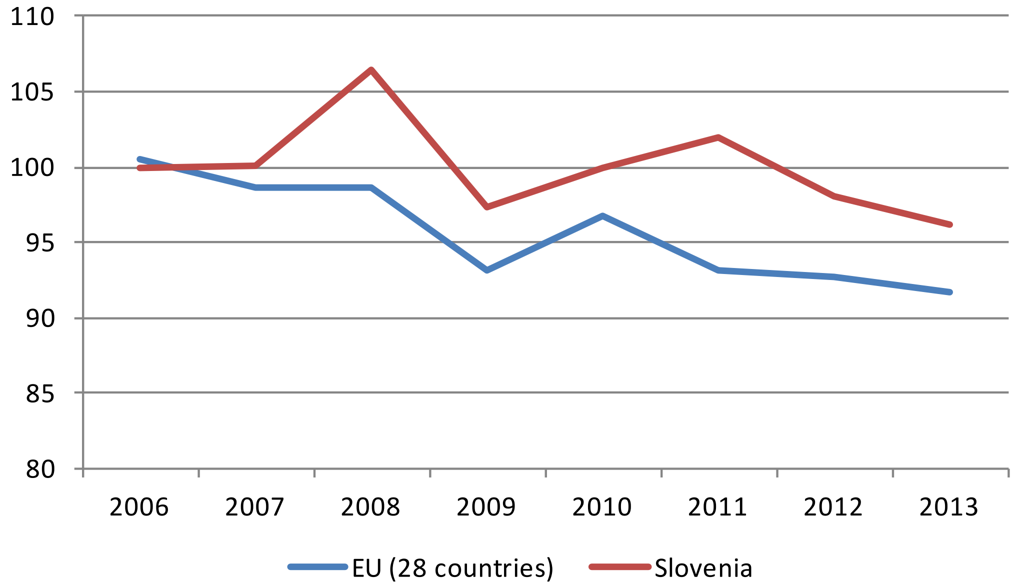


Figure 14.8: Primary Energy Consumption (Index 2005=100)

Source: Eurostat

The primary energy intensity of Slovenia decreased from about 340 ktoe/M€ in 2000 to 295 ktoe/M€ in 2010 or about -13% or -1.4%/year. The major decrease appeared in the period 2001-2007, where the intensity decreased from 355 ktoe/M€ to 292 ktoe/M€. The decrease of the final energy intensity was even more than 16% in the period 2000 - 2010 from 245 ktoe/M€ in 2000 to 206 ktoe/M€ in 2010 (i.e. -16% or 1.7%/year). The major decrease there appeared in the period 2000-2007 (-21%), but as a whole it is still a largely energy intensive economy compared to the EU average (ODYSSEE-MURE Energy Efficiency Policies and Measures in Slovenia 2012) [1]. The figure below presents the energy intensity expressed as the gross inland consumption of energy divided by the GDP (kg of oil equivalent per 1,000 Euros).

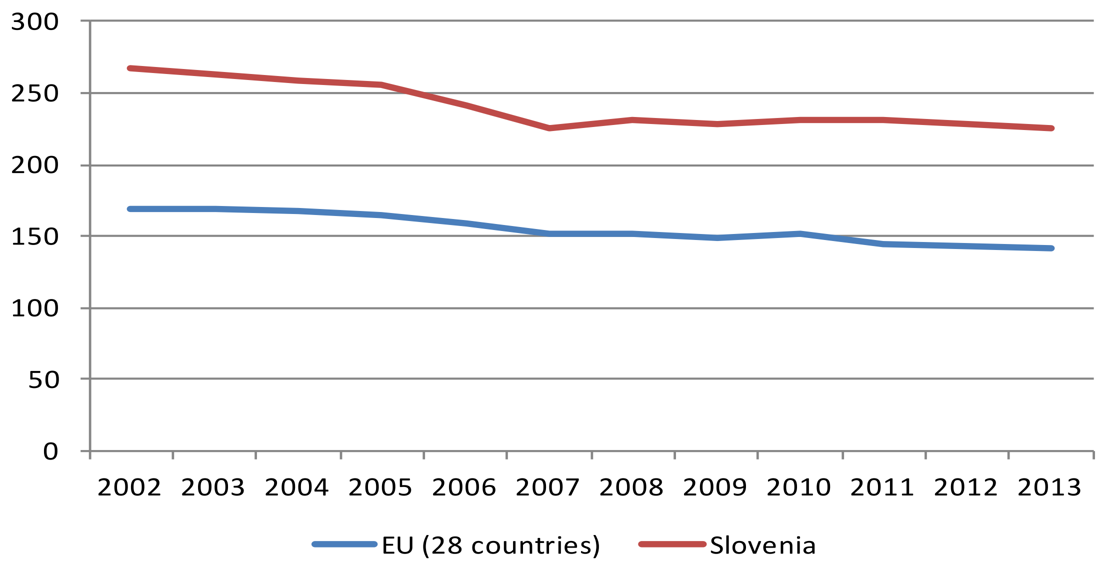


Figure 14.9: Energy Intensity of the Economy

Source: Eurostat

In terms of final consumption in the residential sector, there has been a stabilization and slight decrease over the last couple of years, which could be explained partly due to the financial crisis. The distribution of energy carriers in the energy services is predominantly wood fuels for space heating, space cooling and cooking, followed by electricity and extra light heating oil.

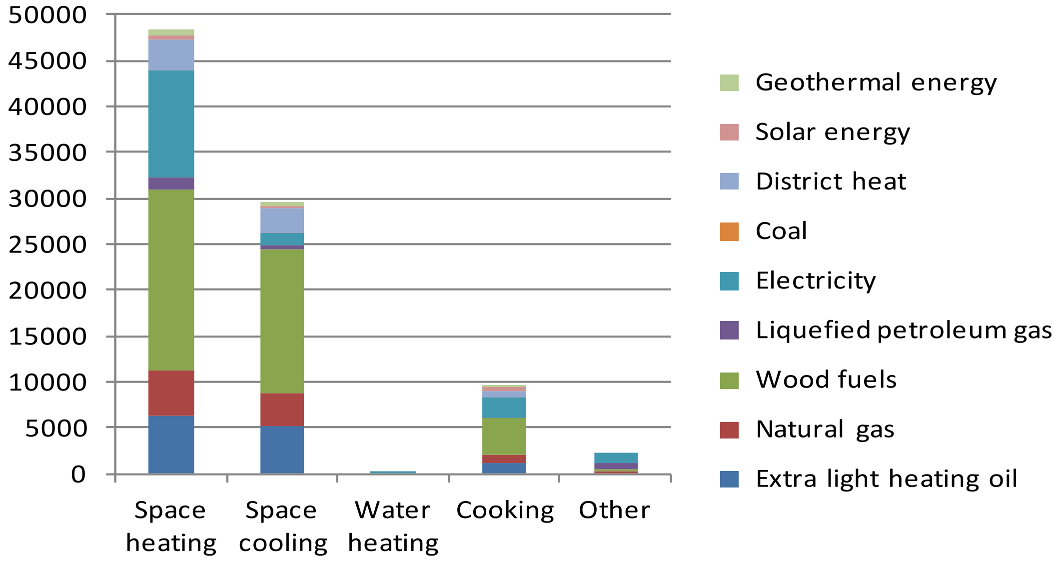


Figure 14.10: Distribution of energy carriers in residential sector

Source: SURS, calculation Jožef Stefan Institute – Energy Efficiency Centre (in TJ)

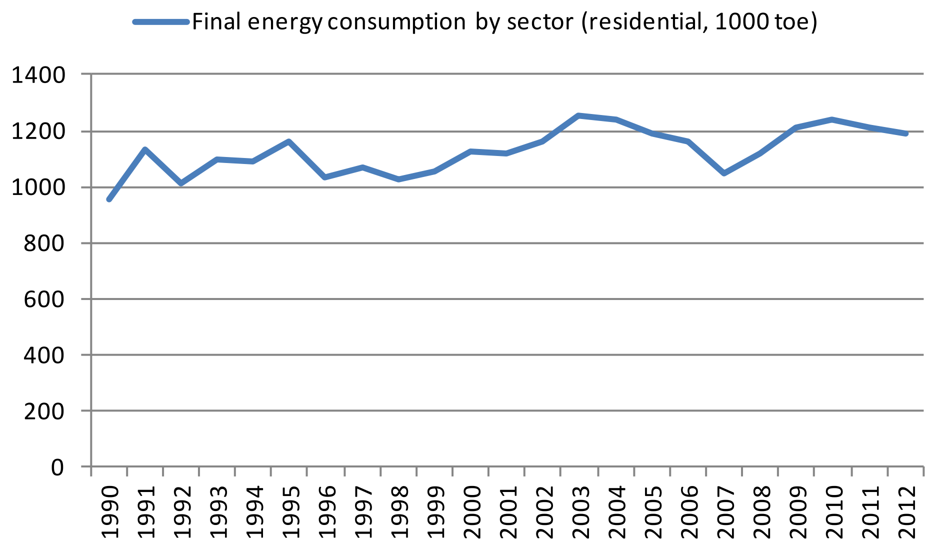


Figure 14.11: Final consumption of residential dwellings (with climatic corrections)

Source: ODYSEE-MURE

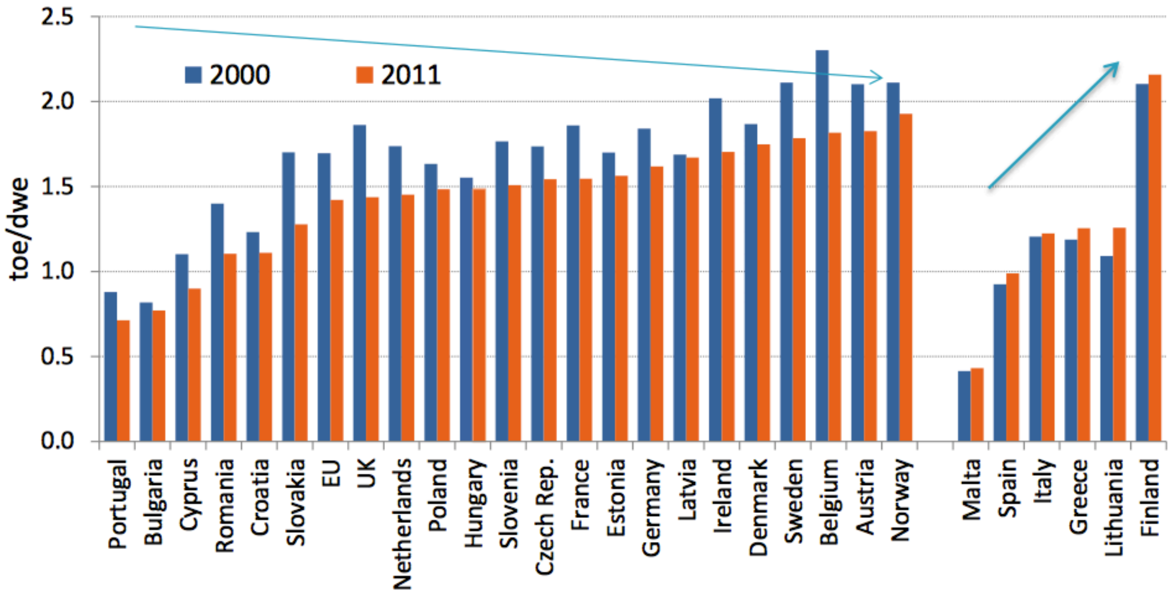


Figure 14.12: Average consumption per dwelling

Source: Enerdata

Taking into account the figures above expressing final consumption in households, we can derive the Slovenia's household sector has received its final energy consumption as an effect of the economic crisis and probably the introduction of new energy efficiency technologies, at a lesser extent. The main consumption is for space heating (900 ktoe) and at a much lesser extent cooking, lighting and electrical appliances (around 200 ktoe in total) (Al Mansur and Cesen 2012). Still, the energy consumption of this sector is considered to be close to the

EU average and there exists several possibilities for energy efficiency investments under the Eco Fund and the EEO schemes.

In the other sectors, Slovenia has its largest final energy consumption in the transport sector, followed by industry and services with a declining trend. This could indicate that the transport sector should definitely be considered in the EEO planning, and this will be addressed mainly by the inclusion of all transport fuels suppliers under the obligation.

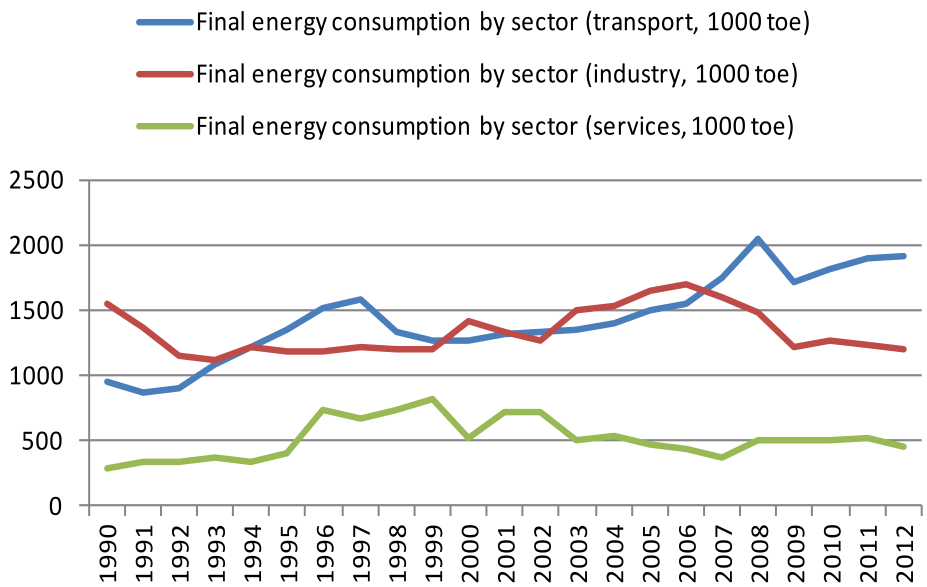


Figure 14.13: Final energy consumption by sector (industry, services, transport)

Source: Eurostat

Energy efficiency gains as a result of newer technologies have increased in all sectors over the last years. For households, they are calculated from unit consumption trends by end-uses and equipment and with a base year of 2000 they have increased to 25%.

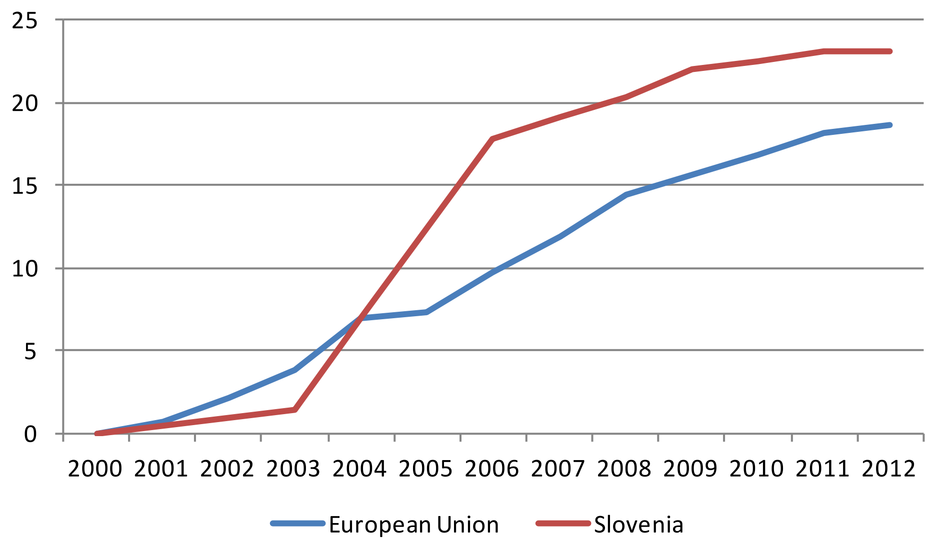


Figure 14.14: Energy Efficiency gains in households

Source: ODYSEE-MURE

Similarly, in industry, despite the downward trend and the energy efficiency losses of 2004 and 2005, the energy efficiency gains have increased up to 20% within the last years. The transport sector has been lagging behind, despite its upward trend (signifying higher gains over the years) and this could signal that energy efficiency actions are still to take place via the fuels obligations. In comparison to the average overall economy's (cross sectoral) gains, the industry sector is contributing majorly, while the transport sector generates much lesser gains.

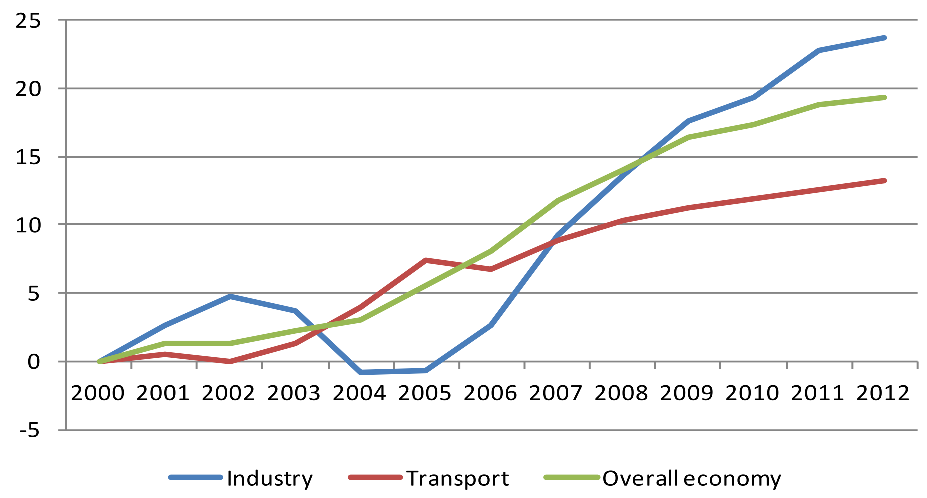


Figure 14.15: Energy Efficiency gains in industry, transport and overall economy

Source: ODYSEE-MURE

For the realization of the energy savings envisaged by the various policy measures and targets set by Slovenia (2nd NEEAP), public funds have been provided in the amount of EUR 502 million (for the 2011 - 2016 period), as follows:

- as part of the Operational Programme for Environmental and Transport Infrastructure Development 2007-2013 (OP ETID): funding from the Cohesion Fund and Slovenian own participation (EUR 161 million);
- surcharge on the network fee to support electricity generated from renewable energy sources and in high-efficiency cogeneration of heat and power (EUR 148 million);
- contribution for raising the efficiency of electricity consumption and surcharges for heat and fuel to raise energy efficiency (EUR 181 million);
- as part of regular items in the national budget;
- low-interest loans from the Eco Fund

Slovenia has set up a well-balanced policy package for buildings. To help citizens comply with these standards economic and financial support has been made available.

All these policies and programs targeted at various sectors, with a primary focus on the residential sector, and they have assisted in their early stages the achievement of energy savings. This trend is continuing up to the last year.

14.2.2 Evaluation of energy savings' capacity - Identification of challenges

The final energy consumption over the recent years due to the economic crisis has been relatively stable, and this has followed also the path of the slight reduction of energy intensity in the economy. These trends could signify that a possible decarbonisation, despite the high intensity could be on track.

Despite the existing policies that reduce primary energy consumption and the final consumption in households, there are still sectors that tend to increase the consumption, such as transport, and these would need to be captured by the planned policies (EEOs and Eco Fund).

14.3 Market preparedness

In order to identify how prepared the market is for introducing such policies, a description is required of the status quo of the Slovenian market in terms of energy efficiency performance, the structure of the energy market, the technical capacity in terms of expertise, certification/training procedures for energy operators as well as the ease of access to finance for beneficiaries (either individuals or enterprises, SME's).

The main indicators used in this section are:

- Electricity Market Structure
- ESCO's market Development
- Energy efficiency performance of the market
- SME Access to Finance Index, which depicts developments and access to funding resources for small and medium sized enterprises.
- Technical capacity and experience in technology.

14.3.1 Description of Status quo

In this section we present Slovenia's market in terms of energy efficiency performance and structure of the energy market, technical capacity in terms of expertise and access to financing for market parties that fall under the country's energy efficiency policies.

According to the Small Business Act (SBA) Fact Sheets, Slovenia's SMEs are still suffering from the consequences of the crisis to different degrees depending on the economic sector they belong to. More specifically, the manufacturing sector, although hit hard, has recovered slightly after 2009 but is still below the pre-crisis levels. The construction sector is still caught up in deep economic restructuring triggered by the shortcomings of the bank sector, which in turn has affected Slovenia's overall financial stability. As a consequence, in 2012, strong austerity measures were taken to correct the economy, which affected only slightly the SMEs access to finance. Financing from structural funds and third sources still remained and SMEs can make use of financing tools for facilitating energy efficiency investments.

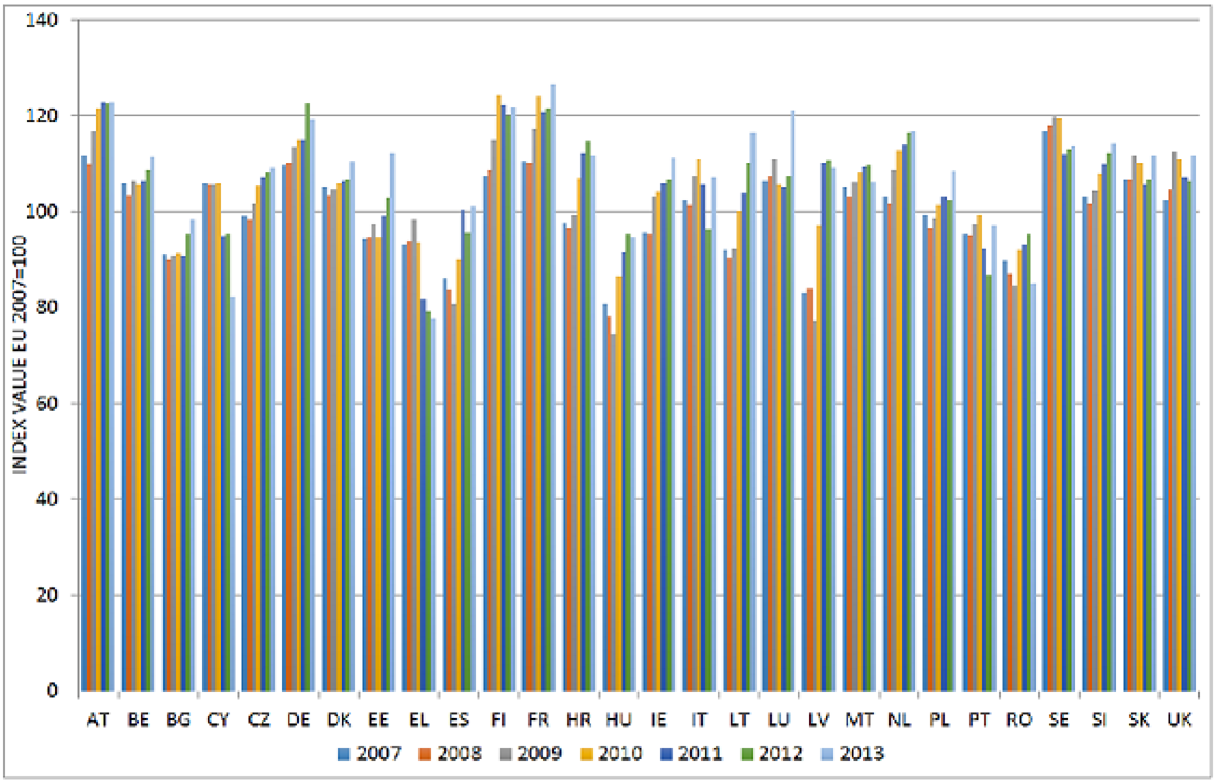


Figure 14.16: Comparison of SME access to finance (Index value 2007=100)

Source: European Commission

In comparison to the EU, the SME access to finance presents a more or less similar trend, as most countries face the same financial bottlenecks for financing investments in the private sector and in very few countries there are outstanding examples of broad financing.

The ESCO market in Slovenia consists of 5 SMEs predominantly focusing on district heating, lighting and cogeneration (JRC 2013). These companies normally offer financing linked with commercial banks and generate savings. In spite of the foreign interest in parallel, the ESCO market was not able to emerge successfully until recently (Bertoldi, Boza-Kiss, and Rezessy 2014; Marino et al. 2010) [2]. Marino et al. (2010) [3] expected a moderate growth as a result of active political attention on environmental protection, including building and lighting legislation, voluntary agreements linked to CO2 tax exemptions, and the use of structural funds to provide support for ESCO projects, amongst others. A further increase is expected in the coming years because of the increasing interest in energy efficiency due to the new policies envisaged such as the EEOs and the Eco Fund. Especially the proper functioning of the EEO scheme is based on the existence of ESCOs, which will facilitate the whole process of energy efficiency investments next to the obligated suppliers. The most important barrier thus far has been the financial incapacity of the market, which was previously overcome by support programmes. The public sector – used to subsidies – has not found a practical way and trust in the ESCO solution to get really engaged, although there could be financial solutions available. Another potential barrier is that the liberalization of the energy market is not yet complete, which could hinder ESCO development. Furthermore, while the construction sector is linked to ESCOs worldwide, in Slovenia due to the lack of financing the construction companies cannot invest in upfront costs and wait for the generation of income in the period ahead from the energy savings (JRC 2012).

The presence of monopolies in the energy market structure is also a determinant factor for the functioning of an EEO scheme and the Eco-Fund. In Slovenia, regarding generation, the state-owned group HSE has a dominant position with a market share of 62% (2011). Together with the state owned GEN Energija (26.4%) and TE-TOL (3.7%), the three undertakings have a market share of 92.5% forming a tight oligopoly. There are three regional markets in place under different prices for the retail sector, while Slovenia has also implemented a coupling of market with Italy with a limited price convergence due to interconnectivity and generation capacity differences. More in detail, in the retail sector there are 8 main companies of electricity supply, where the first two possess over 40% of the retail market (Council of the Energy Agency 2012) [6]. Still, these market shares show a relatively mildly concentrated market (taking into account the HHI index only during the last years a higher concentration ratio is observed). Given that the obligations of the EEOs fall under suppliers (of all gases), the relatively low concentration can still render the energy efficiency market competitive and act as a plus for optimizing costs on energy efficiency solutions.

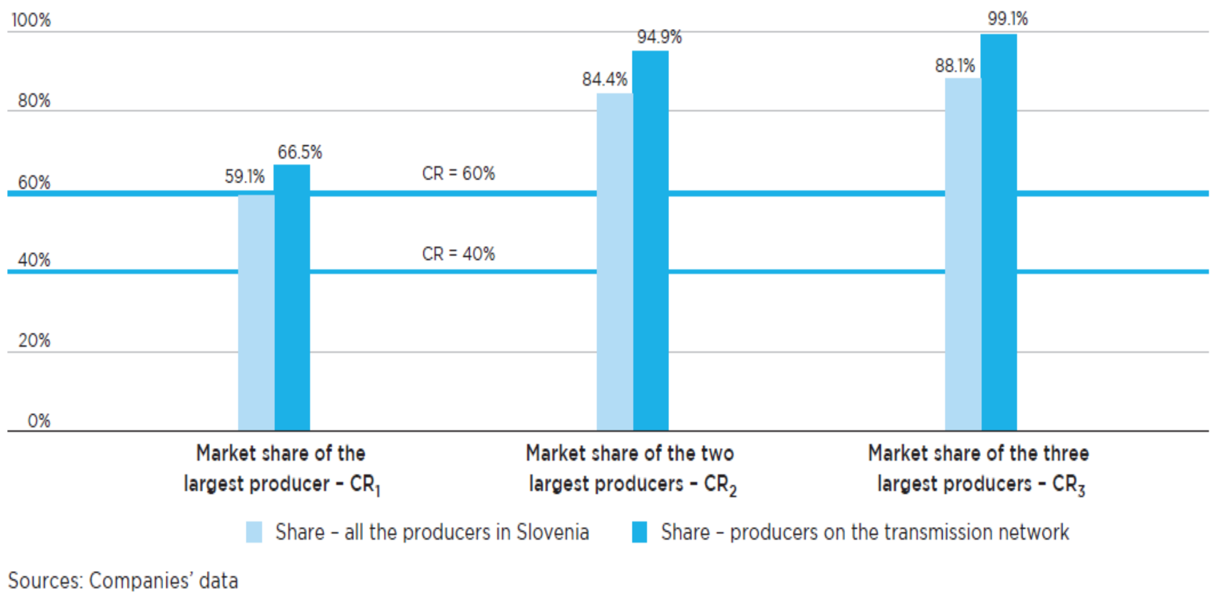


Figure 14.17: Cumulative share of the three largest producers with respect to the installed capacity

Source: Council of the Energy Agency 2012

Supplier	Supplied energy (GWh)	Market share
GEN-I	2,749.7	22.1%
Elektro Energija	2,743.5	22.0%
Elektro Maribor Energija plus	1,597.8	12.8%
Elektro Celje Energija	1,499.2	12,0%
E3	1,187.5	9.5%
HSE	886.4	7.1%
Elektro Gorenjska Prodaja	787.7	6.3%
Petrol Energetika	678.2	5.4%
Others	319.6	2.6%
Total	**12,449.6**	**100.0%**
HHI suppliers to all customers		**1,501**

Sources: Companies' data

Figure 14.18: Market shares of suppliers to all customers in Slovenia

Source: Council of the Energy Agency 2012

Within the EU project BUILD UP Skills (supported by the IEE) [8] surveys on the competence levels in regards to energy efficiency as well as the use of renewable energy have been conducted. The Energy Act defines obligatory qualification for assessors working on energy efficiency and performance certification. In principle highly skilled engineers with minimum two years of work experience can get accredited and every five years the assessor is reexamined. The quality assurance takes place via a desk audit of around 3% of the EPCs issued from a random sampling (BPIE 2014).

14.3.2 Evaluation of market preparedness – Identification of challenges

Departing from the aforementioned indicators, although Slovenia has compiled a comprehensive strategy for achieving energy savings, the existing market conditions seem to pose several bottlenecks. More in detail, the continuous diminishing of access to finance from the private sector, which is common in the EU nowadays is the strongest barrier against facilitating energy saving investments from suppliers or third parties. Furthermore, in the framework of a wider EU energy market, ESCO's play an important role in accessing final customers and implementing energy saving projects. In Slovenia, the number of ESCO's has been stable over the last years, while the negative feeling in the market originating from the mistrust from clients, the lack of appropriate forms of finance, and the public procurement rules are identified as the most common barriers to project development. Currently though, this trend is shifting and there is a growing interest in such companies, which could indicate that in the medium run with the creation of an ESCO association, the market will identify its best needs and opportunities and facilitate the implementation of an EEO scheme. In terms of market competition, eight electricity suppliers have a market share of over 5% and all of them are primarily state owned. Market concentration at retail level is relatively high and the market share of GEN-I is the highest, at 19.9%. In 2010, the annual switching rate in the retail market was 1.9% for households and 4.2% for the whole retail market. While there were no new suppliers on the electricity market, the natural gas supply market was swept by the entry of power supplier Gen-I in autumn 2012, increasing competition. Such a market concentration normally does not facilitate the implementation of an EEO scheme, although due its non provision for a certificate market, these suppliers could achieve their targets by carrying out energy savings in their customers or paying the relative amount to the Eco-Fund.

14.4 Administrative preparedness

At this section we analyze the general administrative system of the Slovenian government associated with the implementation of the EEO scheme while also looking at the following indicators:

- Government effectiveness
- Regulatory Quality

14.4.1 Description of Status quo

In terms of governance systems and their dynamics, Slovenia is presented as an average effective country, when taking into account two basic indicators: a) Government effectiveness and b) Regulatory quality. As far as government effectiveness is concerned, which in fact reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies, Slovenia possesses a medium strong governance. Furthermore, regulatory quality refers to perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Slovenia has a medium quality in regulatory services, which could inhibit private sector investment in the energy efficiency market. This lowering of regulatory quality could also signify that the implementation of a complex dual scheme (EEOs and Eco Fund) could demand higher effort from that administrative side.

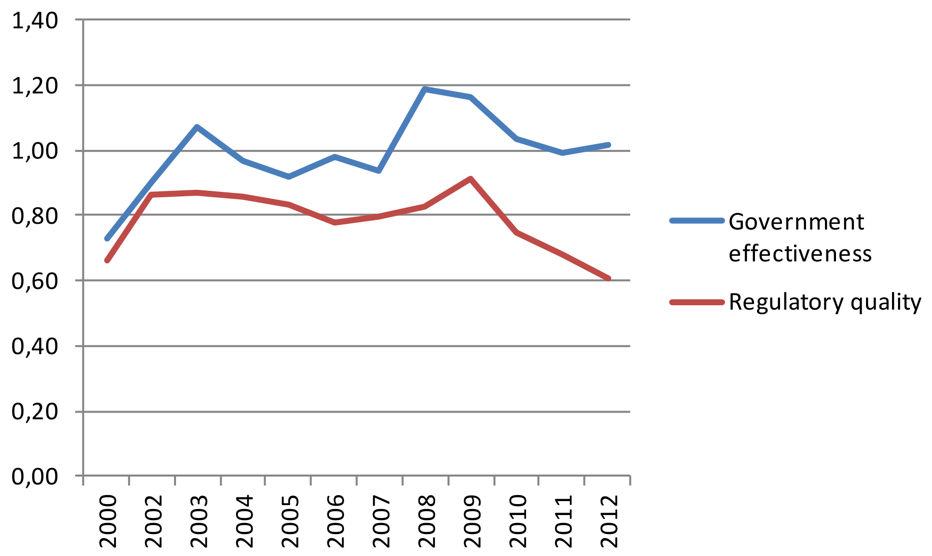


Figure 14.19: Government effectiveness and regulatory quality

Source: World Bank

14.5 Legislative preparedness

At this section, we consider the legislative preparedness of Slovenia in terms of implementing the obligation scheme within a suitable and comprehensive legislative or regulatory framework.

14.5.1 Description of Status quo

The Slovenian government has issued the Energy Act for the introduction of an energy efficiency obligation scheme that will contribute to the implementation of Article 7 of the EED Directive [10].

14.5.2 Evaluation legislative preparedness – Identification of challenges

The administrator of the EEO scheme who is also responsible for reporting and verifying energy savings is the Slovenian Energy Agency.

The verification of energy savings in the Slovenian EEO is ex-post and falls under the authority of the Slovenian Energy Agency. The Energy Agency will verify at least a statistically significant proportion and representative sample of measures to improve energy efficiency implemented by obligated parties (through direct measurements). For this purpose, no more than once a year at the Energy Agency's request obligated parties will submit aggregate statistical data on their final customers (also describing significant changes compared to the previous data set) and current data on end-use (such as load profiles, customer segmentation and geographic profile etc.). In essence thus there is no intermediate period defined for the EEO scheme but savings must be declared yearly.

The Slovenian EEO scheme is bundled with the Eco Fund, which will in fact provide grants to energy efficiency investments. From the current design of the scheme, there are gaps in terms of target setting, especially with the 25% exemption rule, and clearer definitions of this adjustment need to take place. As in most cases where obligation schemes are combined with financing, there is a substantial risk of policy overlapping, which could eventually create double counting. In the current notification, the methodology of calculating savings once is not strong and further efforts per measure are required. Furthermore, explanations on how the EEO will be implemented and how the measures will be introduced in the market is absent, as Slovenia has opted to leave the financing part and the market carry over the cost to the suppliers, and therefore experiences from other countries that have already started with EEOs should be extrapolated in the national design. As in most countries the methodologies for calculating energy savings need to be further elaborated alongside with additionality. In terms of market preparedness and in order to trigger energy efficiency measures from the beginning of the scheme, the penalties should be clearly defined, as they set a ceiling price to the energy efficiency (non-implementation) and they should be higher than the payment to the Eco Fund.

14.6 Social & Political acceptance/feasibility

In this section, we explore the social and political acceptance of the EEO scheme by looking at the following indicators:

- The Market Performance Indicator, which indicates to what extent the market brings the expected or desired outcome to final consumers.
- Level of fuel poverty within the country
- Social stance
- View of the industry

14.6.1 Description of Status quo

As far as the market trust is concerned, the top ranked service sector (from all services) is gas services, ranked 7.8 points and 14 places higher than at the EU27 level. The electricity sector ranks lower, but is still above the EU27 average, rendering the market trust as an important factor for energy savings.

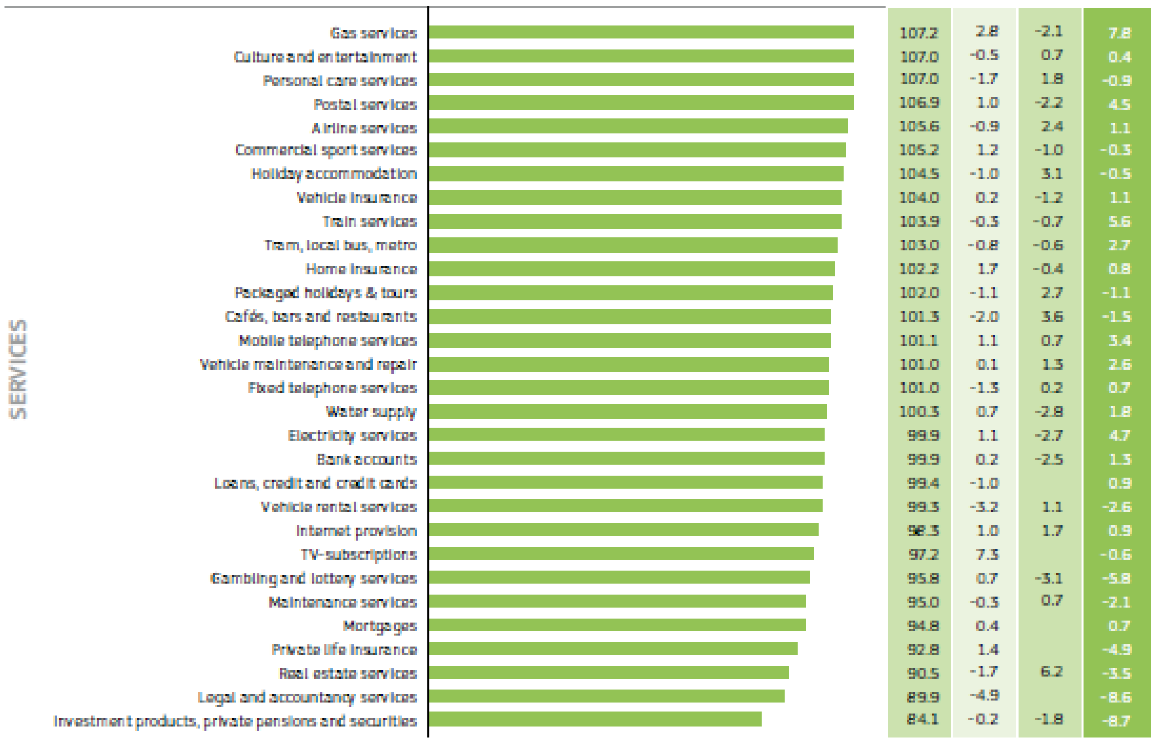


Figure 14.20: Market trust in services

Source: Consumer Markets Scoreboard [7]

Furthermore, the trust in the energy supplier can be considered as a proxy for the annual complaints the supplier receives for the quality of the services. From a research under the Council for the Energy Agency (2012) [6], it was demonstrated that the overall number of complaints received to all energy suppliers reduced over the years from 369 (2009) to 242 (2011), therefore showing that the quality of the services has been improved and there is a bigger market trust.

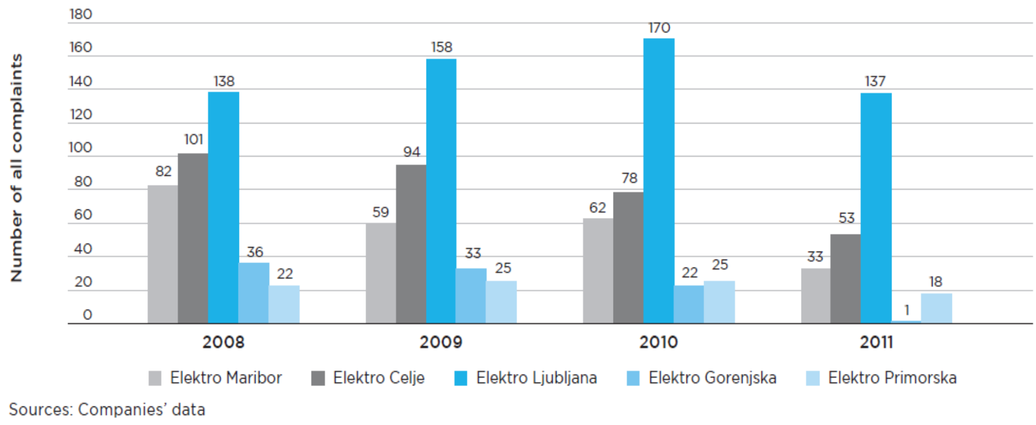


Figure 14.21: Number of complaints received to main companies for quality of voltage

Source: Council for Energy Agency 2012

According to the Household Budget Survey, in 2010 households in Slovenia spent on average 6.8% of their disposable income on electricity, gas and other fuels. Since 2000, when it stood at 6.7%, the share has not changed much; it was the lowest (6.3%) in the 2003-2005 period and the highest in 2010.

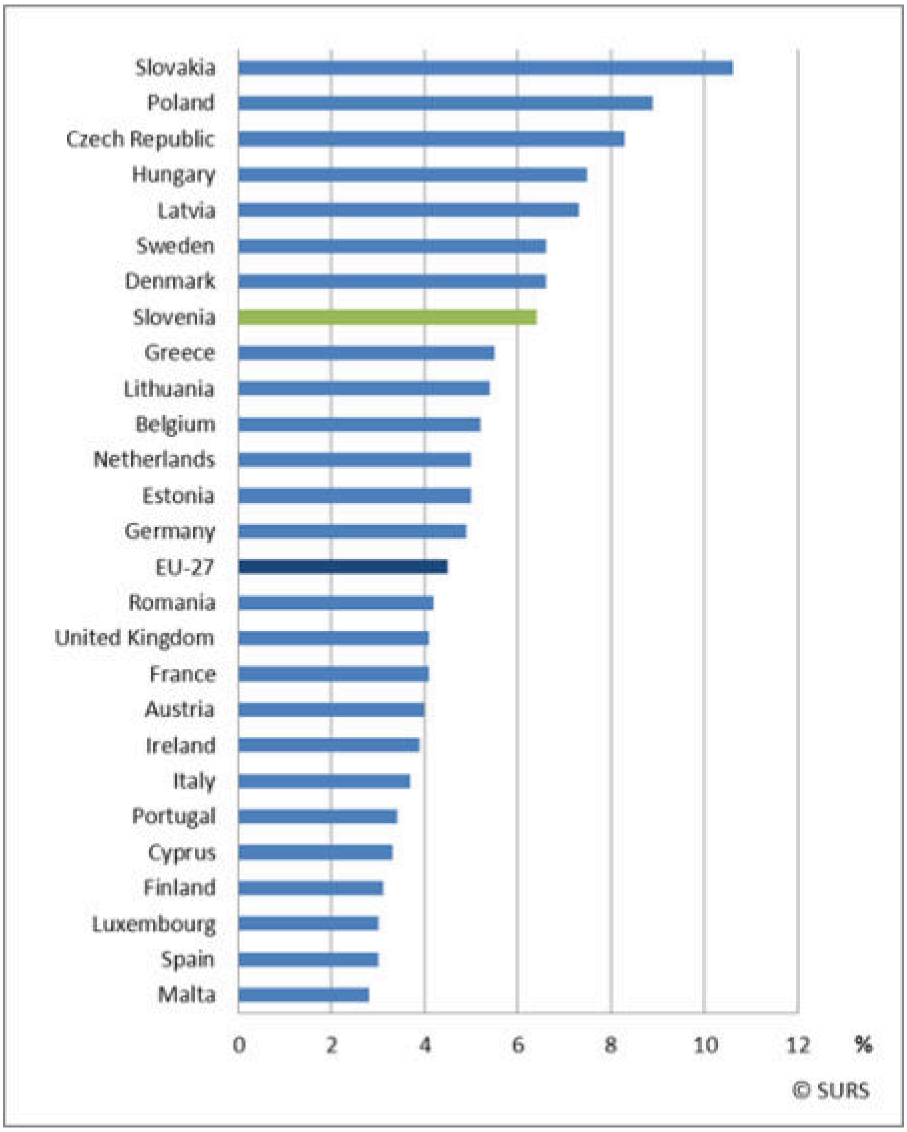


Figure 14.22: Expenditure for electricity, gas and other fuels as percentage of total household final consumption expenditure (2010)

Source: Eurostat

Due to growing prices of energy the issue of fuel poverty is becoming an alarming issue in Slovenia. Roughly speaking, about one third of the households in Slovenia suffer fuel poverty by the European definition). However, energy prices are not the only contributing factor. Also of relevance is the poor condition of buildings. 44,5% of low income families and 28% of families with higher income level live in humid and poorly maintained buildings (leaking roof, humid foundations, floor or walls, shattered windows). This means that in Slovenia fuel poverty could be widespread also in households that are not strictly poor (ACHIEVE project)[119]. This signifies an important parameter for the planned EEO scheme that should be taken into account.

Country	Arrears on utility bills (%)	Inability to keep home adequately warm (%)	Dwellings with leakages & damp walls (%)	Country	Arrears on utility bills (%)	Inability to keep home adequately warm (%)	Dwellings with leakages & damp walls (%)
Bulgaria	50.7	70	29.5	Estonia	20	9.6	30.3
Hungary	58.8	33.9	53	Belgium	14	18.8	26.2
Greece	54.4	47.6	21	Ireland*	27.5	12.5	16.2
Latvia	39.5	35.1	43.3	France	17.8	15.2	22.1
Cyprus	25.9	50.6	34.6	Czech Rep.	19.4	15.3	20
Slovenia	37.5	17.3	46.1	Spain	17.9	18.2	17.9
Italy	24.5	44.1	30.1	Slovakia	18.3	13.6	19.7
Romania	41.5	25.4	30	Netherlands	8.6	8.7	27.4
Lithuania	22.8	38.2	28.6	Germany	8.6	14.8	21
Portugal	14.5	43	28.4	Denmark	5.5	7.1	25.3
Croatia	40.9	21.8	19.9	Luxembourg	6.6	2.2	28.9
Poland	30.1	27.6	20	Austria	11.3	7.7	15.2
Malta	19.4	32.1	12.4	Finland	13.7	3.8	8.6
UK	20.3	19.4	21.4	Sweden	10.3	3.5	11

Figure 14.23: Percentage of people at risk of poverty affected by fuel poverty as reflected by three related indicators

Source: "Alleviating fuel poverty in the EU, investing in home renovation, a sustainable and inclusive solution", BPIE 2014, data based on Eurostat data 2012

14.6.2 Evaluation of social acceptance/feasibility – Identification of challenges

Fuel poverty and the possible increase of energy prices for the final energy consumers influences the fact that society can be skeptical about the planned EEO scheme. At this stage, since the financing of the scheme and of the energy efficiency actions are not defined, the most probable solution is that they will be carried over in the consumers' bills increasing thus the burden. The question remains to which extent this cost coverage will be undertaken by the end users. Low-income and/or fuel poor households will be affected as well. An open question is how to counteract fuel poverty and how the energy burdens of these households

[119] http://www.achieve-project.eu/index.php?option=com_content&view=article&id=13%3Aslovenia&catid=7%3Acountries&Itemid=23&lang=eeu

could be overcome by increasing the energy efficiency of the homes. Hence it is crucial that aspects as fuel/energy poverty will be taken into account when implementing the EEO and effectively addressed. Nevertheless if the costs for the EEO will be financed via the energy bill it is important to offer public funding via the Eco Fund.

REFERENCES

[1] Al Fouad, M., Cesen, M. (2012). Energy Efficiency Policies and Measures in Slovenia. ODYSSEE-MURE 2010, Ljubljana.

[2] Bertoldi, P., Boza-Kiss, B., Panev, S., Labanca, N. (2014) ESCO Market Report 2013. JRC Science and Policy Reports. Ispra, Italy: European Commission, Joint Research Center (JRC)

[3] Marino, Angelica, Paolo Bertoldi, Silvia Rezessy, and Benigna Boza-Kiss. 2010. "Energy Service Companies Market in Europe - Status Report 2010 -". Ispra, Italy: European Commission, Joint Research Center (JRC)

[4] Bijedic, A. (2013). ECO FUND's financial incentives for energy efficiency in buildings. EPEC EE Workshop: Energy Efficiency in Slovenia, Ljubljana

[5] Concerted Action Energy Efficiency Directive (2014). National EED Implementation Reports. IEE/CA/11/001/SI2.594052

[6] Council of the Energy Agency of the Republic of Slovenia (2012). Report on the energy sector in Slovenia for 2011. Ljubljana

[7] EC (2012) Consumer Markets Scoreboard - Making markets work for consumers. Directorate General for Health and Consumers, Brussels

[8] Intelligent Energy Europe, Programme of the European Union, October 2013, BUILD UP Skills – EU overview report, Staff working document, http://ec.europa.eu/energy/intelligent/files/library/doc/overview-report.pdf

[9] Ministry of the Economy, Energy Directorate (2011). Second National Energy Efficiency Action Plan 2011-2016. Republic of Slovenia, Ljubljana

[10] Ministry of Infrastructure and Spatial Planning (2015). Article 7 notification to the European Commission EU PILOT 5931/13/ENER. Republic of Slovenia, Ljubljana

The authors would like to thank Mrs. Jasna Blejc and Mrs. Alenka Domjan from the Slovenian Energy Agency and Mr. Gubina from the University of Ljubljana for providing comments to the Slovenian report.

15 SPAIN - UPRC

General facts and figures about Spain

Spain is situated in the southwest Europe, occupying 85% of the Iberian Peninsula. It is the second largest country in Europe after France [1]. It borders to Portugal to the west and to France and Andorra in the northeast along the Pyrenees. In addition, Spain comprises the Balearic Islands and the Canary Islands, located in the Mediterranean Sea and off the north-western coast of Africa respectively. as well as five places of sovereignty on and off the coast of Morocco: Ceuta, Melilla, Islas Chafarinas, Peñón de Alhucemas, and Peñón de Vélez de la Gomera. Spain is highly heterogeneous. It is divided into 17 autonomous communities, which are subsequently divided into 50 provinces. In addition, the African cities are also autonomous. Each community is legislative and administrative independent to some extent [2, 3].

Population	**47.737.941 (2014 est.)**
Surface Area	504.782 sq km^2

Spain joined the European Union in January 1986. Its labour force was estimated up to 23.2 million people in 2013 [2]. Its economy is mainly structured as shown in Figure 15.1. The main industries include textiles and apparel, food and beverages, metals and metal manufacturers, chemicals, shipbuilding, automobiles, machine tools, tourism, clay and refractory products, pharmaceuticals and medical equipment. Spain has also abundant natural resources with coal dominating, but also including lignite, iron, copper, lead, zinc, mercury, hydropower, gas and uranium [2].

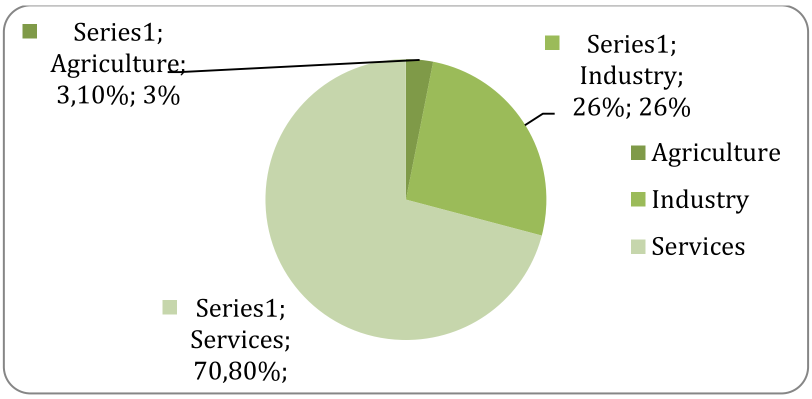


Figure 15.1: Spanish GDP by economic sector (2013 est.).

Source Index Mundi

Below we present a number of indicators that can provide us with a contextual overview on the environmental, economic and socio-political state of Spain in view of the eminent adoption of the EEO scheme.

15.1 Economic profile

At this section, we consider the economic indicators from the following domains:

1. Gross Domestic Product (GDP),
2. Central Government Debt,
3. Electricity and gas prices and
4. Energy Dependence.

15.1.1 Description of Status quo

During the past few years (2008-2014), Spain experienced a deep financial crisis, as a result of the Eurozone crisis. The crisis led to unemployment rates (26,1% end 2013[4]), the building market crash and the bankruptcy of major companies.

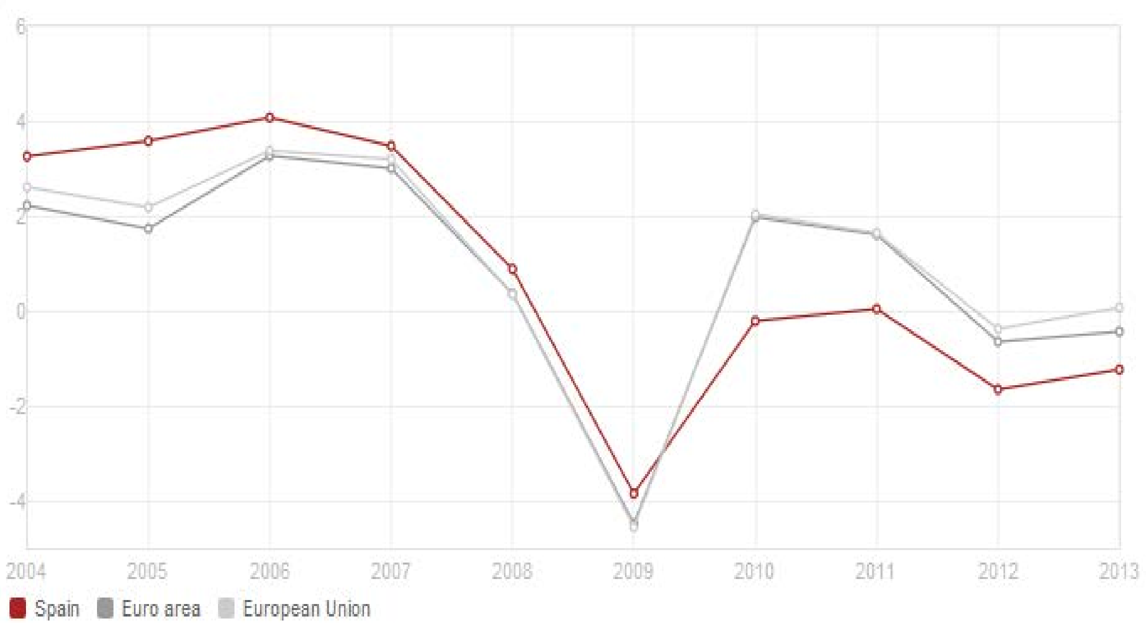


Figure 15.2: GDP growth (annual %) Annual percentage growth rate of GDP at market prices based on constant local currency

Source: World data bank

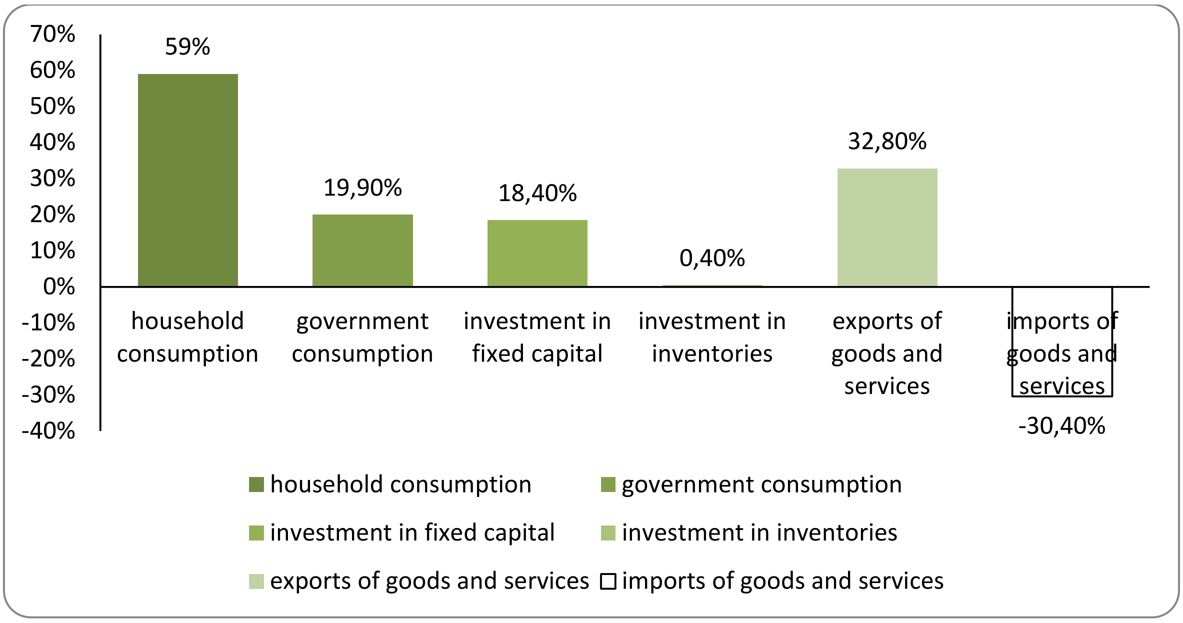


Figure 15.3: GDP composition by end use (2013)

Source: Index mundi

At the end of 2013 there were positive signs regarding the prospect of halting the recession and stabilizing the Spanish economy to growth. The rate of decline in GDP has been decreasing and even a positive growth at the last quarter of the deemed year was observed. The striking reversal of the current account deficit, the gradual disinflation (from 2.8% in January to 0.3% in December) and the slight decrease of unemployment rate (although it remains at very high levels) are also some main facts that should be considered. The evidence so far for 2014 indicates that the positive performance of the economy (GDP growth of 0.4% in the first quarter) will be maintained. According to estimates by the Central Bank of Spain, economic growth will likely be established in the period 2014-2015, with annual changes of 1.2% and 1.7%, respectively [5]. A temporal depiction of Spain's GDP growth is shown in Figure 15.2, where it is obvious how the deep financial crisis that culminated in 2009 has affected Spain's economy. However, it seems that the Spanish economy shows significant signs of recovery during the last couple of years, following the general European trend.

The construction sector has shown a significant decreasing trend over the period 2007 – 2012 (figure 15.4). However the negative growth rate of 9,6% is projected to be restrained to -4,4% in 2014 and a positive growth rate is estimated over the year 2015 [5]. This is considered to be a significant opportunity for the energy efficient actions planned to be implemented within the building scope of the EEO scheme, which is one of the main axes of the measures to be implemented in order to fulfil the obligation [6, 7].

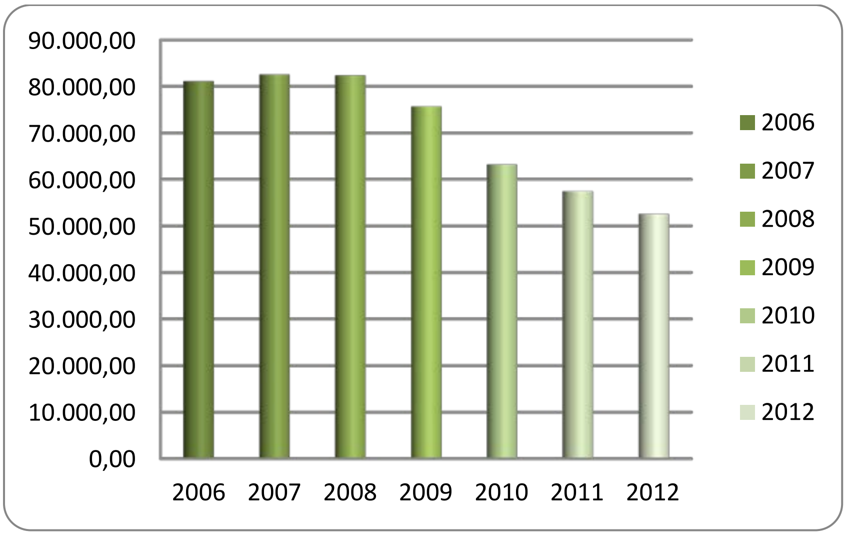


Figure 15.4: Value added of the construction sector, Spain (M€)

At the same time the Spanish central government debt (Figure 15.5) has increased since 2007, due to the financial crisis. Taking into account the fact that the general State budget is expected to be one of the main sources to finance the Energy Efficiency National Fund [6], great risks exist regarding the dispatching of necessary funds, for energy efficiency actions.

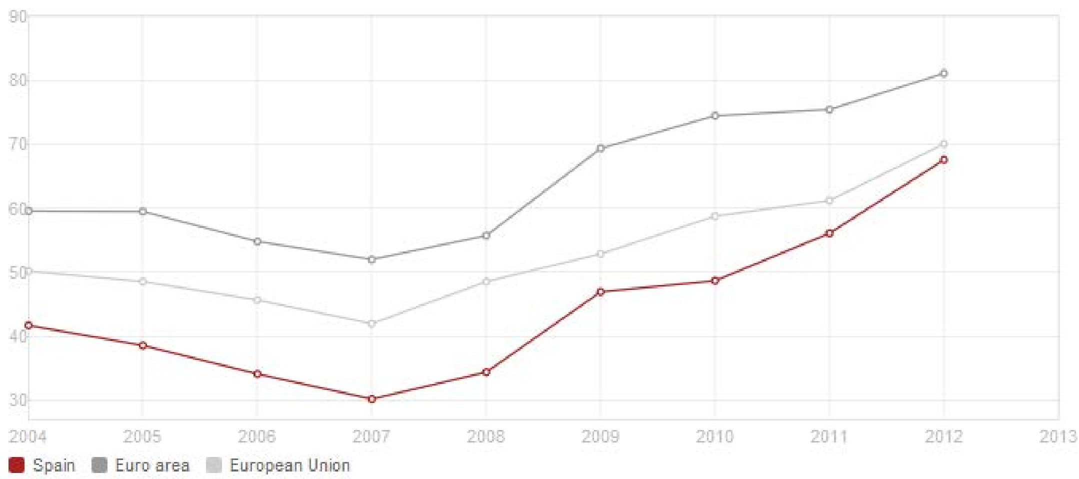


Figure 15.5: Central government debt, total (% of GDP)

Source: The World Bank

Another important component affecting the current Spanish economic status is the sentiment of the global markets. The recent report from the International Monetary Fund (IMF) has confirmed signs which indicate that, in spite of the remaining barriers, it is possible for Spain to overcome the recession [10]. This fact has in turn allowed Spain to get finance on more favorable terms than the previous years [5]. The timetable for achieving the fiscal adjustment and the reduction of government deficit below 3% was extended to 2016, giving a margin for policy implementation minimizing the negative impact on economic growth.

Moreover as indicated by recent studies, energy-pricing structures in Spain often do not reflect the full (environmental) costs, affecting the profitability of energy efficiency investments [11]. As far as the electricity and gas prices are concerned, Spain was one of the most expensive European countries in 2013, despite the crisis. As a matter of fact, both electricity and gas prices for domestic users have been increasing since 2009 and Spanish market's prices are in most of the cases above the average price for EU-28 (figures 15.6 and 15.7). High-energy costs are nevertheless envisaged by the Spanish government to encourage final consumers to cooperate with the obligated parties in implementing energy efficiency measures in order to reduce energy consumption [6]. It is noted that a tax-related mechanism (Law No 15/2012 on fiscal measures for energy sustainability) is already in place since January 2013 giving the appropriate prices to final consumers in terms of encouraging the rational and efficiency use of energy.

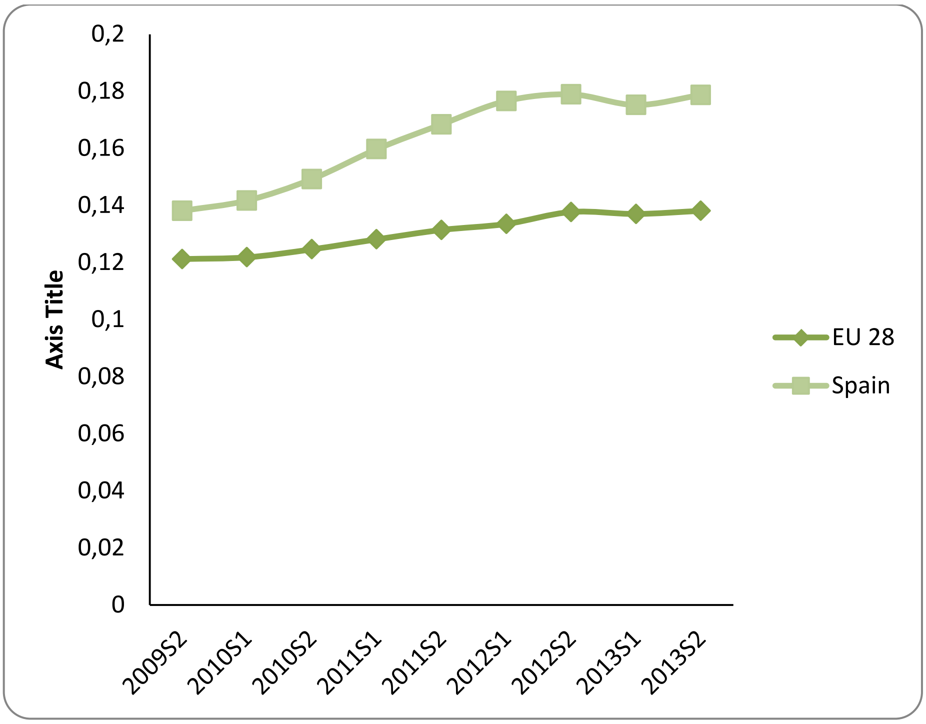


Figure 15.6: Electricity prices for domestic users in Spain (€/kWh).

Data source: Eurostat

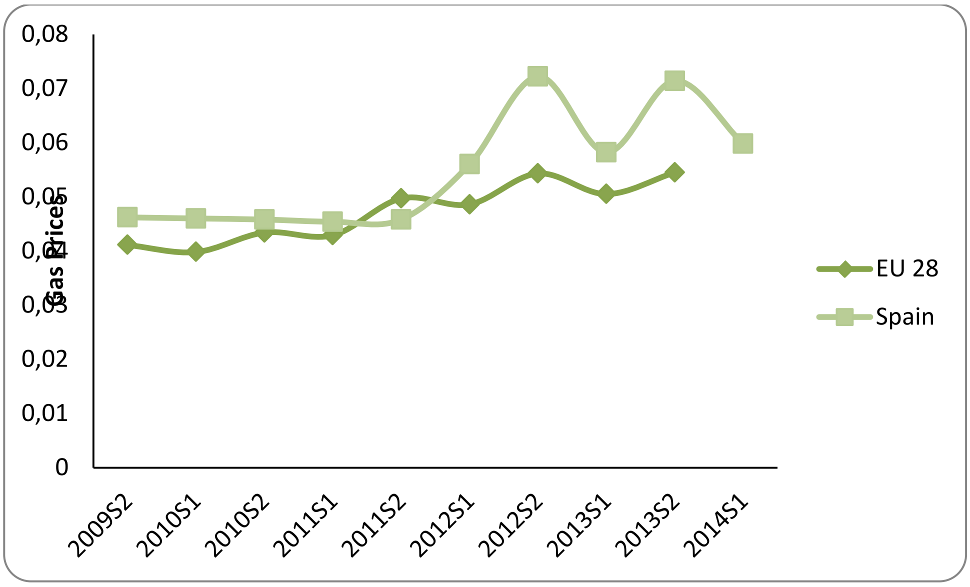


Figure 15.7: Gas prices for domestic users in Spain (€/kWh).

Data source: Eurostat

Last but not least, another factor relevant to national energy efficiency is energy dependence. At EU –28 level, external energy dependence remained at over 50% in 2010. On the contrary in Spain, the economic crisis has moderated the energy dependence (figure 15.8) due to the reduction in energy demand and in energy imports [8].

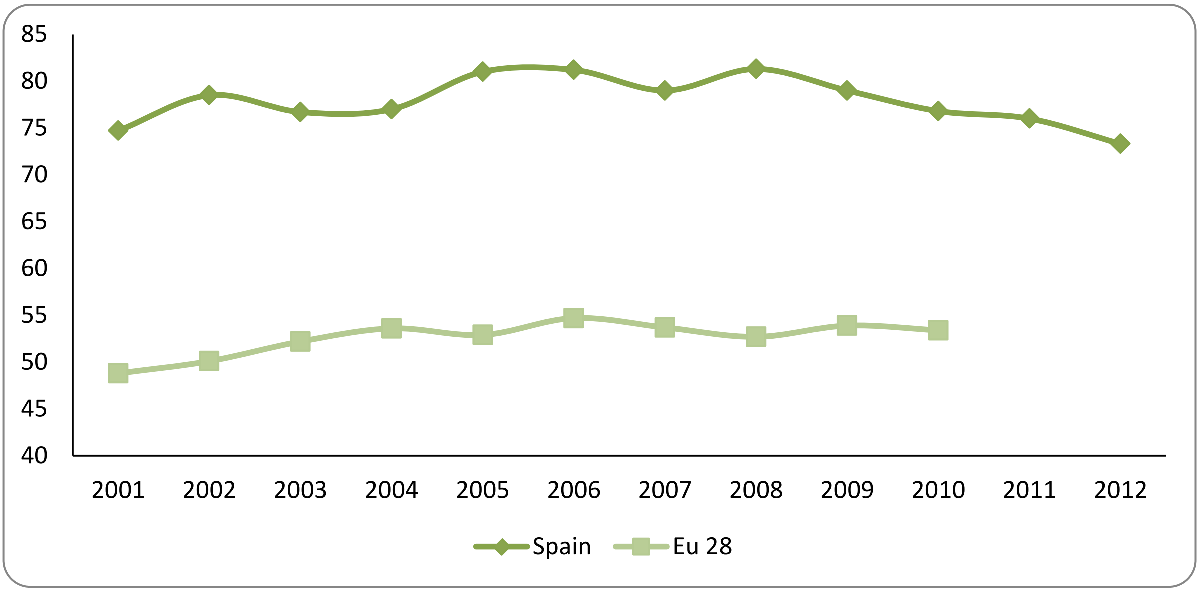


Figure 15.8 Energy dependence (%)

Data Source: Eurostat.

As shown in Figure above, the energy dependence indicator experienced a gradual decrease in Spain since 2008. However, Spain's vulnerability to energy supply has been always higher than the EU average. This is because Spain remains a net oil and gas importer with its energy mix mainly relying on hydrocarbons. As a result improving energy efficiency becomes even more critical in order to decrease its dependence on imported energy sources and also improve the balance of payments [12].

15.1.2 Evaluation of economic preparedness - Identification of financial challenges

The current economic state of Spain sets significant challenges and barriers in the implementation of the EEO scheme. As highlighted in the update of the notification report for Article 7 by Spain in June 2014, "the target calculated under Article 7 is ambitious and difficult to achieve in an unfavorable economic climate". Specifically, the EEO scheme implementation may confront significant barriers as far as access to finance is concerned. Most of the EEOs' actions (like building retrofitting which is the main axe of measures addressed to households) demand large investments and have long pay-back periods. However, solutions with payback periods higher than 10 years are not considered appealing by end-users [9]. In addition, the lack of long-term credit from banks, as a result of the unfavorable investment climate, obstructs the access to finance and makes investments in energy efficiency projects even more difficult.

Addressing the requirements under Article 7 of the Energy Efficiency Directive, an Energy Efficiency National Fund will be created, supporting energy efficiency savings with medium and long-term periods and it will be implemented through subsidy programs, preferential funding and guarantee funds [8]. However, funding options for small size projects are not yet eligible under the fund according to the national notification reports. This financing insecurity, combined with the already perceived high risks of those projects [8, 9], are likely to put off investors' and banks' interest in the Spanish building sector, the main target sector of the EEO scheme.

The poor economic state of Spain arises significant concerns about the total amount of funds that may eventually be available to support the implementation of the obligation. Additionally, the too generous subsidies to renewable electricity producers during previous years has resulted to an accumulative deficit in the national account funding RES which at the end of 2012 already amounted to € 24 billion and continues to increase [5].

Moreover it is still very uncertain whether the obligated parties, especially companies, will be able to fulfil their obligations by paying the financial equivalent, after the exclusion of the certificate mechanism of the first two months of scheme's implementation.

To conclude, evident funding risks may be counterbalanced by the current design of the scheme, stipulating that obligated parties will only have the buy-out option in order to comply with the scheme, securing the operation of the Energy Efficiency National Fund. Finally the mechanisms' cost-recovery principles bound to influence the operation and funding of the scheme, are still to be determined. Existing barriers in terms of end-users reluctance to invest in combination with rising energy prices and difficulties in access to finance could potentially be offset by the alternative measures to be implemented in combination with the EEO scheme.

15.2 Energy & Climate Change profile (Energy Savings' Potential)

At this section, we evaluate the general energy and climate state of Spain in relation to the EEO scheme's exploring the energy saving's potential (Table 15.1). The main indicators considered in this part of the analysis involve:

- Primary energy consumption
- Energy intensity of the economy that measures the energy consumption of an economy and its overall energy efficiency.
- Final energy consumption both by sector and in residential dwellings
- Energy efficiency gains[120] in households and industry, which is a metrics for energy efficiency progress in each sector.
- Distance to target in terms of primary and final energy that measures the savings needed to be achieved in order to fulfil the target set, expressed in ktoe.

15.2.1 Description of Status quo

The Spanish energy and climate policy status involves both encouraging and unsatisfactory elements. As aforementioned the Spanish energy mix consists of nuclear, hydro, coal, combined cycle gas and renewable energy sources [13]. In 2011, the share of renewable sources in gross final energy consumption was 15.1 % (13 418 ktoe), while the indicative target for 2011-to-2012 period was 11.0 %, and mainly consisted of onshore wind (29 %),

[120] Energy efficiency gains are calculated from ODEX (a value of ODEX equal to 90 means a 10% energy efficiency gain) and reflected efficiency gains since 2000. ODEX in industry is calculated from unit consumption trends by branches, by aggregation of unit consumption indices by branch in one index for the sector, on the bases of the current weight of each branch in the sector's energy consumption.

solid biomass for heat (28 %) and hydropower (20 %) [14, 15]. While, from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 8.5 %. In order to reach the 2020 target, an average annual growth rate of 4.8 % is needed during the period between 2011 and 2020. This corresponds to 0.9 times the cumulative effort up to 2011. In this framework, Spain promotes the use of solar heating systems and heating with biomass, as well as geothermal energy in the domestic, commercial and public sectors, aiming to increase self-sufficiency. In the industrial sector subsidies for the use of biomass as a fuel are also available.

Table 15.1: Progress towards 2008-2012 Kyoto target (Mt CO2 equivalent) [15]

2008-2012 average non ETS emissions	**223.3**
2008-2012 average non ETS target	181.0
Gap to target (domestic emissions- target)	42.3
Expected effect of carbon sinks	-11.3
Planned Use of flexible mechanisms	38.8
Issued emission reduction units	-0.1
Overall Gap to Target	-7.7

In addition, Spain is on track towards its Kyoto target as depicted above (Table 15.1). In 2012, total GHG emissions for Spain were 346.1 Mt CO2 equivalent, which correspond to 7.7% share of GHG emissions in total EU-28 emissions. Spanish government intends to close the gap between emission of 2008-to-2012 and its target by acquiring a number of Kyoto units equivalent to 13 % of base-year emissions per year. As far as the European Union Emissions Trading System (EU ETS) is concerned, in 2011 in Spain 1,172 stationary installations were included in the ETS and the share of ETS emissions amounted to 38 % of the total emissions. Spain corresponded towards its 2013 Effort Sharing Decision (ESD) target set on 228.9 Mt CO2 equivalent. Projections show that with the existing measures 2020 emissions will be higher than the 2020 ESD target (208.6 Mt CO2 equivalent) [15].

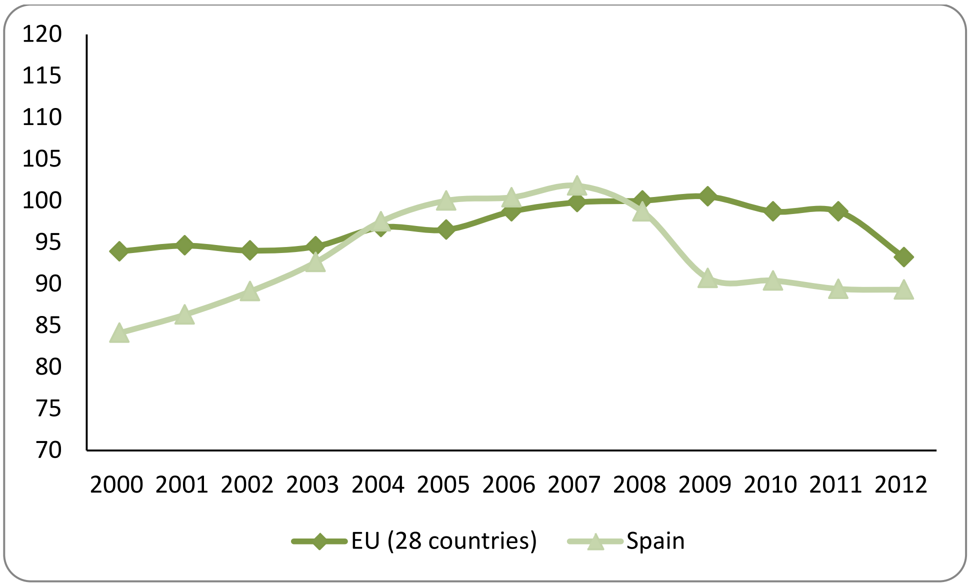


Figure 15.9 Primary energy consumption (MTOE)

Source: Eurostat (2012)

Primary energy consumption in Spain has decreased in the past few years merely due to the above-mentioned actions, but mostly owing to the effects of the financial crisis, and relatively less to other factors like new final use technologies. Over the period 2007 to 2012, there was a 10% decline (figure 15.9).

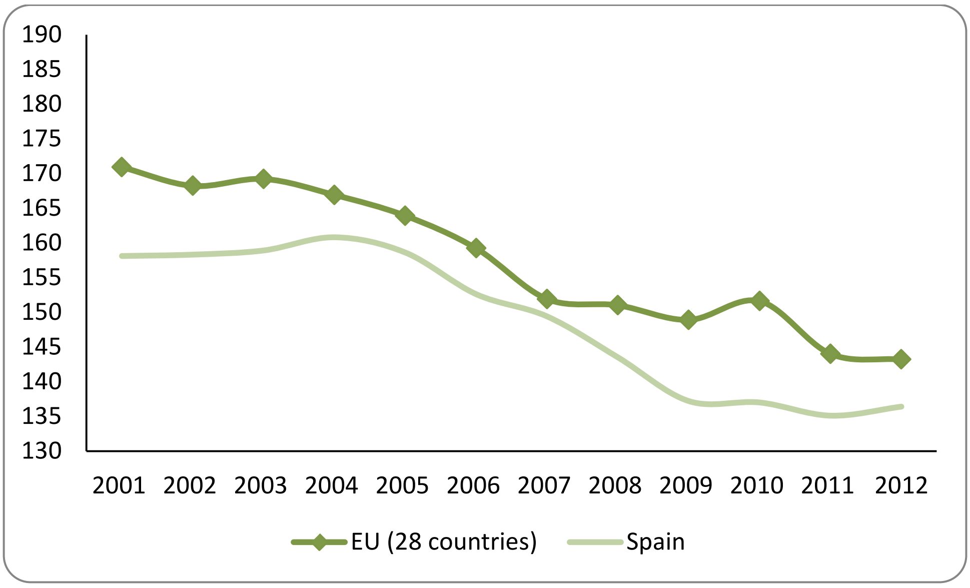


Figure 15.10 Energy intensity of the economy (kg of oil equivalent per 1 000 EUR)

Source: Eurostat. (2012)

The energy intensity of the Spanish economy remains lower than the European (EU 28) average despite the fact that the target for an annual 2% reduction in energy intensity set in the first National Energy Efficiency Action Plan (NEEAP) for the period 2008- 2012 was not finally achieved. The decreasing trend of energy intensity in Spain (Figure 15.10), following the overall European (EU -28) trend (even though at a slower pace), is a proxy measure for energy efficiency improvements, mainly taking place in the industrial sector, which contributes the most to the lower energy intensity of Spanish economy. Although more ambitious energy efficiency gains' targets were set in the sector that were not entirely fulfilled (figure 15.11) [16].

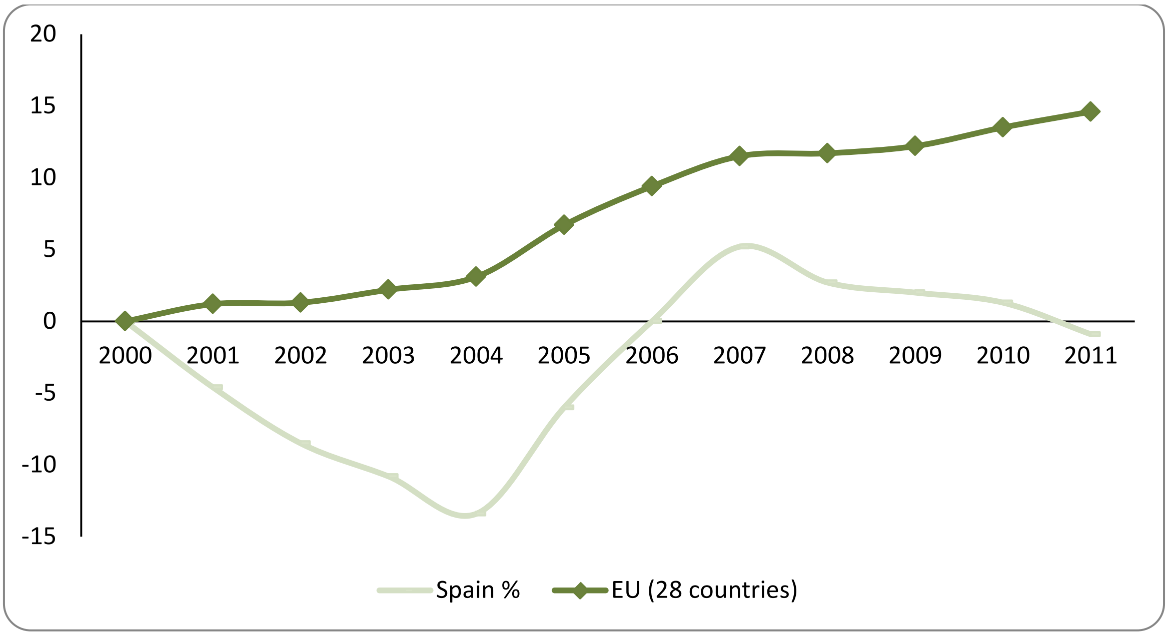


Figure 15.11 Energy efficiency gains in industry.

Source Odyssee (2011)

When looking at the residential sector, final energy consumption in households in Spain has evolved significantly higher than the European average over the years and continues to grow although at a slower pace due to the financial crisis and also due to technological improvements which restraint the rising trend of the previous years. Between 2004 and 2006 residential energy consumption showed a sharp increase which may be related to a long period of drought during 2005 and the landing of hurricane Vince on the south-western coast of Spain in October of the same year. This peak was defused to some extent until 2008 reflecting the first effects of the economic crisis which started to show already in 2007. From 2009 on, an upward trend continued at a slower pace, despite the ongoing recession (Figure 15.12).

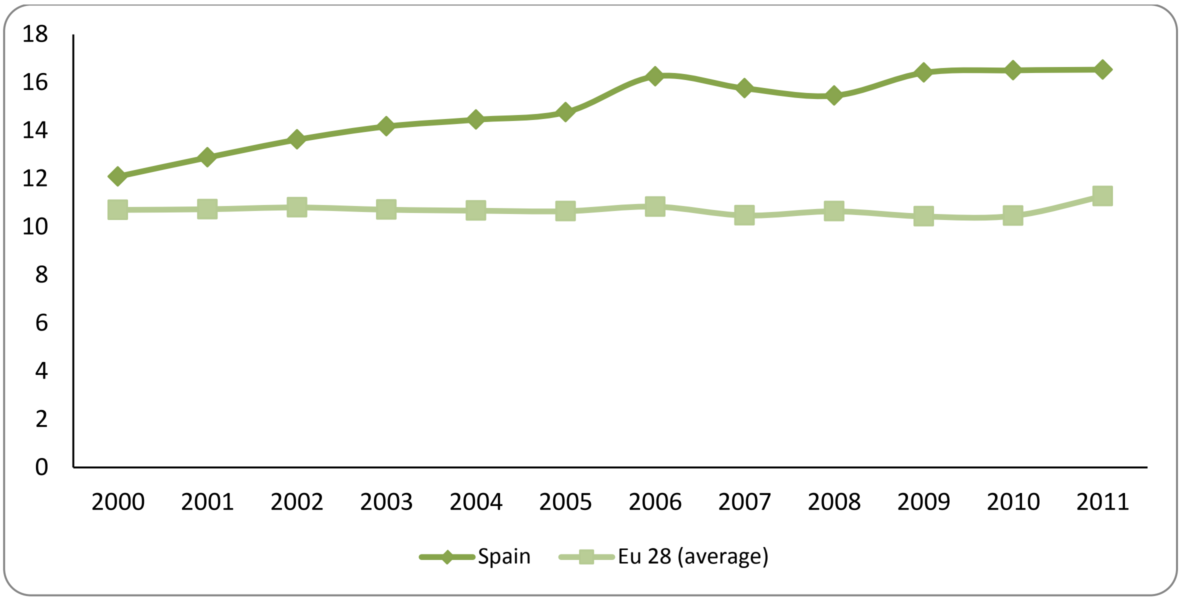


Figure 15.12 Final consumption of residential dwellings (with climatic corrections) (MTOE)

Source: Odyssee (2011)

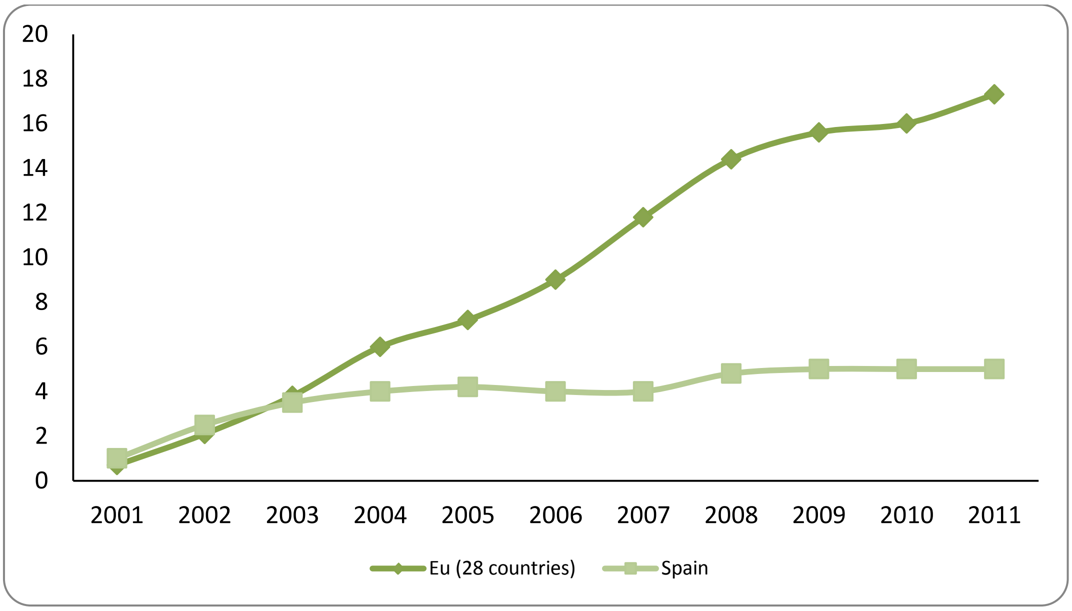


Figure 15.13 Energy efficiency gains in households.

Data Source Odyssee (2011)

At the same time energy efficiency gains in Spanish households after 2003 remain steady despite the increasing European trend (Figure 15.13). However, during 2008 there is a light increase in the Spanish energy efficiency gains and a decreasing trend in the final energy consumption, associated with the introduction of the first Spanish National Energy Efficiency Action Plan in the same year. The low energy performance of residential dwellings is the result of the poor energy efficiency of buildings [17, 18] combined with the lack of investments for improving energy efficiency. Most of the buildings in Spain are built before 1990 (Table 15.2) [19], when no energy efficiency regulations were established. The constantly increasing gap between the Spanish energy efficiency gains and the European trends stresses the necessity of implementing the EEO scheme but also indicates that there are significant challenges to be addressed.

Table 15.2: Year of construction of buildings in Spain [19]

Year of Construction	Number of buildings	Share
Before 1900	899742	10%
1900-1920	426246	5%
1921-1940	496343	6%
1941-1950	538724	6%
1951-1960	885366	10%
1961-1970	1088993	13%
1971-980	1503076	17%
1981-1990	1359016	16%
1991-2001	1415910	16%

15.2.2 Evaluation of energy savings' capacity - Identification of challenges

There are many challenges regarding the energy savings potential in Spain.

Both the efforts to increase self-sufficiency and the commitment to the Kyoto Protocol can contribute supplementary to the implementation of the obligation of the EEO scheme, as they are closely related to actions to improve energy efficiency and to reduce energy consumption.

In addition, the energy savings potential in the Spanish buildings sector, in both the residential and the commercial sector, is considered to be significant and one of the main axes of actions under the implementation of the EEO scheme. A Fraunhofer-study shows that there is a potential of 1098 PJ of cost-effective final energy savings of which 52% is applicable in the transport sector, 30% in the built environment and 15% in industry [20]. While it is estimated that there is both a technical and financial potential of a 30% reduction of energy consumption in residential dwellings by 2020 [21]. Since transport savings will be finally excluded from the EEO scheme, the saving potential in the building sector is crucial for the achievement of the target. In particular, envisaged savings refer to existing buildings and mainly include savings from heating in both existing and new residential buildings, water heating in residential buildings, savings from electrical appliances in residential buildings and fuel and electricity savings in the tertiary sector.

The Spanish energy efficiency policy package, as shown in Figure 15.14, seems inadequate to close the energy savings gap as assessed in the EU context, despite the optimistic projections of the Spanish Government [22]. In addition, as stated in both national notification reports by the Spanish government (from December 2013 and June 2014), previous energy conservation efforts that Spain has undertaken are not taken into account in the context of the new Energy Efficiency Directive 2012/27/EU. As a result, a large portion of the already achieved savings cannot be accounted for within the savings requirements under Article 7. At the same time, the most effective and profitable measures have already been undertaken while the potential for improving energy efficiency is now focused on measures that are more difficult to implement, involving higher implementation costs and longer return periods and generating lower savings in the short term.

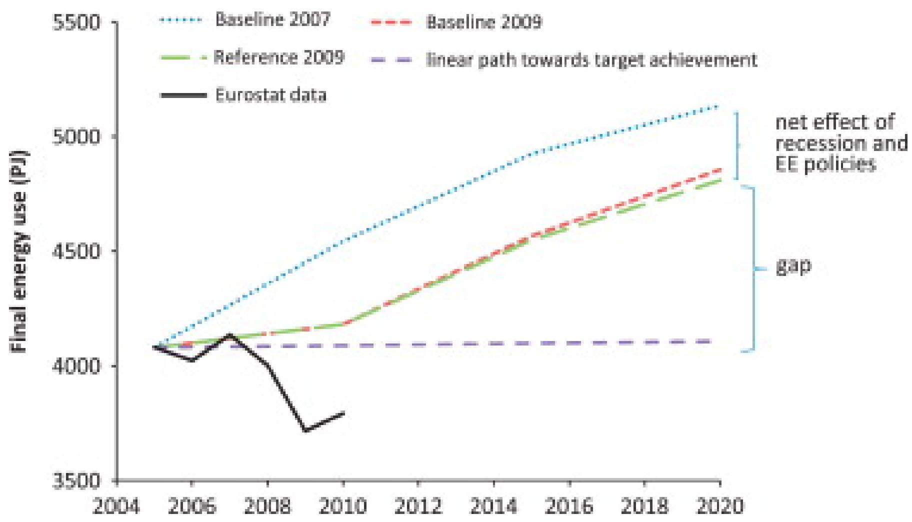


Figure 15.14: Final energy savings gap in Spain [22]

Concluding the above, a feasible and cost-effective potential for improving energy efficiency still exists in the Spanish buildings sector, provided that risks related to the actual realization of savings (due to higher utilization costs and longer payback periods) will be addressed under the EEO scheme through alternative measures supplementing the obligation's efficacy though additional support, motivation and funding.

15.3 Market preparedness

This section aims to provide a description of the status quo of the Spanish market in terms of energy efficiency performance, the structure of the energy market, the technical capacity in terms of expertise, certification/training procedures for energy operators as well as the ease of access to finance for beneficiaries (either individuals or enterprises, SME's). The main indicators used in this section are:

- Electricity Market Structure
- ESCO's market Development
- Energy efficiency performance of the market
- SME Access to Finance Index which depicts developments and access to funding resources for small and medium sized enterprises.
- Technical capacity and experience in technology.

15.3.1 Description of Status quo

Electricity Market Structure

The electricity sector in Spain is governed by the Electricity Sector Act (ESA) which contains the main electricity sector regulation in Spain. It aims to provide regulatory certainty and to ensure effective competition in the electricity sector, as well the economic and financial sustainability of the electricity system. The Electricity Sector Act[121] stipulates the separation between regulated activities (transmission and distribution) and activities which can be developed in conditions of free competition (generation and supply).

Another feature of the Spanish electricity market is the complete liberalization in terms of contracting and selecting of suppliers by end consumers. The liberalization of the electricity market in Spain was a progressive process that started in 1997 with a threshold for eligible consumers initially set at 15 GWh/year. The subsequent years, a paving decrease in the threshold to 5 GWh/year in 1999 and to 1 GWh/year in 2000 finally led to the complete liberalization in 2007.

The access to transmission and distribution networks is conducted through the payment of charges. There are two separate operators established: a system operator responsible for technical management and a market operator for the financial management of the system. The gas and electricity market regulator in Spain is the National Markets and Competition Commission (CNMC). Under the ESA, electricity generation, transmission and distribution cannot be undertaken without a license whereas electricity supply is subject to prior communication to the administrative authorities [23].

[121] Electricity Sector Act 54/1997 enacted in 27 November 1997

In Spain retail companies are the only ones that can sell electricity to final consumers and are divided into two groups: last resort retailers and those that operate on the liberalized market. Even though there are more than 200 electricity retailers, the Spanish electricity market both in terms of generation and distribution is mainly dominated by a few large players: Endesa, Iberdrola, Gas Natural Fenosa, EDP – Hidrocantábrico (Figure 15.15). The largest of them is Iderdrola with a market share of 23,5%. The sole transmission company is the Red Eléctrica de España (REE), operating on an exclusive basis (stipulated in the ESA), and has a key role in the functioning of the Spanish electricity system as the official Transmission System Operator (TSO).

Electricity and gas distribution systems are legally and functionally unbundled.

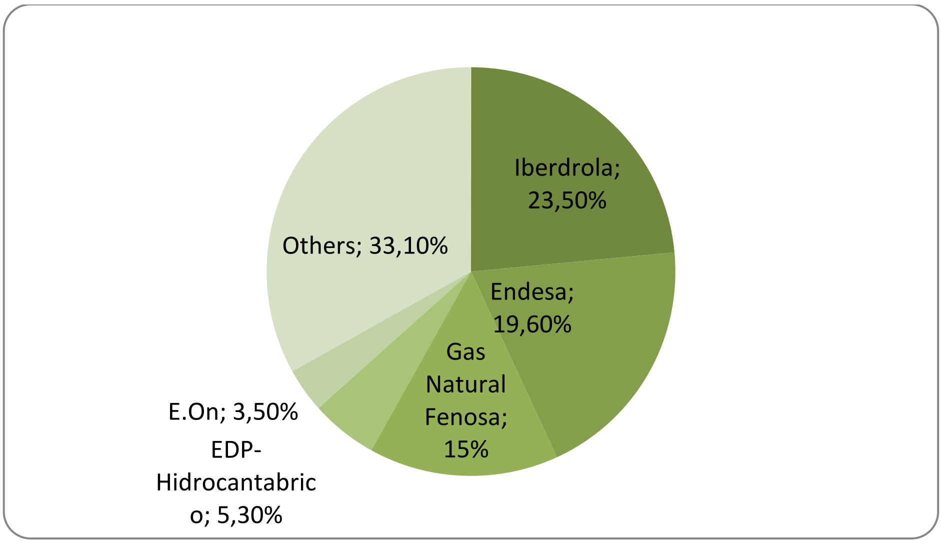


Figure 15.15: Spanish Electricity Market Shares

ESCO's market Development

ESCOs are one of the basic operational parties in the energy services market of the EEO scheme and will play an important role in the fulfilment of the Spanish EEO scheme since they will interact with consumers, obligated parties and IDAE.

During the past few years a continuous but slow growth was registered in the Spanish ESCOs' market, mainly driven by governmental promotion programs, such as the adaptation of the public procurement law and procedures, the incorporation of the ESCO definition[122], procedures in national legislation[123], so that ESCOs projects are better suited) as well as by

[122] Legislative Royal Decree 6/2010, Article 19
[123] New national procurement Law30/2007, modified in Legislative Decree 3/2011, as well as modifications in the Article 11 of the Law defining the Public Private Collaboration Contract – PPCC

credit lines and other financial support mechanisms. Other market factors, such as the growing energy prices and the consolidation of the financial crisis played their role in the enhancement of the ESCO sector in Spain as well. However, the Spanish ESCO market is still considered to be small involving around 20-60 active ESCOs despite the fact that the registry of IDAE contains around 800 companies. The size of the ESCO market is estimated to be € 400- 500 million annually while the size including all costs and investment potential is estimated to range between € 1,5 and € 6 billion comprising construction, installation, operation, maintenance, monitoring, verification and energy supply. Spanish ESCOs come from a diverse background including IDEA (which itself is considered as a public ESCO in many contracts), major energy distributors, small, local or national consultancies (about 15), equipment manufacturers, distributors, installers and further a few dozens of companies whose main activity is to provide renewable based heating (Rivas Puente and Puente 2011) [24].

Energy efficiency performance of the market

The main energy consuming appliances in households are fridges, cookers, washing machines and televisions and are present to almost every household. These represent 3,8% of the total final energy consumption in 2007 [25]. The main components of this consumption include electrical appliances (55%), consumption in kitchens (28%) and the remaining percentage refers to office and small air conditioning systems. The replacement of old equipment in households and tertiary buildings in Spain is considered to be remarkably lower compared to other European countries [26]. In 2003, only 33% of the Spanish population was aware of the European energy labelling system [25,26], while more recently, over the period 2006 to 2010 an increasing trend in the stock of appliances in Spain is demonstrated (figure 15.16). During 2008 to 2012, the Renovation Plan for existing electrical appliances as well as the Plan for Public Administrations took place, promoting savings by updating the current equipment and encouraging rational use of electrical appliances. No evaluation report for the actual uptake of those measures and the plans' performance is currently available. However such facts may as well indicate that the energy efficiency performance of the Spanish market shows signs of relative improvement over the last years in terms of availability of technology and adoption rates.

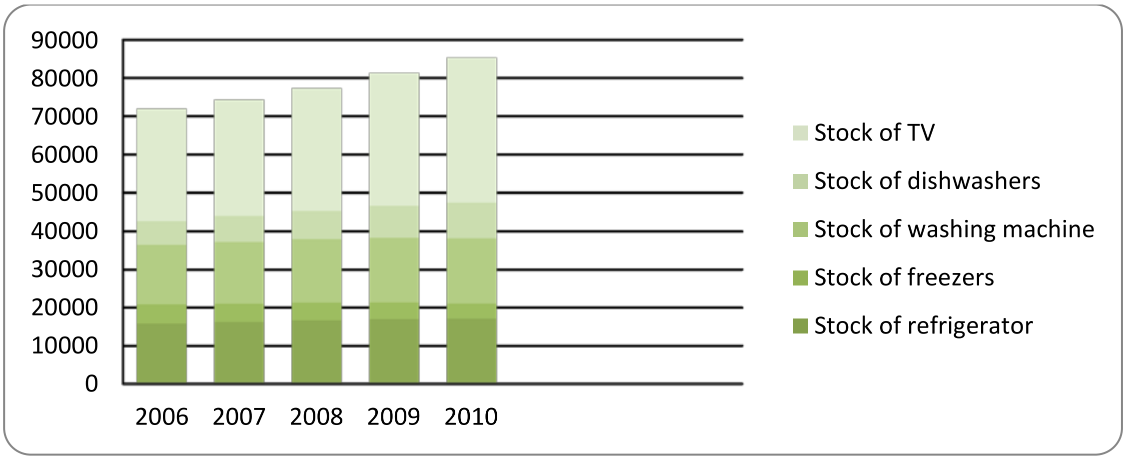


Figure 15.16: Stock of appliances in Spain

Source Odyssee

SME's Access to Finance

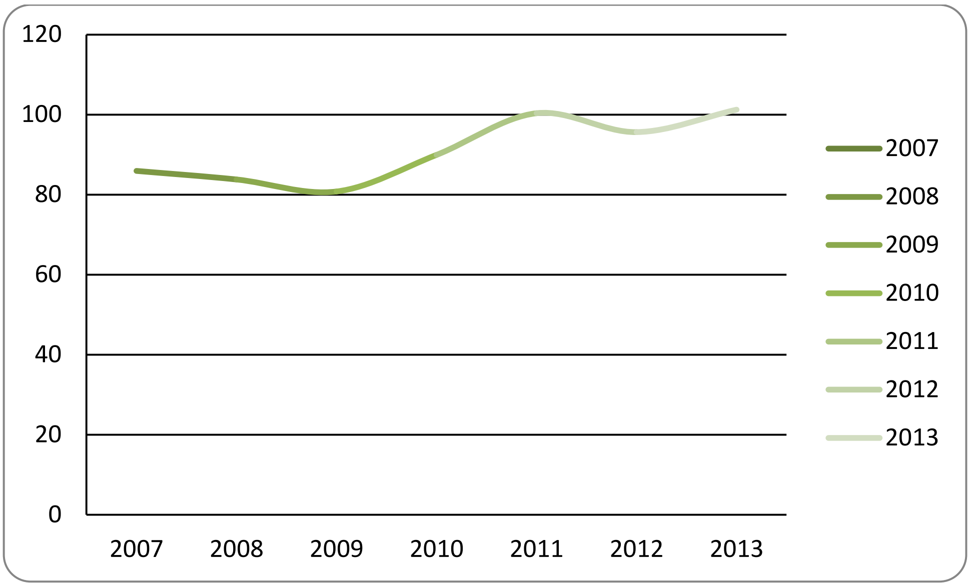


Figure 15.17 SMAF index in Spain.

Source European Commission website

As shown in Figure 15.17, despite the decreased access of SMEs to finance between 2011 and 2012, last year's trend noted a significant rise. This signifies that SMEs access to funding is encouraged which in turn may enable investments in general and also in energy conservation projects.

As far as technical capacity of building professions is concerned, despite the fact that the general education level and technical skills of both native and foreign workers in Spanish building sector are considered to be high, when it comes to energy efficiency technologies the level of expertise is not the same. Vocational education and training in Spain only partially addresses the basics of energy efficiency techniques. The majority of available training programs mainly regard buildings' sustainability and is almost exclusively aimed towards high-qualified professionals [27]. Under the EPBD recast, special workforce education, training programs or certification procedures are just starting to take effect. Nevertheless, the general market preparedness in terms of qualified work force and energy services is considered to be performing quite well according to the Ministry of Industry, Energy and Tourism.

15.3.2 Evaluation of market preparedness – Identification of challenges

ESCO projects in Spain are focused on public lighting and public buildings, as well as private non-residential dwellings and industries involving cogeneration, audits and HVAC control systems, which represent around 90% of all public projects, and some private tertiary projects [24]. Public buildings (municipal offices and health care facilities), with some attention to private non-residential buildings, are also a very attractive sector for ESCOs development but large national support programs that were expected to drive such projects have not still been initiated.

As highlighted by the Ministry of Industry Energy and Tourism, although the qualification procedures reassuring the qualification of auditors are about to take effect, since the transposition of the EPBD recast is still on-going, the market operates quite well and the qualification of the work force has proven to perform quite adequately thus far. Yet, the inadequate workforce education and training programs when it comes to energy efficiency projects and the current lack of certification procedures is a well cited challenge impeding the implementation of energy efficiency measures in Spain until recently [22].

15.4 Administrative preparedness

At this section, we analyze the general administrative system of the Spanish government associated with the implementation of the EEO scheme while also looking at the following indicators:

1. Government Effectiveness, which reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

2. Regulatory Quality, which reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
3. Experience in combating the free rider problem.

15.4.1 Description of Status quo

General governance facts

The Spanish institutional and administrative structure is generally complex. Spain is divided into seventeen autonomous communities and two autonomous cities in the African part. Each community has its own internal structure including a parliament and regional government with a wide range of legislative and executive powers. The communities are also divided into provinces, with less administrative importance [3]. Each of the autonomous communities has also regulatory authorities with responsibilities for electricity activities carried out in their territory, typically regional departments for industry or energy.

When looking at World Governance Indicators (Figure 15.18), we observe that the general effectiveness of the Spanish government has significantly decreased compared to its score earlier in 2000. However, there is an increasing trend over the period 2010 to 2012.

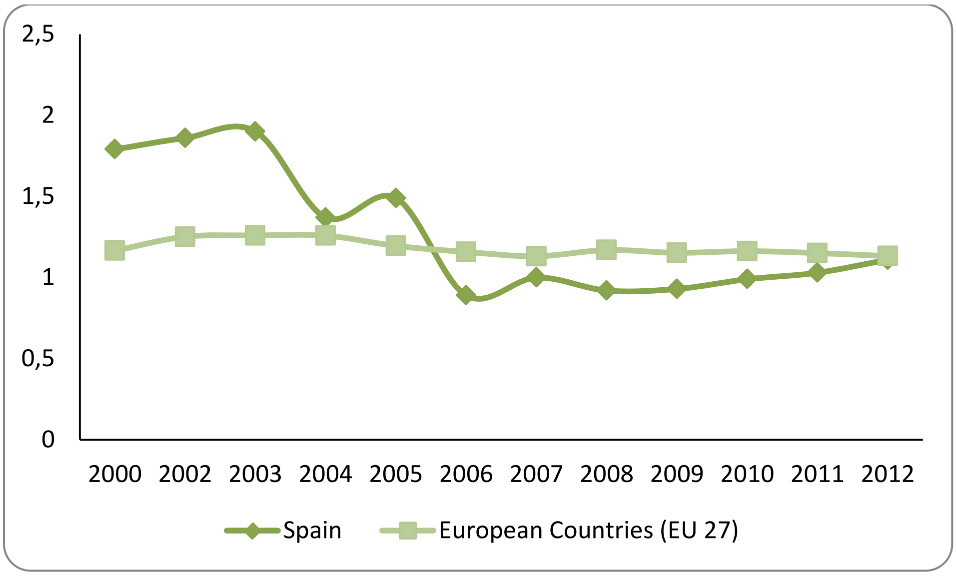


Figure 15.18: Government Effectiveness

Source: World Development Indicators 2012

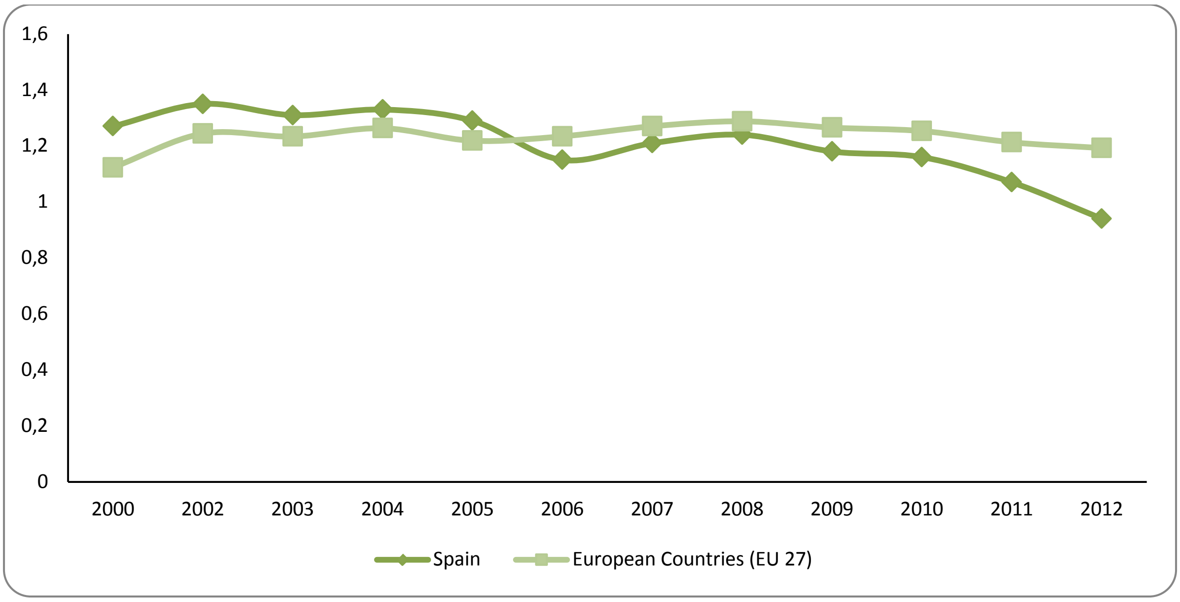


Figure 15.19: Regulatory Quality

Source: World Development Indicators 2012

Likewise, Spanish regulatory quality reflecting the government's ability to formulate and implement sound policies and regulation encouraging private sector development is also close to the European average (Figure 15.19).

Energy Efficiency governance

At the national level, the main regulatory authorities in the energy sector include the Ministry of Industry, Energy and Tourism, which is in charge for setting and implementing energy policy, developing regulatory proposals, approving tariff structures, energy product prices, network access tolls and electricity charges as dictated by the current legislation. It is also responsible for the licensing of facilities, at both national and regional level [3]. Attached to this ministry is the Institute for Energy Savings and Diversification (IDAE), which in the framework of the EEO scheme's implementation is the managing authority accrediting sufficient fulfilment of the obligation set for each of the obligated parties. The main regulatory authorities also include the National Markets and Competition Commission, which is a public regulatory body under the Ministry of Economy and Competitiveness, with its own legal state and the capacity to act independently [23]. It is mainly responsible for the supervision and control of the correct operation of the electricity market issuing circulars related to the electricity sector and developing and enforcing the rules according to the energy legislation. The administrative structure is presented in the following diagram.

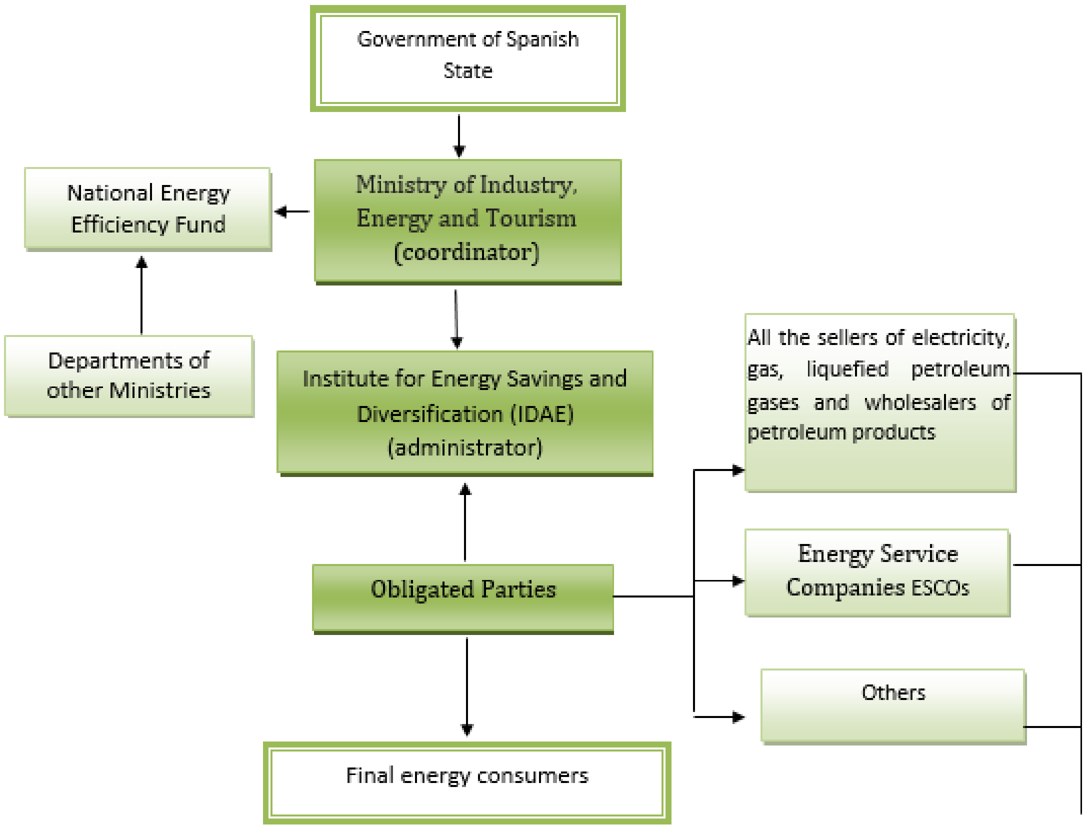


Figure 15.20: Authorities related to the implementation of the EEO

Other authorities related to the implementation of the EEO are: (1) the Ministry of Public Works which is responsible for projects and policy plans (State Plan, 2013-2016) to improve dwellings' energy efficiency [22]; (2) the Ministry of Agriculture, Food and Environment which proposes and implements governmental policy related to climate change and environmental protection and (3) the Nuclear Safety Council which is responsible for ensuring the safe operation of nuclear and radioactive facilities [13].

As stated by representatives of the Ministry of Industry, Energy and Tourism, different departments from various ministries and administrative bodies are involved with the regulation regarding the implementation of the EEO scheme, although the different departments' main involvement associates with the management and allocation of financial resources coming from the National Energy Efficiency Fund. When it comes to the actual regulation and implementation of the scheme the main authority in charge is practically IDAE.

Taking into consideration the above-mentioned facts regarding the structure of the administrative authorities in Spain, it seems that the Spanish system mostly fits with the fifth energy efficiency institutional model, in accordance with the identification by Limaye et al.

(2007) [28]. IDAE as the sole managing authority can be more flexible and acting independently and autonomously to some extent. Its activities can be easily linked to the private sector, taking on a wide range of projects with governmental groups and agencies as well as NGOs and private organizations. This fact may not only provide IDAE with a potential robust portfolio, but it may also increase its credibility, technical capacity and commercial competence. In addition, as IDAE remains attached to the public Ministry of Industry, Energy and Tourism, it can have access to both private and public funding sources, despite the fact that it lacks direct access to donor funding.

Concerning experience in combating the free riders' problem in Spain, the Ministry of Industry, Energy and Tourism noted that there is limited experience in implementing, monitoring and verifying energy efficiency policies. As a result the administrative preparedness in this field is considered to be minimal. In general, the Spanish government is considered to be effective with an adequately performing government close to the European average (Figure 15.18). Especially in terms of energy governance, the Spanish government could reinforce the effectiveness of IDAE as the managing authority of the scheme providing its political support and a firm basis in law.

15.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

Energy efficiency governance is in general a complicated issue and it has proven difficult to implement the right policy mix in order to achieve intended energy savings. Even though government effectiveness and regulatory quality could be significant indicators for the administrative preparedness and ability of Spain to successfully fulfil the savings required under the obligation, energy efficiency governance involves many different parts, such as political authorities, institutions and resources by decision-makers and implementers [29], creating a complex network of administrative authorities that need to be combined in order to secure a sound implementation of the obligation scheme as well as supplementary measures.

Despite the fact that the existence of an independent corporation could provide some flexibility in terms of obtaining funds and external inputs or access private sector talent and technical capacity [29], the role of IDAE in the framework of the EEO scheme is currently limited to administrative and managing authorities and there is no hint if and how Spain plans to take advantage of the potentials offered by this administrative structure. Moreover, despite the existence of the IDAE, there are, at least, three different ministries (Ministry of Industry, Tourism and Commerce, Ministry of Public Works and Ministry of Agriculture, Food and Environment) that are in charge with the regional administration and implementation of energy efficiency policies. Taking into consideration the complexity of the administrative setup in Spain within a network of autonomous communities and provinces, the successful sharing of duties and coordination of all the different regional administrative instruments for the fulfilment of the obligation may be challenging. The complexity of the administrative procedures has been recently cited to discourage investors due to the barriers and difficulties in obtaining the necessary permits for refurbishments and public or EU funding in Spain [22] It is worthy of note that, as highlighted by representatives of the Ministry, the government's capacity to introduce the EEO scheme may also be affected by the lack of previous experience related to the implementation of a similar scheme. In addition the Ministry considers that, although delays during the implementation of energy saving measures have taken place in the past, the administrative process of the EEO scheme is expected to be rather straightforward, due to its simplified design (i.e. without the certification system). Overall the administrative capacity was highlighted as the most crucial factor determining the effective implementation of the Spanish obligation scheme, especially in view of shortages in staff within the administrative services.

15.5 Legislative preparedness

At this section, we consider the legislative preparedness of Spain in terms of implementing the obligation scheme within a suitable and comprehensive legislative or regulatory framework. In more detail, we explore the progress of the transposition of the Directive 2012/27/EU into national legislation in terms of regulation, legislation, and/or statutory instruments, ministerial and administrative processes enacted so far to support the sound implementation of the EEO scheme.

15.5.1 Description of Status quo

The Spanish legislative framework is improving over the past few years as far as energy issues are concerned, in accordance with the European Directives for promoting energy efficiency. However, there are significant challenges for the EEO scheme implementation. Many of the laws and regulations have not been in force yet as there are significant laggings in their implementation, especially as far as the Directive 2010/31/EU on the Energy Performance of Buildings (EPBD-recast) is concerned. Its transposition is still ongoing resulting in a number of regulatory shortcomings (e.g. no sanctions in case of non-compliance with energy performance standards, the EPC framework allows exemptions for many cases and it is still behind the schedule planned for existing buildings). In addition, serious monitoring and compliance issues have occurred due to the fact that the EPBD provisions are implemented at the local level, with different internal structure among the various local regions. The lack of a central database or a national registry makes the whole procedure more complicated and inefficient. Finally as cited by recent literature evaluating policy developments as laid down in the 2nd Spanish Energy Efficiency Action Plan (NEEAP), energy related regulations in Spain are considered to be less stringent than in neighboring countries and there seems to be a lack of a tailored plan so far in terms of improving energy efficiency, especially in the public sector [22].

15.5.2 Evaluation legislative preparedness – Identification of challenges

Even though the Spanish market is fully liberalized and the legislation framing energy efficiency has been enriched and improved over the past few years, there is no particular legislative preparation in place, in terms of detailed and specified regulations or ministerial processes to implement the EEO scheme yet.

Regarding the transposition of the Energy Efficiency Directive 2012/27/EU, the submitted notification plans on Article 7 had only one month of delay (5th of July). This submission was considered rather timely in comparison to other countries' notification reports. Although administrative hurdles and subsequent delays were reported in the past, so far no notable delays have taken place regarding the scheme's eminent enactment into national law. As stated by the Ministry of Industry, Energy and Tourism, the EEO scheme has entered a first trial implementation period from which potential opportunities for re-design and adaptation may emerge. Finally, the fact that the certification mechanism will not be implemented at the beginning reduces significantly the legislative complexity and minimizes the administrative burden of the introduction of the EEO scheme, eliminating potential delays in the policy development process.

15.6 Social & Political acceptance/feasibility

At this section, we explore the social and political acceptance of the EEO scheme by looking at the following factors:

- The Market Performance Indicator (MPI) in the energy sector, which indicates to what extent the market, brings the expected or desired outcome to final consumers. It is the average of four components: comparability, trust, problems & complaints and expectations, each of which has an equal weight. It is measured as a score between 0 (negative evaluation) and 10 (positive evaluation). In order to neutralize the external effects, we would use the normalized indicator, nMPI [31].
- Level of fuel poverty within the country
- Social perspective
- Industry perspective

15.6.1 Description of Status quo

Spanish consumers' rating for their energy suppliers are considerably low, ranking the retail electricity market as the second lowest among all European countries as to trusting providers and comparability in 2012 [32]. The retail gas market's rating is also poor, lower than the European average in most cases, regarding trust, comparability, overall satisfaction and choice and 3rd lowest in the total ranking [33]. In addition, the level of problems and consumer complaints for trust and comparability are the second and the third highest in Europe for the electricity suppliers and the highest of all in Europe for the gas retailers [32]. The low nMPI rankings compared to the other European Countries and compared to the EU-27-average are most likely related to marketing sales practices, which are often denounced by several associations [23] (Figures 15.21, 15.22).

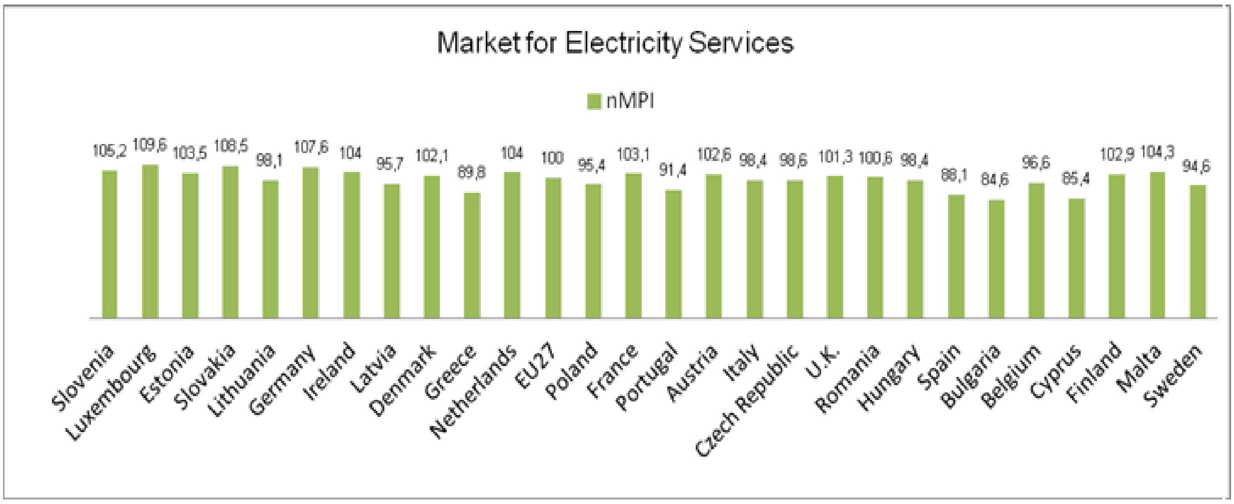


Figure 15.21: nMPI Scores in European Electricity Services' Markets in 2012 [30]

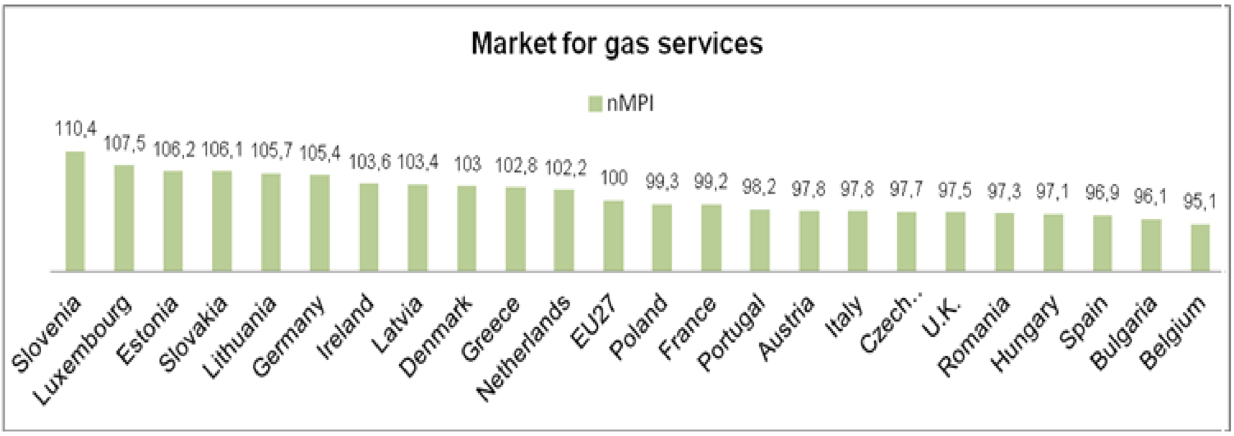


Figure 15.22: nMPI Scores in European Gas Services' Markets in 2012[30]

Regarding fuel poverty in Spain, the term has only recently been cited in Spanish energy laws [37] and few attempts have been made to factor the trend and characteristics of fuel poverty in the country's official energy policy. Since 2009, there is a classification by a social law as to vulnerable electricity customers. In particular, there are three household categories classified: large families, pensioners (over 60, with low-income) and households where all members are unemployed [23]. In addition, there are some early attempts to define fuel poverty in Spain through some key indicators like the percentage of households able to adequately heat homes, winter mortality rates and delays on payment of utility bills [38].

An official definition of fuel poverty indicators has been constituted, by which "a household is considered to be in fuel poverty if they have required fuel costs that are above average (the national median level) or were they to spend that amount they would be left with a residual income below the official poverty line". In addition to that, a Fuel Poverty Indicator has been formulated which shows the percentage of households in fuel poverty and also demonstrates the intensity of fuel poverty in terms of how far into fuel poverty households are [37,39,40].

According to the U.K.'s experience, there seems to be a close relationship between fuel poverty and the socio-economic characteristics of energy poor households, such as the unemployment rates. Under these circumstances, the Spanish case becomes even more severe. In Spain unemployment rates have increased from 7.8% in July 2007 to 26.9% in May 2013 [38]. As a result, there are great concerns that, in comparison to 2010, a larger fraction of the Spanish population is now struggling with fuel poverty based on a self-reported survey (figure 15.23).

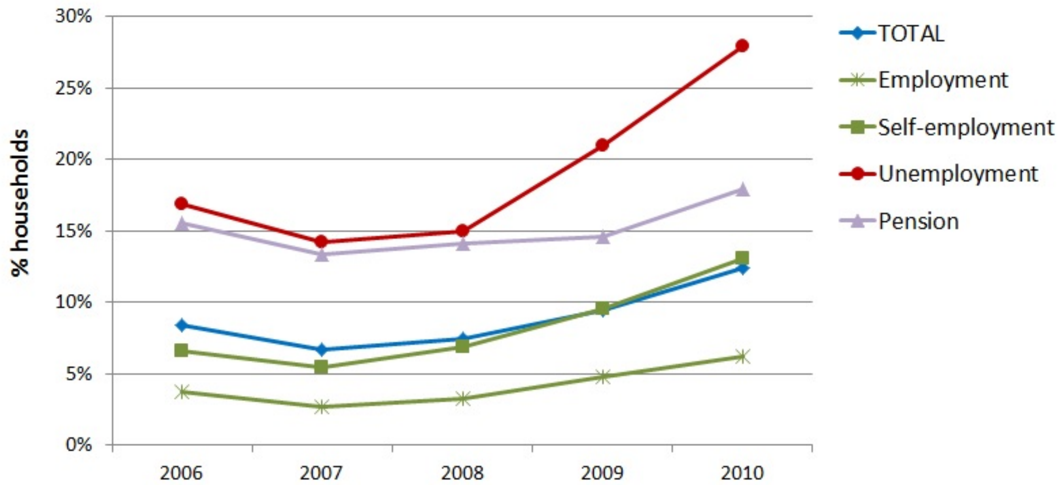


Figure 15.23: Expenditure-based and consensual or self-reported energy poverty rates in Spain 2004-2010 (% households in energy poverty)

Source: Tirado Herrero et al. (2012)

Except for the increasingly high unemployment rates and the national socio economic characteristics, there are also other important structural causes that define and explain longer-term fuel poverty trends in Spain. Some of these are of course household incomes, energy prices and the energy efficiency of the residential stock. However in the case of Spain, climate is also important and adds a new, somehow different dimension in fuel poverty. In many Spanish regions winters may not be as harsh as in northern European countries, but heating is necessary in the largest part of the country. Another important issue is the fact that due to the mildest weather in some regions, the energy performance of residential buildings is very poor, with bad or no insulation and often with no heating system available, which forces domestic users to rely on expensive electricity to keep their homes adequately warm. Additionally, apart from heating needs during winter, cooling demands during summer in the warmer parts of the country are also of great importance [17, 18].

As far as Spanish industry is concerned, it seems that there are significant potentials for energy efficiency improvement. In general, Spanish industries show suboptimal energy efficiency levels mainly due to the use of outdated technology with high consumption and operating costs. The high renovation costs of technological equipment as well the lack of financial incentives by the State (e.g. subsidies, tax deductions, etc.) are the main factors preserving the industry's low efficiency performance. Moreover, industrial inefficiency may also depict difficulties to implement and achieve the expected results through public policy strategies as a result of imperfectly competitive circumstances in the market. Improving energy efficiency could help industries in multiple ways increasing economic and productive efficiency as well as by reducing energy consumption and its related costs but also reducing CO2 emissions and subsequent environmental penalties.

15.6.2 Evaluation of socio-political acceptance/feasibility – Identification of challenges

In Spain, the average expenditure in energy only represents 3% of the general household expenditures, which makes energy savings a low priority. Consumers invest in building upgrades for safety, health, comfort, esthetics, reliability, convenience, and status reasons. Taking the latter into account combined with the aforementioned facts about the lack of consumers' trust in Spanish energy suppliers and fuel poverty levels, the social acceptability of the scheme may prove to be rather low in the future, although during the first implementation period of the obligation, public's response does not really become relevant to the effectiveness of the scheme.

At the same time, there is a great potential for creating new employment opportunities and economic recovery in the framework of the actions undertaken within the EEO scheme. Especially for the building sector, where the effects of the financial crisis are more intense, reconstruction, refurbishing and improving efficiency actions in existing buildings as part of the implementation of the obligation may help to reduce high unemployment rates and boost the construction activity. It is estimated that the renovation of 10 million dwellings in terms of improving energy efficiency will create 110-130 thousand direct jobs in Spain over the period 2012-2050 [36].

However, the fact that a larger (than depicted in the indicators) portion of Spain's residential consumers is estimated to suffer from fuel poverty and that so far there are no predictions for fuel poverty included in the EEO scheme, may as well affect the introduction of the EEO scheme through limited participation levels and poor willingness to respond to governmental incentives regarding residential end users, especially in the case where cost-recovery principles are allowed by the government in the future. Examples from other MS country schemes such as the UK obligation are well proven practices of how the obligation could work towards addressing fuel poverty issues, raising social acceptance and participation and thus increasing the scheme's efficacy. Indicatively, in the UK, where 10% of the total households are considered to be in fuel poverty, 40% percent of the measures included in the national EEO scheme target at low- income households [37].

The Spanish government could extract significant lessons from the British EEO scheme. The measures implemented could have a clause on social consideration and reassure the proportionality between the costs to be covered by consumers and the expected benefits. Moreover, it is important to define and monitor the state of fuel poverty in the country, especially as far as vulnerable consumers are concerned within a national database. This database combined with a better recoding of the energy performance of buildings through the appropriate certification, could help defining the scheme's target groups and cost recovery mechanisms more efficiently.

Significant challenges could be confronted in the industry sector due to the high costs related to energy efficiency improving actions. It is important that the State provides the necessary financial support, through subsidies and tax deductions in order to assure industrial stakeholders' cooperation. Moreover, the final decision of whether a cost recovery mechanism will be finally applied or not will in effect determine the view of the industry over the scheme.

In conclusion, as highlighted from the representatives of the Spanish Ministry, the EEO scheme has not yet been populated to the wider public and it becomes difficult to get a sense of society's response. It is, however, deemed that social partners (building owners, gas and electricity retailers, petroleum wholesalers and especially industries) are mainly opposed to the implementation of the scheme due to the current lack of cost-recovery mechanisms and their inability and/or unwillingness to pay the financial equivalent under the obligation. On the contrary, in favour of the scheme seems to be the ESCOs and the building contractors, who view the scheme as an opportunity for recovering through the crisis.

Conclusions

The implementation of the EEO scheme in Spain is more likely to confront significant challenges in many fields, despite some favorable conditions and opportunities to be taken into consideration. First of all, the deep financial crisis of the past seven years (2007 – 2014) has severely weakened the Spanish economy, affecting the lending market and arising high investment risks. The large government deficit and the austerity plans may set important barriers in terms of financing the EEO scheme and may also affect the sustainability of the Energy Efficiency National Fund, which will be in principle partially funded by the general Spanish Budget. Additionally, it is yet unsure if the obligated parties will be able to correspond to their obligations through the mandatory financial compensation, which has been imposed after excluding the certification mechanism during the first period of the scheme's implementation. Social acceptance and consumers' response are still not influential over the first phase of the scheme's implementation, however potential risks lie in the future uptake of energy conservation measures and realization of savings due to rising energy prices and subsequent high energy costs. Considering the above and given the fact that there is no information available about the cost recovery mechanism (whether or how it would be finally implemented), the financial capacity of Spain to fulfil the obligation remains challenging, despite some early signs of recovery depicted in the analyzed financial indicators.

Furthermore, in spite of the energy savings potential, which especially in the building sector offers significant opportunities for the fulfilment of the obligation, the temporary exclusion of the certification mechanism invalidates this advantage, limiting the potential benefits only to the alternative measures proposed, at least during the first implementation phase of the obligation.

In general, Spain's preparedness to take full advantage of the existing opportunities can be considered to have a long way to go, in many terms. There are no certification procedures yet to regulate the energy end-use market and despite the general good evaluation of the market's operation and its stakeholders' technical skills, it might be challenging to take full advantage of the available funding and maximize energy efficiency gains [22]. Moreover, without the certification mechanism ESCOs' contribution will be limited during the first couple of months.

As far as administrative preparedness is concerned, the fact that there is no previous experience in implementing such a scheme foreshadows challenges of administrative nature as well. In detail, the general effectiveness of Spanish government is highly evaluated. However, this fact does not imply equally high effectiveness in terms of energy efficiency.

Even if governance effectiveness is high, the final performance of policy measures may not meet the initial targets as a result of general market failures and externalities.

When it comes to the legislative framework, the Spanish government has made significant progress complying with the European Directives over the past few years, even though there were some delays in the transposition process of the EPBD recast. As a result, nowadays, there is a bunch of laws addressing energy efficiency issues. However, laggings in their implementation rebound to no available feedback regarding their effectiveness. Another key factor to be considered is the high heterogeneity of Spain in both administrative and legislative terms that increases the complexity of the EEO scheme's implementation.

Finally, low awareness of social stakeholders and public partners, such as final consumers, building owners, gas and electricity retailers, petroleum wholesalers and industry deprives any feedback in terms of their perspective on the scheme as well as their willingness to cooperate. However, the current socio economic status quo of Spain sets a challenging background and the rising energy costs may affect severely the public view and willingness to participate in measures under the obligation scheme.

REFERENCES

[1] http://www.spanish-town-guides.com/Facts.htm

[2] http://www.factmonster.com/country/spain.html

[3] http://www.nsd.uib.no/european_election_database/country/spain/

administrative_divisions.html

[4] Eurostat, Unemployment rate by sex and age groups - annual average, %, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=une_rt_a&lang=en

[5] Memmos Anastasios, June 2014, Spain Annual Report 2013, Madrid

[6] Ministry of industry, Energy and Tourism, Secretariat of State for Energy, Madrid, 5 June 2014, Report on Energy Saving and Efficiency Policy Measures in compliance with Article 7

[7] Ministry of industry, Energy and Tourism, Secretary of State for Energy, Madrid, 3 December 2013, Report on the Energy Saving and Efficiency Policy Measures in compliance with Article 7 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on Energy Efficiency

[8] M. Levine, D. Ürge-Vorsatz, K. Blok, L. Geng, D. Harvey, S. Lang, G. Levermore, A. Mongameli, Mehlwana, S. Mirasgedis, A. Novikova, J. Rilling, H. Yoshino, 2007, Residential and commercial buildings

[9] B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (Eds.), Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA (2007), Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change

[10] International Monetary Fund, June 2013, Report for Spanish economy, Embassy of Madrid

[11] P. Linares, X. Labandeira, Journal of Economic Surveys, 24 (3) (2010), pp. 573–592, Energy efficiency: economics and policy

[12] http://www.worldenergy.org/data/sustainability-index/country/spain/2013/

[13] http://uk.practicallaw.com/4-529-81160

[14] Patrick Bennerstedt, Johan Grelsson, 2012, Spain's electricity market design – A case study, Master of Science Thesis, Stocholm, Sweden

[15] European Environment Agency, 2013, Climate and energy country profiles- Key facts and figures for EEA member states

[16] Spain, Energy efficiency report, http://www05.abb.com/global/scot/scot316.nsf/veritydisplay/63d95ad8a7643c50c12579d0004f44f3/$file/Spain%20Energy%20efficiency%20Report.pdf

[17] Department of Energy & Climate Change, Minister of State for Climate Change, 9 September 2014, Helping households to cut their energy bills

[18] Department of Energy & Climate Change, 22 July 2014, Cutting the cost of keeping warm to tackle fuel poverty

[19] Valencian Institute of Building, November 2011, Use of Buildings Tyopologies for Energy Performance Assessment of National Building Stock, Existent Experience in Spain

[20] Fraunhofer and Partners, 2009. Study on the Energy Savings Potentials in EU Member States, Candidate Countries and EEA Countries. Final Report for the European Commission Directorate-General Energy and Transport. EC Service Contract Number TREN/D1/239-2006/S07.66640.

[21] WWF, 2010. Potencial de ahorro energético y de reducción de emisiones de CO2 del parque residencial existente en España en 2020. WWF/Adena, Madrid.

[22] Jessica Yearwood Travezan, Robert Harmsen, Gibeon van Toledo, June 2013, Policy analysis for energy efficiency in the built environment in Spain

[23] http://ec.europa.eu/energy/gas_electricity/doc/es_energy_market__2011_en.pdf

[24] Paolo Bertoldi, Benigna Boza-Kiss, Strahil Panev, Nicola Labanca, July 2014, JRC Science and Policy Reports, ESCO Market Report 2013

[25] Ministerio de Economia, July 2007, Estrategia de Ahorro y Eficiencia Energatica en Espana 2004-2012, E4, Plan d' accion 2008 -2012

[26] Itziar Martinez de Alegria Mancisidor, Pablo Diaz de Basutro Uraga, Inigo Martinez de Alegria Mancisidor, Patxi Ruiz de Arbulo Lopez, July 2007, European Union; renewable energy sources and energy efficiency policy review: The Spanish case

[27] Intelligent Energy Europe, Programme of the European Union, October 2013, BUILD UP Skills – EU overview report, Staff working document, http://ec.europa.eu/energy/intelligent/files/library/doc/overview-report.pdf

[28] Limaye D., Heff ner G. & Sarkar A. (2007) An analytical compendium of institutional frameworks for energy effi ciency implementation, World Bank energy sector management assistance program ESMAP

[29] Nick Jollands, Mark Ellis, Energy Efficiency Governance – an emerging priority

[30] The Regulatory Assistance Project, June 2012, Best practices in designing and implementing Energy Efficiency Obligation Schemes, Research Report Task XXII of the International Energy Agency Demand Side Management Programme

[31] GfK EU3C, 20 November 2012, MONITORING CONSUMER MARKETS IN THE EUROPEAN UNION, Final report

[32] 8th Consumer Markets Scoreboard, 2012, European Commission, DG SANCO, http://ec.europa.eu/consumer_research/editions/cmc8_en.htm

[33] European Consumer Markets Monitoring survey, http://ec.europa.ec/consumers/strategy/cons_satisfaction_en.htm

[34] Mendiluce, María & Pérez-Arriaga, Ignacio & Ocaña, Carlos, 2010. "Comparison of the evolution of energy intensity in Spain and in the EU15. Why is Spain different?," Energy Policy, Elsevier

[35] MITyC & DAE, 2007. 'E4: Plan de Acción 2008–2012'

[36] Cuchí, A., Sweatman, P., 2011. Una visión país para el sector de la edificación en España. Hoja de ruta para un nuevo sector de la vivienda.

[37] European Fuel Poverty and Energy Efficiency (EPEE) project, Evaluation of Fuel poverty in Belgium, Spain, France, Italy and the United Kingdom

[38] Narec Distributed Energy, October 2013, ERDF Social Housing Energy Management Project - Final Project Report (Report) (1st ed.). UK National Renewable Energy Centre (Narec).

[39] John Hills, March 2012, Getting the measure of fuel poverty - Final Report of the Fuel Poverty Review (Report) (1st ed.). Department of Energy and Climate Change.

[40] Practical Law, a Thomson Reuters Legal Solution, http://uk.practicallaw.com/4-529-81160

[41] PEPDEE Brussels Workshop, Rapporteur Report, Session D Group Discussion, Incorporating Social Considerations into EE Obligations,

[42] Department for Communities and Local Government, Minister of State for Housing and Stephen Williams MP, 16 April 2014, Improving the energy efficiency of buildings and using planning to protect the environment

[43] Department of Energy & Climate Change, Minister of State for Climate Change, 9 September 2014, Helping households to cut their energy bills

[44] Department of Energy & Climate Change, 22 July 2014, Cutting the cost of keeping warm to tackle fuel poverty

[45] U.S. State Dept. Country Notes: Spain

[46]National Institute of Statistics www.ine.es/

[47] http://www.worldenergy.org/data/sustainability-index/country/spain/2013/

[48] http://www.epc-spain.com/questions-about-energy-performance-certificate.html

[49] Ministry Of Industry, Energy and Tourism, phone interview validating the content and information of the report with: Luz Evelia Perez Galan, Technical Adviser, DG of Energy and Mining Policy Electrical Energy

16 United Kingdom - OUCE

The United Kingdom is made up of England, Wales, Scotland and Northern Ireland. Wales, Scotland and Northern Ireland have devolved powers. Voters in a Scottish referendum in 2014 rejected independence, with 55% opting to remain part of the United Kingdom and 45% voting for independence

Britain was the world's first industrialized country. Its economy remains one of the largest, but it has for many years been based on service industries rather than on manufacturing.

Despite being a major member of the EU, the country is not part of the Eurozone, and looks unlikely to join. The Conservative party (currently the major party in government) have promised a referendum on whether to remain part of the EU, if they form the government after elections in May 2015.

The UK population was 64.1 million at mid-2013 (ONS, 2014). Population continues to grow, largely due to high levels of inward migration from other EU countries.

16.1 Economic profile

Table 16.1. GDP in the UK, 2013 estimates

Economic indicator	Value
GDP (purchasing power parity = PPP)	$2387 trillion
GDP growth	1.8%
GDP per capita (PPP)	$37,300
GDP by sector	Agriculture: 0.7% Industry: 20.5% Services: 78.9%
Public Debt	91% of GDP

Source: (CIA, 2014)

16.1.1 Description of Status quo

Annual GDP growth

The UK's GDP growth rate has been similar to the average for the EU28 for the period 2004 - 2011. However, from 2012 onwards, the UK's growth rate has been higher than average, suggesting that the UK is recovering more quickly from the global economic crisis in earlier years. In 2014, GDP grew by 2.6% compared with the previous year.

Figure 16.1: Real GDP growth rate (percentage), UK and EU-28, 2003 - 2014

Source: Eurostat

GDP per capita

According to UK government statistics, real GDP per capita stood at £22,403 in 2014 (ONS 2015). This is still below peak GDP per capita of £23,001 achieved in 2007, and shows the effect of the recession. Real disposable income per capita is also still below the 2007 level, and this reduction in incomes has increased sensitivity to rising energy prices, and has had an effect on EEO policy, as explained later.

Eurostat provides comparison indicators between GDP per head by country, adjusted for purchasing power parity. This indicates the UK currently has slightly higher than average GDP per capita, but that it was considerably higher than the EU average in the past.

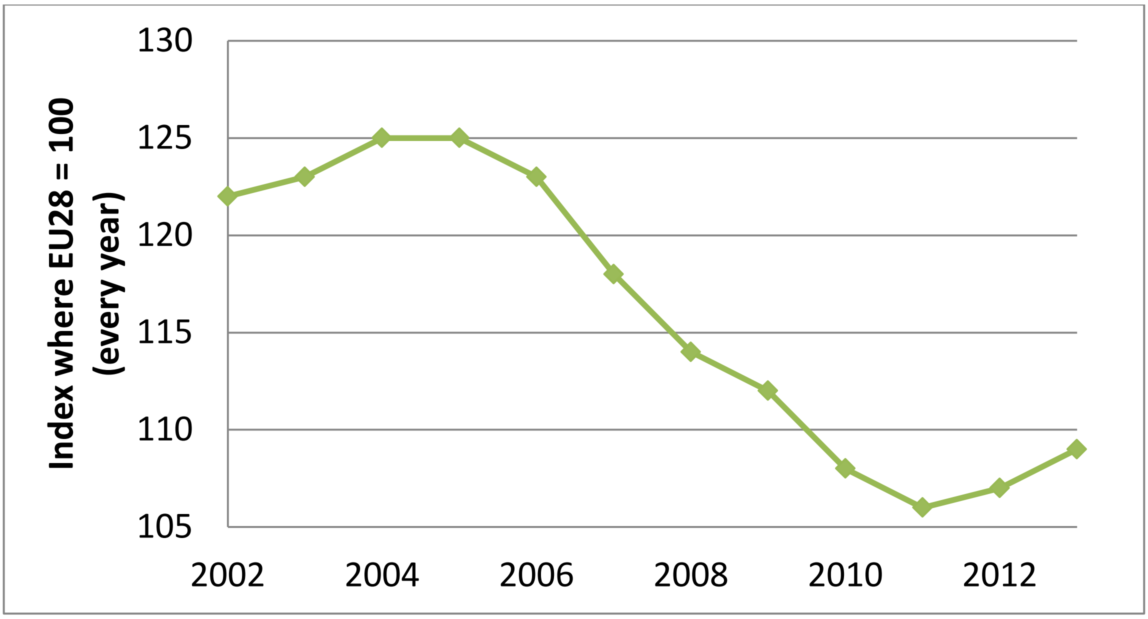


Figure 16.2: Index of UK GDP per capita, adjusted for purchasing power parity, compared with EU28 average (=100), 2002 – 2013

Source: Eurostat

Central government debt

In common with many other EU countries, the UK's government debt has risen considerably since the global economic crisis. In 2013, it stood at 87.2% of GDP, slightly higher than the EU28 average.

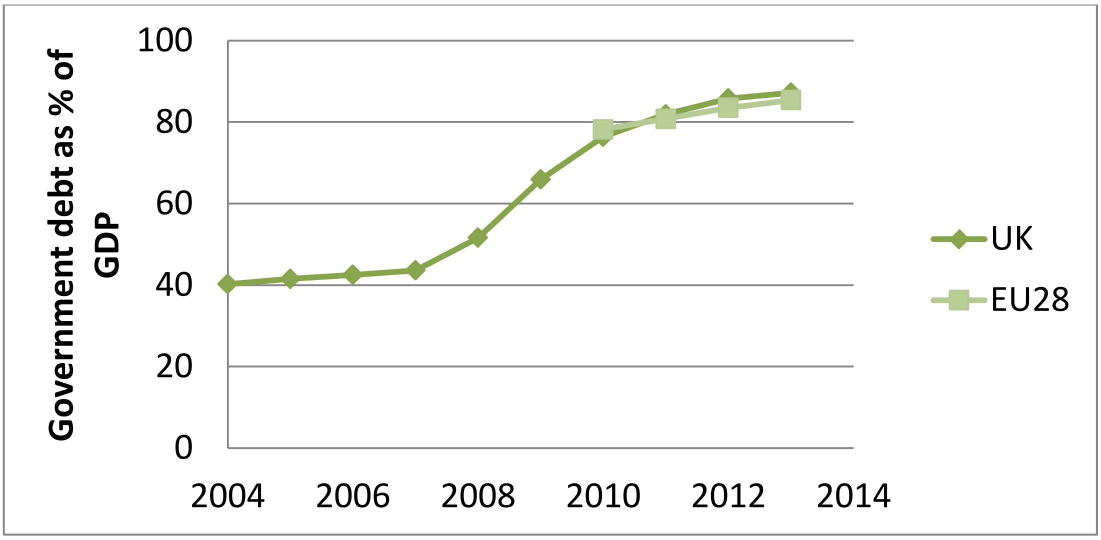


Figure 16.3: Government debt as a percentage of GDP, UK and EU28, 2004 - 2014

Source: Eurostat

Household electricity and gas prices

When taxes and levies are included, the UK's household electricity prices are below the EU28 average.

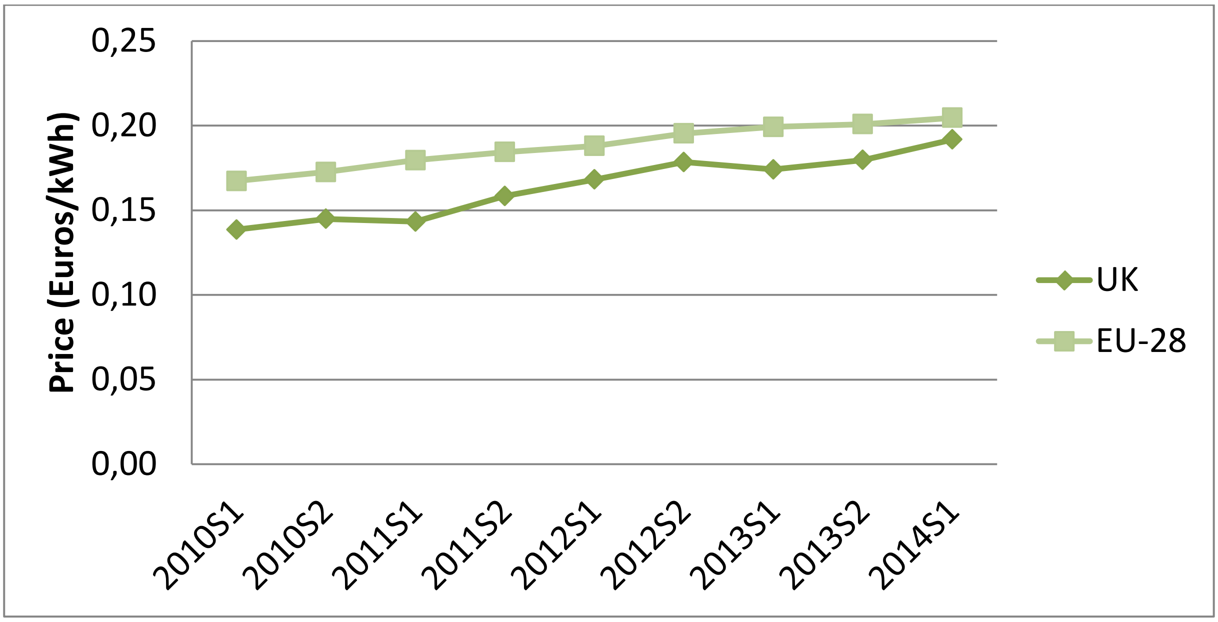


Figure 16.4: Household electricity prices, all taxes and levies included, UK and EU28, 2010 - 2014

Source: Eurostat

The UK's residential gas prices are very similar to the EU28 2010-13, although higher in the first half of 2014.

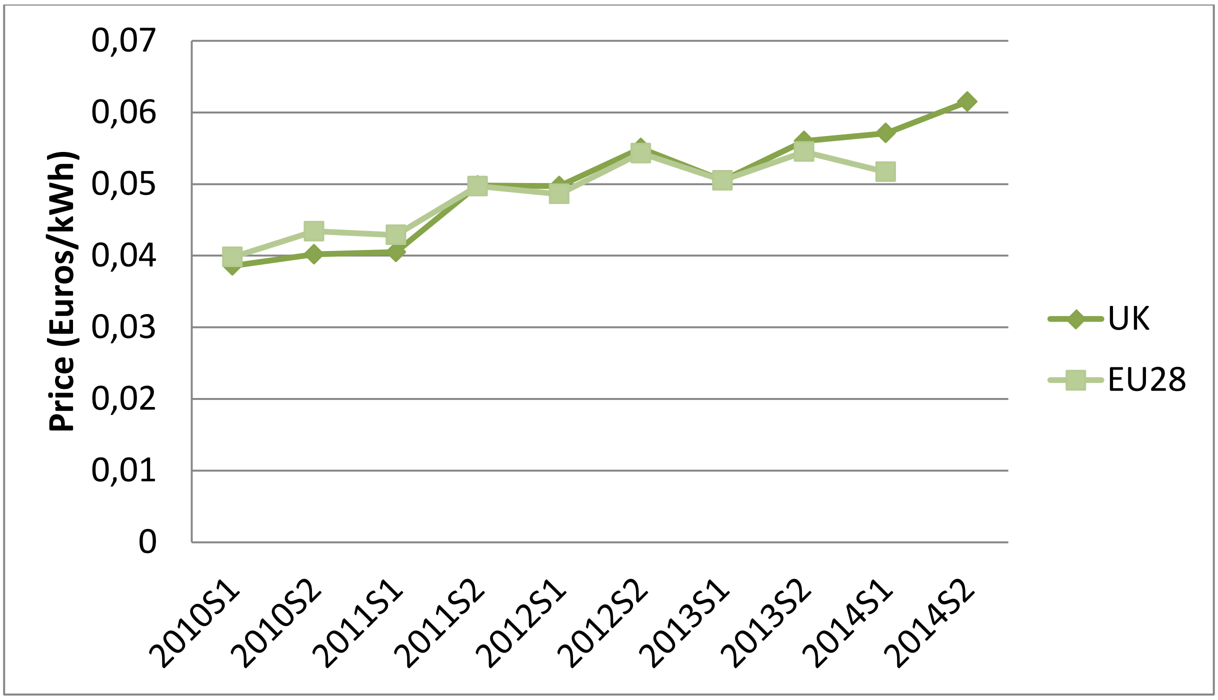


Figure 16.5: Household gas prices, all taxes and levies included, UK and EU28, 2010 - 2014

Source: Eurostat

According to Eurostat, the share of taxes and levies (including VAT) within the total price of electricity and gas was lowest in the United Kingdom (with taxes and levies accounting for 4.8 % and 4.9% respectively), resulting from a relatively low VAT rate being applied to the basic price, while no other taxes were added. Only one other EU country has taxes, levies and VAT that accounted for a single-digit share of the price of electricity (Malta) and natural gas (Luxembourg).

These low taxation rates reflect the political and social sensitivity of household energy prices in the UK. The key economy-related issue which is influencing the re-design of the UK's EEO is the cost of energy for households, and the percentage that energy company EEO programmes add to household bills. In a time of constrained household incomes and high global energy prices, this is an important political issue. The effect of this on EEO re-design has been to reduce the energy savings targets, and to move away from an initial focus on higher cost measures in the current phase (2013 – 2017) (described in more detail in the UK report on EEOs)

Energy Dependence

The UK went from being a net energy exporter, to needing to import energy in 2003-04, as oil and gas extracted from its North Sea reserves fell. Since that time, national oil and gas production has continued to fall, and, in consequence, the UK's energy dependence is increasing. It is now approaching the EU average. The EU average has risen somewhat over time.

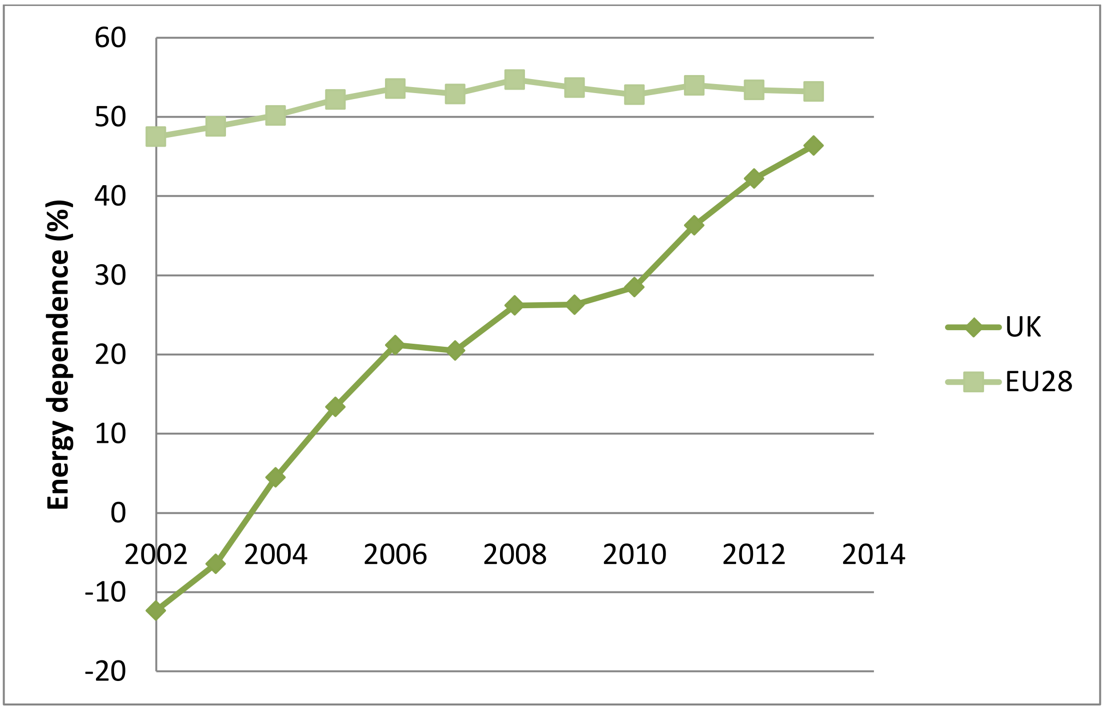


Figure 16.6: Energy dependence, imports as a percentage of total energy consumption, UK and EU28, 2002 - 2013

Source: Eurostat

As the UK has become more dependent on energy imports, energy security has become a more prominent aspect of public debate and energy policy. However, this has largely focused attention on issues around energy supply (e.g. the role of renewables and nuclear, the geography of energy imports), rather than leading to an increased focus on reducing demand through EEO and other efficiency policy.

16.1.2 Evaluation of economic preparedness - Identification of financial challenges

An EEO is already in place in the UK, and has been for two decades. Its design did become a matter of public and political debate, due largely to a combination of the economic climate and rising world energy prices – as explained later.

16.2 Energy & Climate Change profile (Energy Savings' Potential)

The pattern of final energy use by sector has changed considerably in the UK from 1980 to the present time. Energy use in the industrial sector is approximately half of what it was at that time, while transport and domestic energy use have both increased. Energy use in the commercial, public administration and agricultural sectors has changed relatively little over time, despite very strong growth in economic activity in the commercial sector. In recent years, final energy consumption in both the domestic and transport sectors has fallen considerably. Domestic energy use reached a peak in 2004, and has been falling since that point (with the exception of the particularly cold year of 2010).

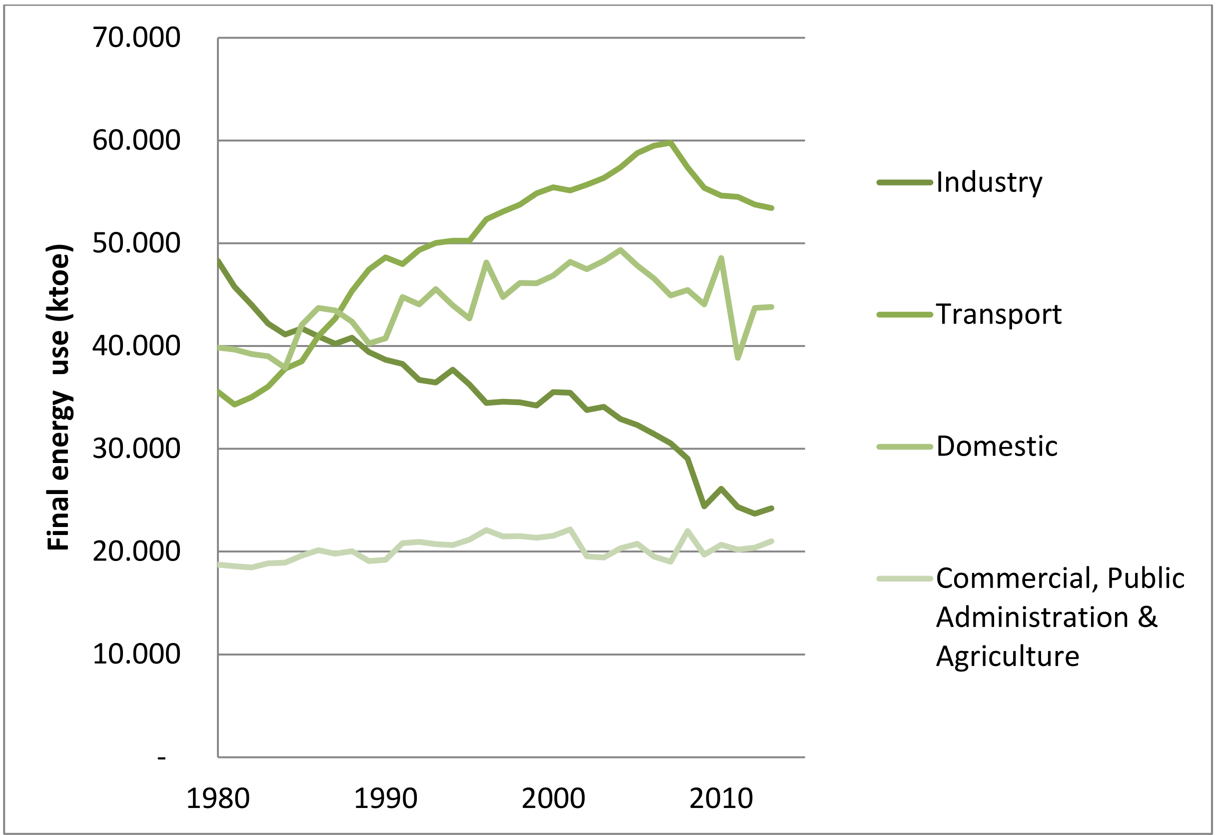


Figure 16.7: Final energy consumption by sector, UK, 1980 - 2013

Source: (DECC, 2014c)

The UK's energy intensity is lower than average for the EU. Energy intensity reflects the structure of an economy as well as its energy efficiency.

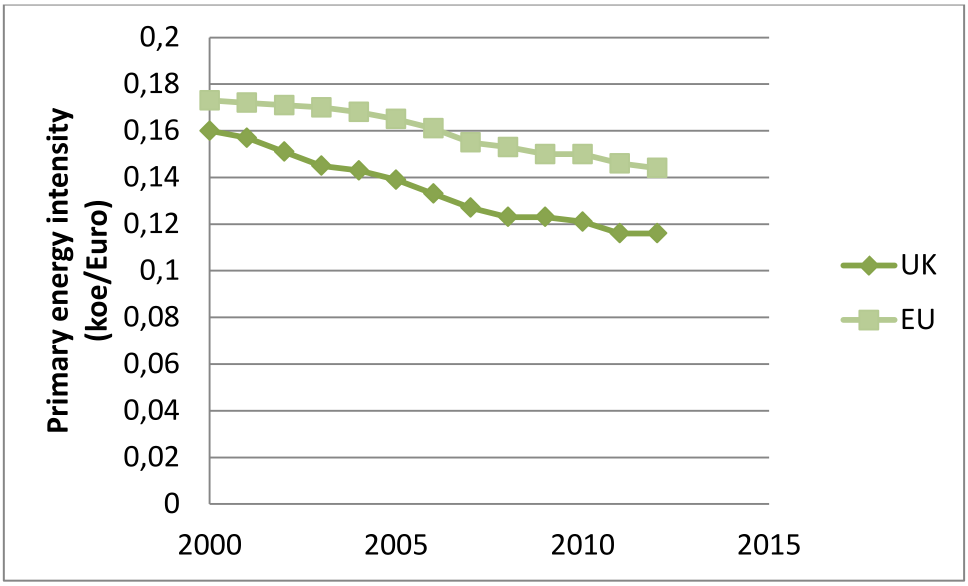


Figure 16.8: Primary energy intensity at purchasing power parities (ppp, 2005) with climatic corrections, UK and EU28, 2000 - 2012

Source: Odyssee-Mure

The index for efficiency gains (in transport, residential and industrial sectors) indicates that the UK has made gains in efficiency improvement in recent years, and now exceeds the EU average.

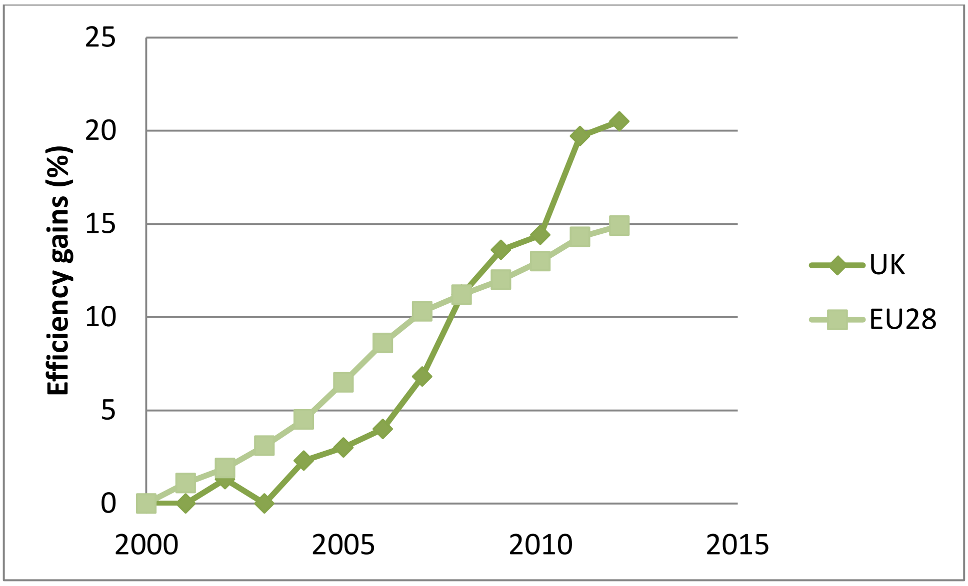


Figure 16.9: Percentage overall energy efficiency gains (industry, residential, transport), UK and EU28, 2000 - 2012

Source: Odyssee-Mure

Building stock

There UK housing stock is generally reported to be amongst the oldest and least-efficient in the EU. Although the graph below shows that the UK energy use per dwelling is now similar to the EU average, it is not clear how much this is an effect of how the index has been calculated. There continues to be considerable concern about the inefficiency of the national housing stock, and the EEO has always focussed on this sector, to the exclusion of others (with the exception of a very small amount of funding for SMEs in the early years of the scheme).

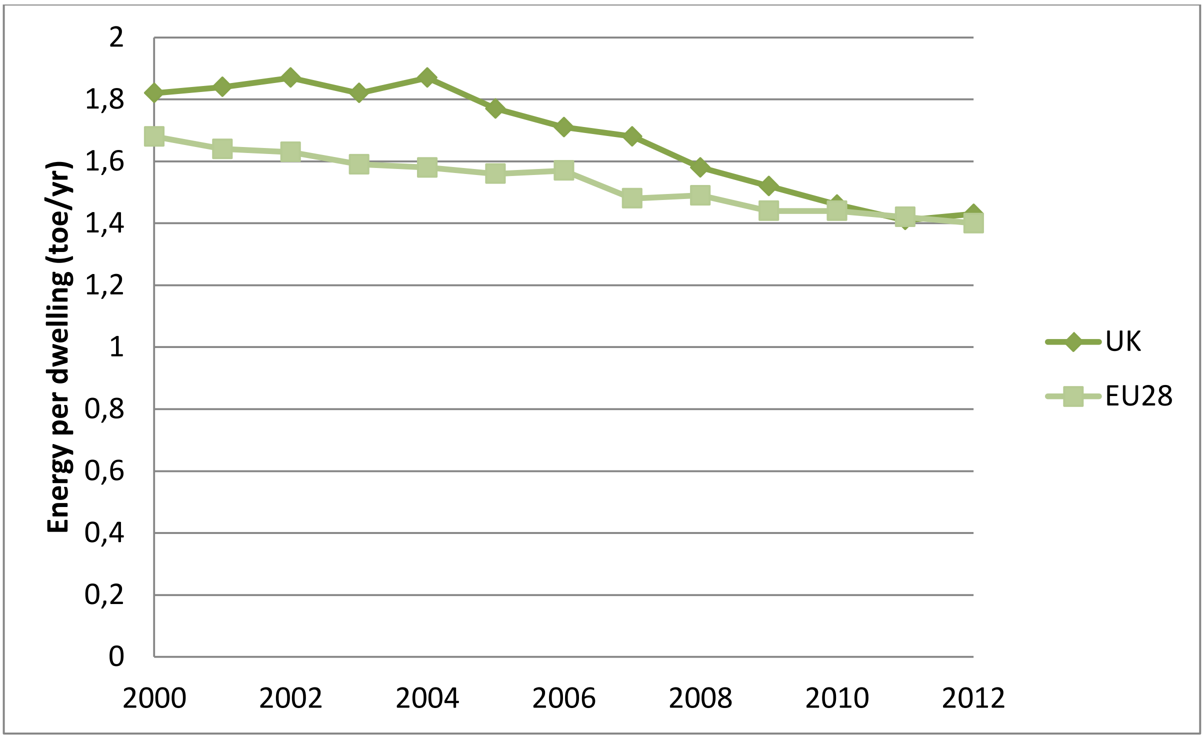


Figure 16.10: Energy consumption per dwelling with climatic corrections, toe per dwelling, UK and EU28, 2000 - 2012

Source: Odyssee-Mure

Industry

According to Eurostat figures, improvements in industrial efficiency have increased markedly in recent years in the UK, with total efficiency gains since 2000 considerably in excess of the EU28 average.

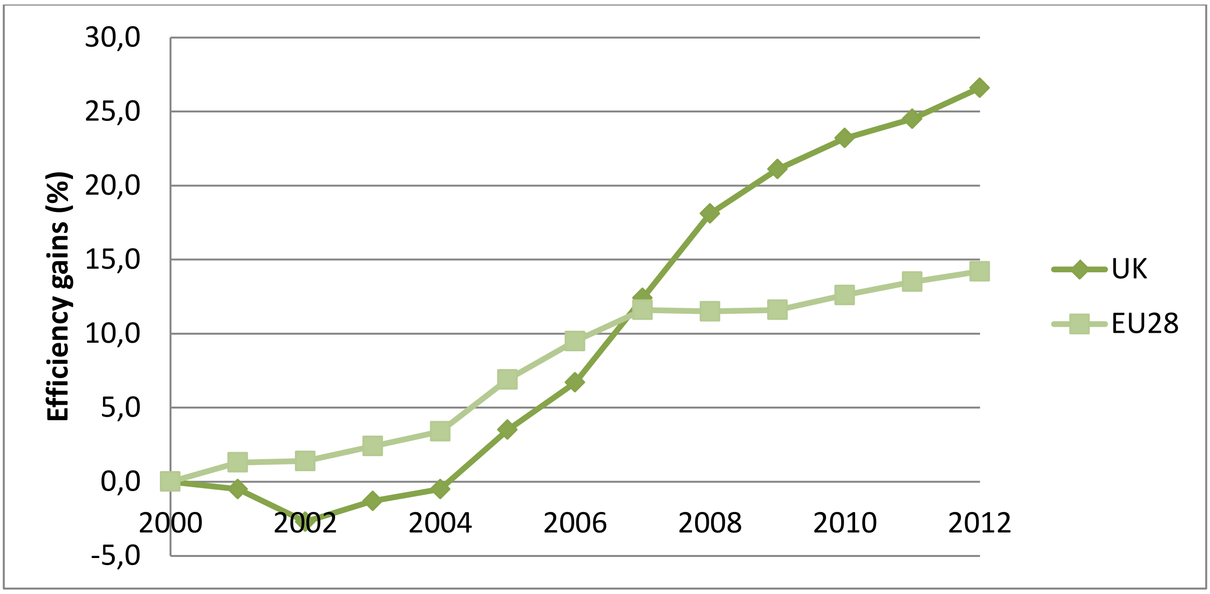


Figure 16.11: Energy efficiency gains in manufacturing industry, UK and EU28, 2000 - 2012

Source: Odyssee-Mure

Energy saving targets

The UK's target for energy saving (as described in its NEEAP, DECC 2014d) is 129.2 mtoe. This represents an 18% reduction in its final energy consumption, relative to the 2007 business-as-usual projection.

16.2.1 Evaluation of energy savings' capacity - Identification of challenges

The EEO is an important policy in enabling the UK to meet its savings targets. This is less true under the 2013-2017 phase of the EEO, due to redesign choices which do not prioritise energy and carbon savings to the same extent as in earlier phases. According to the UK's NEEAP, the cumulative effect of different phases of the EEO will amount to 36% of total savings delivered by policy to 2020 (DECC, 2014d).

The current phase of the UK's EEO, known as ECO (Energy Company Obligation), was designed to work in tandem with a loans for efficiency measures programme (Green Deal). Green Deal was supposed to increase the paid-for market for efficiency measures, which had been previously subsidized via earlier EEOs. However, this has not been successful (as shown by statistics presented in (DECC, 2014b), and so there is a large untapped potential for delivering efficiency measures to particular social groups and types of housing, which are largely outside the scope of the current EEO. This suggests there is room for further policy action to encourage uptake of these measures – whether that be an effective re-design of Green Deal, an expansion of EEO or another policy mechanism.

16.3 Market preparedness

The UK has run an EEO scheme for twenty years, and most of the obligated energy suppliers have been involved for the majority of that time. They have a proven capacity to deliver the savings targets set to date (with the exception of one part of the scheme, 2009-2012, which focused on disadvantaged householders (CESP), where only 85% of the carbon savings target was delivered). Giving a number of independent electricity generators savings targets 2009-2012 was less successful. They were included in a new and relatively complex part of the EEO scheme (known as CESP), and missed their targets by a long way. The revised EEO from 2013 no longer includes these actors.

16.3.1 Description of Status quo

SME Access to finance

The SMAF index provides an indication of the changing conditions of SMEs' access to finance over time for the EU and its Member States. The index is calculated using a baseline of EU 2007=100, and so allows comparison between countries and across time. The base reference of 2007 deliberately provides a baseline before the onset of the financial downturn.

The index comprises two main elements or sub-indices:

- Access to debt finance
- Access to equity finance

It does not include other sources of finance – such as peer-to-peer lending, which are becoming more important.

The UK's SMAF index has been higher than the EU average over 2007-2013 and has risen throughout the period. This, however, does not indicate that there are no problems with SME access to finance. It is acknowledged as something the government is seeking to improve. Data is regularly collected on SME access to finance on behalf of the government, via the SME Finance Monitor (http://bdrc-continental.com/products/sme-finance-monitor/). The British Business Bank, a development bank owned by the government, has recently been set up to improve SME access to finance.

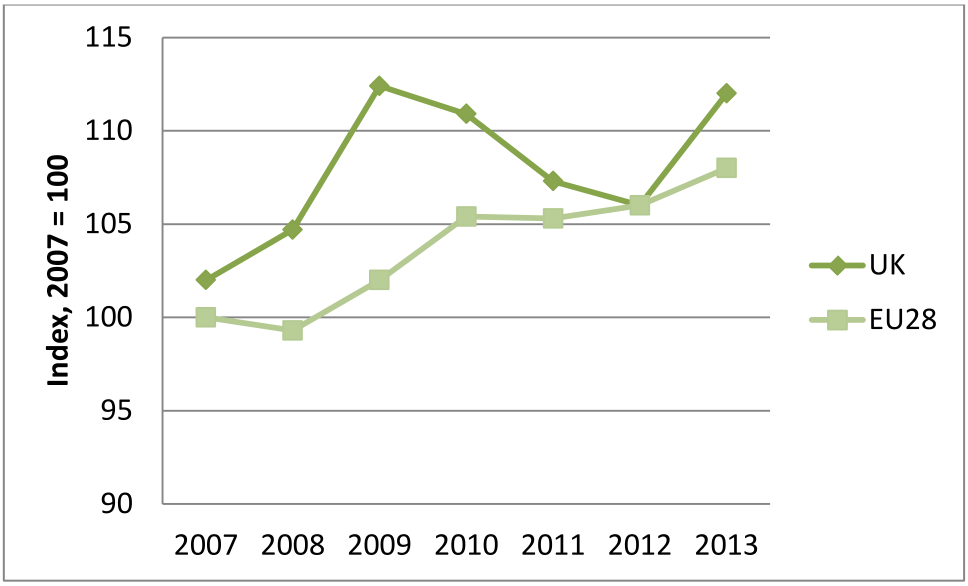


Figure 16.12: SME Access to finance index (SMAF), index value 2007=100, UK and EU28, 2007 - 2013

Source: Eurostat

Because the UK's EEO does not cover the SME sector, and the obligated parties are not SMEs, the SMAF indicator is not of high relevance to this policy. The organizations that actually deliver energy efficiency measures to homes (sub-contracted by the obligated parties) may be SMEs, and so there may be some relevance to those delivering the policy. This indicator is of more importance in other 'alternative' measures, e.g. policy to encourage SMEs to invest in energy efficiency measures.

ESCOs in the residential sector

The UK EEO only covers the residential sector, where there are very few ESCOs operating. Those which do exist are generally linked to CHP schemes. According to (Irrek et al., 2013), "typically an ESCO in the UK residential sector builds, operates and maintains the community or district energy scheme, sells energy to the end customers and provides customer care services." Irrek et al (2013) suggest that residential ESCOs may be few in number because what they term 'energy efficiency services' (better described as energy efficiency measures) are already provided by energy companies, and their sub-contractors, to meet EEO obligations.

Qualification/Certification of energy operators

The EEO system in the UK has an associated quality management system, which is overseen by the energy regulator, Ofgem. The system is applied to the obligated parties, and covers all measures funded under EEO, with regular reporting, sampling and inspections as part of the system. The key aim is to ensure that the measures installed will actually deliver the energy savings expected (energy savings are calculated on a 'deemed' basis). Fuller details are given in the document describing the UK EEO.

Energy retailers

Energy retailers are the obligated parties under the EEO. There are currently seven obligated parties, the so-called 'Big Six' and one new market entrant.

The UK energy regulator, Ofgem, and the Office for Fair Trading completed a review of retail competition during 2014 (www.ofgem.gov.uk). Their key conclusion was that competition isn't working as well for consumers as it should. Findings included increasing distrust of energy suppliers, uncertainty about the costs and benefits of the relationship between the supply businesses and the generation arms of the six largest suppliers, and rising profits with no clear evidence of suppliers reducing their own costs or becoming better at meeting customer expectations. Ofgem have referred the retail energy market to the Competition and Markets Authority (CMA), which has greater powers to address any structural, long-term barriers to competition. It is expected to report by the end of 2015. Its conclusions could lead to significant change in the energy retail market. CMA's findings, and subsequent changes to the retail energy market, could affect the design of future phases of the EEO.

16.3.2 Evaluation of market preparedness – Identification of challenges

As mentioned earlier, the UK has a long-standing EEO, which is redesigned every few years. To date, there has generally been capacity in the efficiency measures market to deliver sufficient measures so that the obligated parties meet their targets. This was less true in the 'Community Energy Savings Programme' (CESP) which ran 2009-2012 (part of the overall EEO scheme), where partnerships working with local authorities and other actors, and targeting vulnerable groups proved more difficult than anticipated, leading to 85% delivery on target. There has also been a challenge around delivering sufficient solid wall insulation, where this is a key sub-target in both the previous and current EEO scheme.

Challenges are:

- Successfully identifying vulnerable groups, and delivering measures to them
- Building up the solid wall insulation industry to meet targets
- Managing the change in emphasis in EEO, particular the large changes which took place in 2012 / 2013, which have led to the collapse of the cavity wall and loft insulation sector (this has been partly resolved by a re-design of the current EEO)

16.4 Administrative preparedness

16.4.1 Description of Status quo

UK government effectiveness and regulatory quality, as measured by indices calculated by the World Bank, are in the top ten and top five percent of global governments respectively (as calculated in 2013 - http://info.worldbank.org/governance/wgi/index.aspx#home). The UK has run an EEO for twenty years, without major problems arising from either lack of government effectiveness or poor regulatory quality.

Managing additionality issues effectively is one of the key features of a successful EEO scheme. The UK has measures to ensure additionality within its EEO – one of the effects of which is to reduce the number of free-riders (where free-riders are people who would have adopted the technology in the absence of the incentive).

Additionality is ensured in a number of ways

- Measures are only allowed if the technology has an expected energy efficiency performance exceeding the minimum required by law and the average efficiency in the market. For example, B-rated boilers were disallowed at the point they were made mandatory in the UK in 2005.
- Measures are not usually included in the list of eligible measures, where there would be very high levels of free riders, e.g. double glazing.
- At the measure level, savings are discounted by an 'in use factor' based on the savings observed in monitored installations compared to those from engineering calculations. This 'in use factor' accounts for the difference between ideal and actual savings, whether arising from technical under-performance, poor installation, 'take back' by householders (also known as the rebound effect) or a combination of these.
- At the programme level, the expected savings of the policy as a whole are reduced to take into account a modelled counterfactual, i.e the number of installations expected without the EEO.

Elements of the current EEO scheme are restricted to certain priority groups, thus excluding higher income people, who might be considered free riders.

16.4.2 Evaluation of administrative preparedness in relation to the EEO scheme

The EEO has been administered by the same organization – the energy regulator (Ofgem) – for several years, and there is no suggestion that this arrangement is problematic or likely to change.

16.5 Legislative preparedness

16.5.1 Description of Status quo

Legislative procedures and capacity to manage these are well-established in the UK.

16.5.2 Evaluation legislative preparedness – Identification of challenges

There are no particular legislative challenges to re-designing the EEO. The challenges relate more to the politics and economics of re-design.

16.6 Social & Political acceptance/feasibility

16.6.1 Description of Status quo

The social and political feasibility of the EEO has been less secure in recent times, and after a public and political debate centred around energy costs in late 2013, the EEO was re-designed to make its targets, and hence its cost, less ambitious. More lower-cost measures were also included in the scheme, largely to reduce costs to householders (through reducing EEO charges on energy bills), but also to support sectors of the insulation industry. Despite there being sound analysis and years of experience showing that the EEO would reduce the total costs of energy use rather than increase them, political leaders chose to focus only on the additional up-front cost to bill payers, ignoring cost savings from efficiency.

Consumers' trust in their energy supplier

Householder trust in energy companies is widely acknowledged as being low in the UK (e.g. - https://www.gov.uk/government/speeches/energy-uk-conference-trust-and-consumer-engagement) - a government minister's speech to the energy industry) – but see later for further comments on this.

Fuel poverty

Fuel poverty has been acknowledged as an important social problem in the UK for a number of years, and it is generally agreed that improving the energy efficiency of dwelling for lower income households is the long term solution. Fuel poverty statistics are calculated by country in the UK, and different countries now use different definitions of fuel poverty (England uses 'low income high costs', while Wales, Scotland and Northern Ireland use the original definition of needing to spend more than 10% of income to achieve adequate energy services). In England, under the ‘low income high costs’ definition, in 2012 the number of households in fuel poverty was estimated at 2.28 million, representing 10.4% of English households (DECC, 2014a).

The changed definition in use for England has been controversial, and it has been claimed that it has reduced the number of households defined as being in fuel poverty by 2.36 million in 2014 (Association for the Conservation of Energy, 2014).

In terms of the EEO, until the latest version (Energy Company Obligation, 2013-2017) there had been no expectation that the EEO policy would directly tackle fuel poverty. There was a separate policy for that, funded by general taxation (‘Warm Front’), until the end of 2012. The EEO was designed to ensure lower income households received a fair share of benefits, but not to prioritise those in fuel poverty. Since 2013, the EEO has been partly designed to direct efficiency measurements to those in fuel poverty.

There are proposals by the Labour party (currently the main opposition party) to redesign the EEO so nearly all funding goes to those at risk of fuel poverty, post-2017 (One Nation Labour, 2014).

16.6.2 Evaluation of social acceptance/feasibility – Identification of challenges

During the debate about re-designing the EEO in 2013, a number of the large energy suppliers (the obligated parties) made public statements against the continued imposition of any EEO. Thus some of the powerful stakeholders see it as being in their interests to remove this policy – which may be a threat.

The UK Labour Party has promised to have an ‘energy price freeze’ if it is elected into government in 2015. While this does not necessarily constitute a threat to the EEO, a focus on prices as being the only way of framing consumer benefits from energy policy is a threat.

The UK EEO has consistently been structured to ensure that lower income and disadvantaged groups are treated fairly within the scheme. There have been debates about the balance between ensuring a policy which does not have adverse distributional impacts (i.e. taking from the poor and giving to the rich) and delivering high levels of savings at low cost. But the focus on ensuring a just distribution of costs and benefits has remained. However, EEO has not been intended to tackle the larger issue of fuel poverty, which remains a major social problem. If it were judged as a policy which should have resolved fuel poverty, then it could be seen as a failure – another threat to its continued existence.

Householder trust in energy companies is widely acknowledged as being low (e.g. - https://www.gov.uk/government/speeches/energy-uk-conference-trust-and-consumer-engagement) - a government minister's speech to the energy industry). However, this has not prevented EEOs being successfully delivered in the past, and it is not clear that it constitutes a significant challenge. Nevertheless, there is some debate about moving responsibility for delivering savings from the energy companies towards local authorities, who are more trusted and may be better able to increase participation, particularly in disadvantaged communities (One Nation Labour, 2014).

More generally, the debate about how the next round of Energy Efficiency Obligations, post-2017, should be designed, has already begun, with a wide range of options currently being explored (Roberts et al., 2014).

REFERENCES

Association for the Conservation of Energy, 2014. Fuel poverty: 2014 update. Association for the Conservation of Energy, London.

CIA, 2014. The world factbook. Central Intelligence Agency, Available at: https://www.cia.gov/library/publications/the-world-factbook/geos/uk.html [accessed March 2015].

DECC, 2014a. Annual fuel poverty statistics report, 2014. Department of Energy and Climate Change, London.

DECC, 2014b. Domestic Green Deal and Energy Company Obligation in Great Britain, Monthly Report (June 2014). in: Change, D.f.E.a.C. (Ed.). fc, London

DECC, 2014c. Energy consumption in the UK: Domestic data tables, 2014 update. Department for Energy and Climate Change, London.

DECC, 2014d. UK National Energy Efficiency Action Plan. Department for Energy and Climate Change, London.

Irrek, W., Bertoldi, P., Labanca, N., Suerkemper, F., 2013. ESCOs for residential buildings: market situation in the European Union and policy recommendations, ECEEE Summer Study Proceedings, Toulon/Hyères, France.

One Nation Labour, 2014. An end to cold homes: One Nation Labour's plans for energy efficiency. The Labour Party, London.

ONS, 2014. Compendium of UK statistics: population and migration, Available at: http://www.ons.gov.uk/ons/guide-method/compendiums/compendium-of-uk-statistics/population-and-migration/index.html [accessed March 2015].

Roberts, S., Redgrove, Z., Blacklaws, K., Preston, I., 2014. Beyond ECO: An exploration of options for the future of a domestic Energy Supplier Obligation. Centre for Sustainable Energy, Bristol.

ONS, 2015. United Kingdom Economic Accounts, Office for National Statistics, London.