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Short term high quality studies to support activities under the Eastern Partnership

HiQSTEP PROJECT

STUDY ON ENERGY EFFICIENCY IN INDUSTRIAL SECTORS IN GEORGIA AND AZERBAIJAN

Component 2 Report:

Overview and Gap Analysis of the Energy Efficiency Framework in Industry in Georgia and Azerbaijan

June 2017

Contents

List of Tables

List of Figures

List of abbreviations

ABEMDA	State Agency for Alternative and Renewable Energy
ACA	Accelerated Capital Allowance for Energy Efficiency Equipment
BEMS	Building Energy Management Systems
CDM	Clean Development Mechanism
DSM	Demand Side Management
EE	Energy Efficiency
EEC	Energy Efficiency Centre
EED	Energy Efficiency Directive
EERSF	Energy Efficiency and Renewable Sources Fund
EnC	Energy Community
ENI	European Neighbourhood Instrument
EnMS	Energy Management System
EPC	Energy Performance Contracting
ESCO	Energy Service Company
EU	European Union
GDP	Gross Domestic Product
GHG	Greenhouse gas
GoA	Government of Azerbaijan
GoG	Government of Georgia
IEA	International Energy Agency
LIEN	Large Industry Energy Network
M&V	Measurement &Verification
MEPS	Minimum Energy Performance Standard
NAMA	Nationally Appropriate Mitigation Action
NEEAP	National Energy Efficiency Action Plan
NGO	Non-Governmental Organisation
PEEREA	Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects
RES	Renewable Energy Sources
SEAI	Sustainable Energy Authority of Ireland
UMID	Social Development Public Union

Preface

This report presents a review and assessment of the Azerbaijani and Georgian relevant Energy Efficiency framework targeting the industry sector with focus on identifying gaps and elaborating proposals for sustainable Energy Efficiency improvement in industry. The report is part of the study “Energy efficiency in industrial sectors in Georgia and Azerbaijan”. The study has been implemented in the framework of the project ‘Short term high quality studies to support activities under the Eastern Partnership – HiQSTEP, EuropeAid/132574/C/SER/Multi’, carried out by an international consortium under the leadership of Kantor Management Consultants.

The study has been implemented between March 2017 and January 2018 by a team under the leadership of George GEORGOCOSTAS (Study Team Leader) and composed of the International Energy Efficiency Experts Konstantinos GEORGAKOPOULOS, Kyriakos ARGYROUDIS, the International Legal Expert Nick PITSAS and the following national experts: Manana DADIANI (Georgia) and Azer ABDULLAYEV (Azerbaijan).

Overall supervision has been carried out by Przemysław MUSIAŁKOWSKI, Team Leader of the HiQSTEP Project.

The views presented in this report are those of the report authors only and do not represent the official position of the European Commission.

January 2018

Executive summary

1.1 Introduction

This report "**Component 2: Critical analysis of the EE framework in Azerbaijan and Georgia / gap analysis**" is drafted as part of the deliverables of the study **"Energy efficiency in industrial sectors in Georgia and Azerbaijan",** which is implemented under the project "High quality studies to support activities under the Eastern Partnership" (EuropeAid/132574/C/SER/Multi)".

The overall **aim of the study** is to:

- present EU policies, rules, regulations and tools on energy efficiency (EE) and energy savings, emphasizing on selected industries after consultation with the EC;
- review the overall methodology for conducting energy audits in the countries under consideration;
- map and assess existing policies, rules, regulations and tools towards the implementation of EE measures in specific industrial sectors in Azerbaijan and Georgia; and
- develop pre-feasibility studies for the implementation of EE measures in typical industries following the completion of short energy audits.

The study also aims to prepare a preliminary list of energy savings possibilities and an evaluation of such possibilities based on energy, environmental, technical, operational and economic criteria. The study will conclude with elaboration of recommendations on how to further enhance industrial EE in Azerbaijan and Georgia.

The study is comprised of three Components:

- **Component 1** covered mostly the review of the industrial EE policies, rules, regulations and tools applicable mostly in the EU and the Energy Community (EnC) Contracting Parties. Component 1 dealt also with the methodology, procedures for the conduction of energy audits as well as with the responsibilities of Member States (and EnC Contracting Parties) towards the certification of energy auditors.
- **The present Component 2** includes a review and assessment of the Azerbaijani and Georgian relevant EE framework targeting the industry sector with focus on identifying gaps and elaborating proposals for sustainable EE improvement in industry.
- **Component 3** will include the development of four pre-feasibility studies for the implementation of EE measures in typical industries following the completion of short energy audits. Component 3 will conclude with elaboration of recommendations and proposals for energy saving possibilities in the two beneficiary countries.

In more detail, the **aim of the present report, which relates to Component 2 of the study** is to:

- conduct a comprehensive overview of the EE framework currently in force in Georgia and Azerbaijan, focussing especially on their respective industrial sectors;
- carry out an in-depth appraisal of the relevant legal, regulatory, and policy instruments in both countries against the backdrop of the prerogatives set in the EE acquis with the aim to identifying existing gaps that required to be filled in;
- elaborate concrete proposals for improvements on the existing framework regulating EE policies in the Georgian and Azeri industrial sector; and

- set in motion the process of cooperation and exchange of best practices between the two countries through coordinated collaborative actions and joint initiatives for EE in their respective industries.

1.2 Review of the current legislation and policies on EE in the industrial sector in Georgia

Georgia has recently joined the Energy Community Treaty as a **Contracting Party. All Energy Community Acquis, including this related to EE, must be transposed and implemented**.

Currently Georgia, supported by EBRD Technical Assistance, elaborates the draft **EE Law**, transposing EE Directive (2012/27/EU). This law will streamline the whole EE activity in the country.

In addition, the country is currently in the **final stages of adopting a National Energy Efficiency Action Plan (NEEAP)**, which has been elaborated in accordance with the provisions of Directive 2012/27/EC. The NEEAP sets the country's indicative national EE targets for 2020, 2025, and 2030 and estimates expected energy and GHG savings by measures per sectors. More vitally, it specifies the primary policy measures that can effectively address EE in industry, such as:

- incentivising / mandating EE in industry, which is expected to stimulate interest and improve the financial case for investment even beyond the strong financial parameters present;
- training and education, including energy advisory programmes, which will educate industry's decision-makers on investment options;
- qualification, accreditation, and certification schemes, and potentially to EE investment schemes, which are anticipated to increase the level of certified expertise in the industrial sector to better enable investment planning and implementation; and
- energy audits and management systems, boiler inspections in the industry sector, which will require energy audits/energy management in large industries and encourage them in SMEs.

Furthermore, the draft NEEAP includes:

- the improvement of the statistical data on industry production and energy consumption;
- a programme of technical assistance for the period 2017-2020;
- the linking of energy audits from the horizontal measures to investments in this sector, which has technical assistance requirements; and
- the making of investment from industry – via a credit line, bank financing, or other financing sources of a total of approximately EUR 106 million over the period of 2017 through 2020.

However, until the drafting of the current report and apart from the draft NEEAP, **Georgia has not yet put in place any particular legislative framework directly related to the development of its EE policies,** let alone any legislation specifically targeting the enhancement of the efficient operation of its national industrial sector. However, **references to the need to improve EE are scattered across a number of legislative acts**. The most important pertinent pieces of legislation are the following.

The **Law on Electricity and Natural Gas** regulates the country's power and gas markets. In the field of **EE**, it stresses the importance to promote growth of efficiency in the areas of electricity

generation, transmission, dispatch, distribution, import, export and consumption, as well as in the areas of natural gas supply, import, export, transportation, distribution and consumption. In addition, it emphasizes the need to prioritize the utilization of RES and to support the implementation of EE measures relating to an increase in the efficiency of energy resource production.

Another key document is the "***Main Directions of the State Energy Policy of Georgia***", which was adopted on June 2015 as a new energy strategy. The document specifically mentions the development and implementation of an integrated approach to EE as one of the primary goals of the national energy policy.

EE and the efficient use of energy are also incorporated into the Social-economic "***Development Strategy of Georgia - Georgia 2020***"[1], a document that also envisages the introduction of the relevant legislative mechanisms in order to enhance the country's energy security and to promote the rational use of resources in accordance with international and European norms.

In addition, the Government of Georgia - with the assistance of the USAID - has prepared a **draft National Low Emission Development Strategy** with the view to increasing climate change mitigation through EE and clean energy and to promoting and facilitating private sector investments in EE improvements and green buildings.

Finally, it needs to be mentioned that Georgia is at present **finalizing the development for a new Building Code** that will take into consideration the proposed EE targets and specify minimum energy performance indicators for buildings.

The **primary State central bodies** in charge of drafting, implementing and monitoring compliance with EE related legislation and in developing and promoting the relevant policies and standards are the Ministry of Energy, the Ministry of Economy and Sustainable Development and the Ministry of Environment and Natural Resources. The **Ministry of Energy** has the overall responsibility for the development of the national EE framework and, for this purpose, a **Department of Energy Efficiency and Renewable Energy has been recently set up** with responsibility to design the necessary EE strategic policies and actions plans in line with the prerogatives of the relevant EU legislation. The duties of the **Ministry of Economy and Sustainable Development** include the promotion and coordination of EE activities in the industrial, construction and transport sectors and the preparation of any EE policy and standards for these sectors, which are to be included in the NEEAP.

1.3 Assessment of compliance of Georgia with EU norms relating to EE in industry

Georgia lacks a sound regulatory framework to support EE investments in industry, since the current legislative regime does not fully address the needs for establishing an effective EE market. In more detail:

- **Georgia has not formulated a comprehensive and well-elaborated strategic vision for the medium- to long-term direction of its energy and related policies and implementing mechanisms** in line with the country's long-term economic outlooks; as a

[1] See Social-economic Development Strategy of Georgia "GEORGIA 2020" (2013), which is available at https://www.adb.org/sites/default/files/linked-documents/cps-geo-2014-2018-sd-01.pdf.

result, EE, especially as regards the reduction in industrial energy consumption, is not well integrated into the broader policy framework of economic development;
- **there does not exist at present any primary or secondary legislation** specifically addressing the carrying-out of any EE activities;
- **the EE legislative references are of a very general nature** and do not systematically set out the horizontal national policy objectives and instruments in the field of EE;
- **the present framework does not provide for a lucid and coherent institutional structure and responsibilities regarding the implementation of the EE initiatives** envisaged in the NEEAP. This is especially the case in respect of EE measures pertaining to the industrial sector as the relevant competences seem to be divided between the Ministry of Energy and the Ministry of Economy and Sustainable Development;
- there are **no specific EE measures in the NEEAP related to energy labelling, the promotion of energy service companies (ESCOs)**, etc.;
- **no proper incentives and support or voluntary mechanisms have been set up** to encourage the wider use of EE measures in the industrial sector;
- **no concrete scheme for sanctions** exists to penalize any breach of EE obligations;
- there is **not in place any monitoring mechanism** for appraising any progress made with the implementation of EE policies and measures.

As a conclusion, **Georgia has yet to develop a sound EE strategy and pertinent regulatory framework for EE in its national industrial sector that is compatible with the corresponding EU standards**.

1.4 Proposed policy initiatives for further uptake of EE in the Georgian industrial sector

Potential policy initiatives that could be undertaken by the Government of Georgia are:

- the improvement of the **existing legislative framework**;
- the refinement of the **present institutional framework** for industrial EE;
- the introduction of **certain key policy initiatives**, which will motivate, or even oblige, industrial enterprises to initiate the installation of EE measures;
- the formulation of **fiscal and financial EE instruments**;
- the formulation of **information and capacity building policies**; and
- the **monitoring and evaluation** of the policies / initiatives to be implemented.

Each initiative is analysed in brief below.

1.4.1 Improvement of the existing legislative framework

The Study Team recommends that one of the necessary actions towards this direction involves the **preparation by the GoG of the primary EE legislation** so that the country can meet its commitments under the Energy Community Treaty and the EU Association Agreement and achieve the goals set out in the NEEAP. In this respect, the first step is the **adoption of an Energy Efficiency Law**, which will transpose the EE Directive (2012/27/EU). As aforementioned, **Georgia is in the process of drafting - with EBRD's assistance - an Energy Efficiency Law**, which will be compliant with the requirements of the EE Directive. However, this Law should be complemented with the adoption of all the necessary secondary acts, which will further elaborate the legal, regulatory and financial mechanisms, and specify clear and enforceable technical rules, for the implementation of EE investments in industry. In addition, it will be necessary that the GoG

commences the process of gradually transposing a number of pieces of EU legislation, whose implementation is expected to have a very favourable impact in the area of industrial EE, such as:

- the **Industrial Emissions Directive** (Directive 2010/75/EU);
- the **Eco-design Directive** (Directive 2009/125/EC) and the **Energy Labelling Directive** (Directive 2010/30/EU);
- the **Directive 2008/1/EC** concerning integrated pollution prevention and control.

Last but not least, the Study Team deems it imperative that the gradual transposition of the aforementioned pieces of EU legislation should be accompanied by their **effective and transparent enforcement by the competent State bodies**.

1.4.2 Refinement of the present institutional framework

At present, aspects of the EE policies relating to the Georgian industry are **split between the Ministry of Energy,** which has overall charge of the national EE framework**, and the Ministry of Economy and Sustainable Development**, which is, *inter alia*, responsible for matters relating to sustainable development and green economic growth of the country and the promotion and coordination of EE activities in the industrial sector. However, the Study Team recommends designating **a single authority to have full competence** over EE policies and measures in industry.

Another topic that will need to be investigated concerns the potential **designation of a dedicated national Energy Efficiency Agency**, which - as an autonomous public body - will be in charge of stimulating investments in EE in all sectors of the domestic economy (including in industry) and push forward the implementation of EE improvements. It is understood that the GoG is currently considering the establishment of an Energy Efficiency Agency, as envisaged in the NEEAP, under a separate technical assistance project. This is expected to be a **very important milestone** in the process of untapping the country's large energy savings' potential and of progressively putting in place a functioning and sustainable local EE market.

1.4.3 Introduction of certain key policy initiatives

The initiatives recommended by the Study Team to be implemented are the following:

- the improvement of the collection and processing system of industrial data;
- the carrying-out of energy audits by industrial operators;
- the establishment of an accreditation and certification system for energy auditors;
- the adoption and implementation of internationally accepted standards on energy auditing and energy management;
- the introduction of sub-metering requirements for industrial facilities;
- the imposition of minimum energy performance standards; and
- the development of industry-wide EE groupings and networks.

1.4.4 Formulation and implementation of fiscal and financial EE instruments

The policy initiatives outlined above are unlikely on their own to increase the flow of EE investments in the Georgian industry. Therefore, the Study Team recommends to the GoG that these initiatives should be accompanied by Government-supported central targeted programmes of **fiscal and financial nature**, which will lower the high costs of development of EE industrial projects, enhance local access to EE technologies, products and equipment and positively influence the speed with which EE improvements are taken on by industrial enterprises. In this

respect, financial incentives might include:

- **subsidies** or **grants** provided by programmes that are to be developed by the competent State authorities to carry out energy audits, to use other energy services and/or the purchase of EE related equipment and products;
- the provision of long-term low or free-interest **loans**, which could be made available by local financial institutions, preferably with the financial assistance through dedicated credit lines of international financial institutions, to subsidize part of the capital cost of some EE interventions;
- investment **credits** or State-backed **guarantees**, which could be furnished to support the implementation of EE upgrades or for the adoption of proven EE technologies by industrial operators; etc.

Financial support from the GoG and the competent State authorities, international financial institutions and development agencies **will also be needed in order to provide technical training and capacity building to various stakeholders' groups**, support the research, development, demonstration and deployment of EE technologies, including the carrying-out of pilot projects, improving information dissemination and raising general awareness of the benefits of EE investments in industry. On the other hand, **fiscal policy initiatives** provided by the GoG could include the granting of **tax refunds, deductions, rebates or profit-tax credits** to industrial enterprises and/or original equipment manufacturers.

However, since State-backed support schemes are unlikely on their own to sustain the long-term viability of EE investments, the GoG will eventually need to promote the use of specific market-based energy policy initiatives, like **the gradual development of the energy service sector through the promotion of ESCOs** and **energy performance contracting (EPC)**.

1.4.5 Formulation of information and capacity building policies

The Study Team considers vital to **improve the know-how and capabilities of the Georgian industrial companies** so as to develop and implement effective EE programmes, as well as to boost up the capacities of other actors, such as energy auditors, original EE equipment manufactures and technology vendors as well as of the banking and financial sectors. Such capacity building activities in the form of **training activities, workshops, discussion platforms, working groups, etc. will need to be formulated and implemented** not only by the competent State authorities, but also through international agencies and donors, IFIs and international partnerships.

More importantly, the Study Team strongly suggests to the GoG that their implementation is supplemented with the execution of well-focused **small demonstration projects**, so that industrial companies can gain tangible practical experience on energy auditing and energy management.

1.4.6 Monitoring and evaluation of the policies and initiatives to be implemented

In order to accurately screen and appraise progress, **it would be useful** that the State authorities having competence over EE industrial policies (the Ministry of Energy and the Ministry of Economy and Sustainable Development) **adopt a measurement mechanism** that will weigh up the extent of implementation success of each specific implemented initiative in specific time horizon (for instance, in a 5-year lifecycle up to 2023).Several different monitoring methods and tools have been developed (and employed) for this purpose, one of which is the so-called "energy efficiency balanced scorecard" system.

1.5 Review of the current legislation and policies on EE in the industrial sector in Azerbaijan

The Republic of Azerbaijan - like Georgia - is still **lacking any specific national law regulating EE investments**, but EE considerations are included in several pieces of legislation and legal documents.

The most important piece of primary legislation is the **Law on the Use of Energy Resources (adopted in 1996)**. This Law enumerates a series of guiding principles governing State policy on the use of energy resources, which are required to be premised on the:

- implementation of financial and administrative regulatory measures aimed at reducing energy consumption;
- establishment of mechanisms to improve EE in energy production, transmission, supply and use;
- adoption of energy savings' and EE norms and standards;
- conduct of mandatory energy audits for new and rehabilitated buildings;
- imposition of economic sanctions in the event of any breach of obligations;
- raising of public awareness on the economic, environmental and social benefits of energy savings;
- provision of education and training in energy conservation matters;
- promotion of international cooperation in the field of energy savings; and
- introduction of incentives for the creation and application of new energy saving technologies.

It also **requires the carrying-out of State energy audits** and the implementation of monitoring and control mechanisms[2]. In addition, the Law advocates the establishment of an **EE Fund**, which is proposed to be financed by non-State budget, with the aim to funding research and development, to promoting the creation of new EE technologies and to subsidizing the implementation of EE programmes.

Another major legislative act is the **Law on Energy (adopted in 1998)**. With regard to **EE matters**, this Law stipulates that one of the principal State policies relating to the functioning of the national energy market involves the efficient extraction, production, transport, distribution, storage, use and security of energy as well as the conservation of energy resources and the efficient use of energy and the use of RES.

It needs to be noted that Azerbaijan has **prepared a draft Law on Energy Efficiency** that was developed with EU budget support in 2012, but it has not yet been incorporated into the national legal order.

In the field of EE, and in relation to the power and natural gas sectors, another important policy programme is the **State Programme for the Development of the Fuel and Energy Sector (2005–2015)**, which was developed by the Ministry of Energy. This programme targets the reduction of losses and inefficient use of energy in order to cover the electric power and natural gas demand.

Finally, it needs to be noted that Azerbaijan has drafted a State Programme of Development,

[2]There is not any time framework during which such audits would be undertaken. It seems that such audits are not in practice carried out.

Technical Regulation and Standardisation of Energy Efficiency, which has not been officially adopted yet.

The Cabinet of Ministers is the central and highest executive authority that is vested with the overall responsibility for directing and co-ordinating the activities of all competent State bodies and institutions, including the design and implementation of the energy policy, together with matters pertaining to EE issues. The **Ministry of Energy** constitutes the main State body that is in charge of ensuring the implementation of the State policies related to the national energy sector. As regards the development and implementation of the State policies on energy savings and EE, the **Department of Energy Efficiency, Alternative and Renewable Energy Sources of the Ministry of Energy,** which was established in 2014, is in charge.

In the absence of direct governmental implementation of concrete EE measures, certain independent national NGOs (such as the Social Development Public Union and the Ecological Stability) play some role in the promotion and development of EE.

1.6 Assessment of compliance of Azerbaijan with EU norms relating to EE in industry

Azerbaijan is a country with an energy intensive economy that is fuelled by its oil and gas deposits and in which **EE technologies have not at present any momentous market penetration**.

Despite that the current legislation sets out a general system for promoting energy conservation, **a coherent and concrete EE strategy at both the policy and regulatory levels is still missing**. More specifically, the following weaknesses have been identified:

- **there is not yet in place any law that lays down a fully adequate set of common rules in the field of EE**;
- **references to EE obligations are diffused in a number of different and disparate legal acts** and State programmes and have failed to establish an effective regulatory structure for the implementation of EE investments;
- the **enforcement of the legislation currently in place remains challenging**, largely due to the lack of well-elaborated secondary legislation detailing rules and procedures for the carrying-out of EE projects. **More vitally, even enacted legislative provisions are not implemented**;
- unlike in Georgia, **no consolidated national EE Action Plan has been prepared** that enumerates the national EE strategic objectives and which sets out the array of incentives for the wider use of energy savings' measures;
- **there is not a clear and sound institutional EE framework** that specifies in detail the respective mandate and duties of the competent State bodies;
- **the EE measures** contemplated in the present legislation are **characterised by weaknesses in terms of the degree of their implementation details**: for instance, little guidance is provided respecting the metering of the energy consumption of industrial installations. More importantly, monitoring of compliance with existing EE obligations and standards is at the best incomplete, especially as regards State inspections related to the energy use levels of industrial enterprises to make sure that the energy consumption of both energy and manufacturing equipment remains within the accepted limits;
- the **system of accounting energy consumption is inaccurate**, which makes it difficult to assess the need for EE improvements; and

- **no verification and reporting regime exists** that allows for monitoring progress made with the implementation of envisaged EE policies / measures.

The conclusion is that Azerbaijan's regulatory legislative framework governing EE investments in industry is not compatible with the relevant EU norms. There exist **limited and inadequate enforcement of the relevant EE obligations** and, allied to that, **the lack of a coherent national EE strategy** coupled with the largely obsolete legislation, which is at present in force, necessitates the adoption of more integrated approach in the area of industrial EE at both the regulatory and policy implementation levels.

1.7 Proposed policy initiatives for further uptake of EE in the Azerbaijan's industrial sector

Potential policy initiatives that could be undertaken by the Government of Azerbaijan are:

- the carrying-out of an **industry-wide review on energy end-use**;
- the enactment of specific **EE legislation**;
- the improvement of the present **institutional set-up**;
- the development of a **State Programme** for the promotion of EE in industry;
- the imposition of **EE obligations on industrial operators**;
- the introduction of **specific EE measures**;
- the facilitation of the establishment of **industrial clusters to enhance EE**;
- the **design of incentives' packages** for implementing identified energy savings opportunities in industry;
- the **development of capacity building and training activities** on industrial EE; and
- the **management and monitoring** of the planned EE policies.

Brief analysis for each initiative is provided below.

1.7.1 Carrying-out of an industry-wide review on energy end-use

Since there are no accurate data and information on industrial energy consumption, an initial step towards the design of an EE policy in industry could involve the undertaking of a **scoping study** by the Government, which will provide a broad overview of how the various segments of the national industry currently operate and perform. The study is recommended to include benchmarking against both in-country and international examples and should aim to identify those sub-industries that will most benefit from the implementation of energy end-use efficiency applications.

In this connection, **several energy audits could be undertaken** by State-owned industrial operators to gain a preliminary understanding of the tangible prospects for economy-wide implementation of EE improvements. The **scoping study should also specifically consider certain vital financial issues**, such as the actual availability of State-backed funding for EE investments in industry, the relevant taxation regime and the ability of industrial companies to finance with their own capital EE investments.

1.7.2 Enactment of specific energy efficiency legislation

The Study Team recommends that the present regulatory framework should be strengthened through the **consolidation of the existing and disparate laws that affect EE investments into a single legislative act**. This piece of primary legislation could be based on the current draft EE

Law or be an entirely new legal act. This **Law must also serve as legal basis for drafting and adopting any secondary legislation, operational instructions, tools, standards and procedures** that are necessary to implement the Law's provisions.

1.7.3 Improvement of the institutional set-up

The proposed Law on EE should define and organize the institutional structure within the Government by designating the State bodies and authorities, which will be in charge of planning, executing and monitoring EE policies and programmes. The Study Team recommends that **the leading responsibility for EE issues is retained in the hands of the Department of Energy Efficiency, Alternative and Renewable Energy Sources** of the Ministry of Energy.

In the longer-term, though, the Government of Azerbaijan may consider to eventually set up **a dedicated agency**, which will be responsible for the implementation of EE policies and national and local EE State programmes and action plans.

1.7.4 Development of a State Programme for the promotion of EE in industry

The Study Team recommends that the Government of Azerbaijan prepares a national programme for the uptake of EE measures by the local industry. The programme is recommended to **initially target key sub-industries** that need to increase the level of energy savings, concentrating particularly on **energy intensive industrial operators** with large capital investment requirements for machinery and change of outdated equipment.

It would further be prudent to ensure that the programme is supplemented with an **Implementation Plan**, which can be adopted by the Government - in consultation with industry representatives and supporting sectors.

1.7.5 Imposition of EE obligations on industrial operators

The Study Team recommends that the Government of Azerbaijan should consider the **placement of specific requirements on industrial operators** that will compel them to improve the efficiency and energy conservation levels of their respective facilities. Such compulsory obligations may be the following measures:

- Implementation of **Energy Management System(s)** by large industrial companies. Energy management can substantially improve an industrial operator's energy performance. It is, therefore, recommended to the Government to place an explicit obligation on large energy intensive industries to adopt specific energy management measures which are usually integrated in the set-up and implementation of an EnMS. An integrated EnMS is normally based on the so-called Plan-Do-Check-Act methodology, which encompasses the development of an energy policy, planning, implementation and operation, checking and management review. A widely acceptable national standard to put in force is **ISO 50001**. In parallel, a **certification body** will need to be designated by the Government, which will formulate and implement the process that will assess the compliance of industrial operators against the minimum requirements of the adopted EnMS standard.
- Mandatory **engagement of energy managers** by large energy intensive enterprises. This will safeguard that any such facility has committed resources to meet specific energy targets. The energy manager's role will be to act as the "in-house" expert or auditor for administering the relevant facility's energy needs and performance. However, it is also crucial that the Government puts in place a corresponding certification, accreditation

and/or equivalent qualification scheme for engineering professionals wishing to become energy managers, since **currently there are not available competent human resources** experienced to handle the energy manager's functions.

1.7.6 Introduction of specific EE measures

The previously described obligations that are proposed to be imposed on industrial operators will need to be strengthened with the implementation of additional requirements, which could involve:

- the carrying-out of energy audits by industrial operators on a voluntary basis at least with this measured gradually becoming mandatory for large industrial companies;
- the designation by the Ministry of Energy of the basic principles and quality requirements guiding the process of energy auditing in industrial facilities;
- the design of support measures for industrial SMEs to cover costs of an energy audit;
- the establishment by the Government of an accreditation scheme for energy auditors;
- the development by the Ministry of Energy of streamlined methodologies for energy savings calculations;
- the adoption by the Ministry of Energy of internationally recognized procedures for the ex-ante monitoring and verification of such savings;
- the adoption by the local industry of standardized full cost accounting systems for industrial EE investments;
- the introduction by the Government of mandatory minimum performance standards for a range of energy consuming equipment within the industrial sector, such as motors and boilers; and
- the design and implementation by the Ministry of Energy of a labelling scheme for the products produced by each industry in terms of their efficient use of energy and their energy footprints.

1.7.7 Facilitation of the establishment of industrial clusters to enhance EE

Another possibility that might be explored by the Government of Azerbaijan involves the assessment of the formation of **industrial clusters**. International experience has proved that a cluster structure can effectively incite the participating enterprises to adopt more efficient technologies and to implement energy savings' interventions that can jointly be acted upon to minimize production costs and achieve higher productivity and greater competitiveness.

1.7.8 Designing of suitable incentive package(s)

The aforementioned policy priorities should be synergized with **fiscal and tax benefits**, which would be elaborated by the Government and competent State bodies (e.g. the Ministry of Energy and the Ministry of Finance) to render more financially attractive any proposed EE investments. For instance, relevant financial facilities may be available to support the performance of energy audits in industrial facilities, the purchase of high-efficiency equipment, etc.

Taxation measures, on the other hand, which should be complementary to any regulatory incentives, could be applied to a wide variety of taxes and duties and may take the form of some indirect subsidy, a tax relief, deduction, rebate or investment tax credit.

It would also be pertinent for the Government of Azerbaijan to **consider setting up an Energy Efficiency Fund** with appropriate guidelines and governance structure to focus entirely on the financing of EE investments. In addition, like in Georgia, suitable market-oriented instruments (e.g. ESCOs) should be gradually developed under the guidance of the Ministry of Energy that

will help self-finance demand side management measures.

1.7.9 Development of capacity building and training activities on industrial EE

The capacity building measures selected to be implemented by the Ministry of Energy should be geared at improving both internal capabilities (the abilities and know-how of the staff of the national industrial operators regarding, especially, the quality of energy management within the relevant enterprise) as well as external ones (involving outside stakeholders, such as energy auditors and EE specialist consultants, equipment providers and installers as well as local banks and financial institutions).

On top of that, the Study team recommends that the Ministry of Energy **combines** all these capacity building and training activities **with high-profile information dissemination and educational campaigns**, which will scale up public awareness of the benefits of EE gains and the necessity to give tangible incentives for the national industry to pursue EE improvements.

1.7.10 Management and monitoring of the planned EE policies

The proposed policies, initiatives and programmes to be developed, should be regularly monitored and evaluated in order to ensure their efficient and effective carrying-out. In this respect, the Study Team recommends putting in place a scheme to assess the level of implementation of the various policies and measures, which should be constantly updated and revised, as the need arises. It is anticipated that the Department of Energy Efficiency, Alternative and Renewable Energy Sources of the Ministry of Energy will be the key State body to manage and supervise the proposed scheme's implementation and coordinate activities with all other competent State bodies and authorities.

1.8 Recommendations on collaborative initiatives that can be undertaken by Georgia and Azerbaijan in the field of industrial EE

Even if Georgia and Azerbaijan are neighbouring countries, **their EE sector is at a different level of development**. Georgia, as already stated, is a Contracting Party to the Energy Community Treaty and all Energy Community *acquis* related to EE must be transposed and implemented, while Azerbaijan is not a Contracting Party and there does not exist any plan at the moment, to accede to the Energy Community Treaty. On top of that, Georgia is an importer of energy, while Azerbaijan is fully supplied from locally available energy sources and is a net exporter of oil and natural gas, particularly to European markets.

On the other hand, **both countries are members of the Energy Charter Treaty and the PEEREA** that support cooperation in the area of EE. Additionally, both countries are members of the Eastern Europe Energy Efficiency and Environment Partnership (**E5P**) and are participating in the **EU4Energy initiative,** which supports the elaboration and implementation of energy policies that reduce their energy dependence and intensity.

Furthermore, a **number of donors** such as the EBRD, the World Bank, USAID are active in both countries, offering technical assistance in the energy sector.

Taking the above aspects into consideration, the **development of a joint EE centre is not proposed** due the different state of development in the EE sector between both countries. On the contrary, the Study Team considers **more rational and effective the development of:**

- either a **mutually agreed high-level coordination structure** which will be geared at solidifying the multi-faceted aspects of their joint courses of action in promoting EE in their respective national industrial sectors, or
- a looser type of collaboration, such as a **joint international platform**, which will primarily aim at improving knowledge, developing exchanges of information, sharing best practices and evaluating experiences.

The **mutually agreed high-level coordination structure**, will need to be implemented by means of a written arrangement, which could be achieved through an **Inter-Governmental Agreement** that will enumerate in detail the framework for cooperation through the selected formalized structure. A structure of this type is envisaged to encompass a single dedicated inter-governmental body (e.g. in the form of a **Steering Committee**), which will be in charge of direct bilateral policy dialog on EE topics with the aim to reinforcing institutional and regulatory capacity of the competent State authorities in both countries. The Steering Committee could be co-chaired by Azerbaijan's Minister of Energy and Georgia's Minister of Energy or the Minister of Economy and Sustainable Development and consist of high level officials of competent Ministries from both countries. Furthermore, under the umbrella of this Steering Committee, a number of **Task Force Groups** may also be put in place, which will deal with specific issues relating to energy conservation, including the promotion of EE in the two countries' respective industrial sectors. These task force groups would bring together EE experts from State bodies and academic institutions to share their experiences on EE initiatives pertaining to specific sectors, learn lessons and look for solutions to address any emerging challenges.

The **joint international platform** could be based on a **Memorandum of Understanding** that will be signed by the Governments of both countries and which will be mainly directed at facilitating the mutual sharing of information, expertise and good practices on a variety of EE matters.

Independently of the form of cooperation between Georgia and Azerbaijan, the scope of activities and initiatives undertaken could be extremely wide and diverse; such initiatives could include:

- identifying priorities of cooperation between the two countries in the domain of EE and considering proposals for further development of the cooperation;
- introducing new legislative and policy initiatives in enhancing EE, especially in the industrial sector, at the national level;
- elaborating coordination and supervision mechanisms for joint actions and initiatives that will increase technical capacities and ensure appropriate communication and collaboration between the relevant State bodies;
- improving knowledge on EE matters, particularly in industry, by means of common measurement tools and methodologies coupled with the promotion of joint comparative analysis and related relevant indicators;
- assessing the effectiveness of different policy measures and initiatives in promoting EE;
- establishing tools, for instance a knowledge bank of different EE measures and practices, to enhance energy conservation and to reduce energy intensity;
- examining ways to jointly promote data sharing in the area of EE;
- organizing peer reviews to follow progress in the implementation of EE measures;
- encouraging consumers' EE by supporting the use of energy-efficient products through the implementation of internationally recognized energy labelling and eco-design requirements; and

Other initiatives that could be implemented are the organisation and conduction of common promotional and awareness raising activities, such as high-level workshops, seminars and business to business meetings. Stakeholders that could participate in such type of dissemination activities may be government agencies, universities, research centres and technological organizations with the scope to exchange information on EE issues and share best practices from both countries.

In addition, design and organisation of common training activities could also be undertaken. These trainings will mostly be addressed to State bodies authorities in order to enhance their capabilities and knowledge to tackle the national challenges linked to increasing energy savings.

Last but not least, another important joint initiative that could be organised is the implementation of energy audits and Energy Management Systems according to ISO 50001, especially in the industrial sector of both countries. This initiative could be organised in a framework of a common programme and include the development of common non-binding guidelines and/or streamlined principles and even handbooks of good practice and trainings for energy audits and the development of EnMS.

Especially, the Study Team recommends that the EnMS concept, according to ISO 50001 could also be disseminated to the other countries of the Eastern Partnership through common trainings, exchange of guidelines and good practice handbooks.

2 Introduction

This report "**Component 2: Critical analysis of the EE framework in Azerbaijan and Georgia / gap analysis**" is drafted as part of the deliverables of the study **"Energy efficiency in industrial sectors in Georgia and Azerbaijan",** which is implemented under the project "High quality studies to support activities under the Eastern Partnership" (EuropeAid/132574/C/SER/Multi)".

The overall **aim of the study** is to:

- present EU policies, rules, regulations and tools on energy efficiency (EE) and energy savings, emphasizing on selected industries after consultation with the EC;
- review the overall methodology for conducting energy audits in the countries under consideration;
- map and assess existing policies, rules, regulations and tools towards the implementation of EE measures in specific industrial sectors in Azerbaijan and Georgia; and
- develop pre-feasibility studies for the implementation of EE measures in typical industries following the completion of short energy audits.

The study also aims to prepare a preliminary list of energy savings possibilities and an evaluation of such possibilities based on energy, environmental, technical, operational and economic criteria. The study will conclude with elaboration of recommendations on how to further enhance industrial EE in Azerbaijan and Georgia.

The study is comprised of three Components:

- **Component 1** covered mostly the review of the industrial EE policies, rules, regulations and tools applicable mostly in the EU and the EnC Contracting Parties. Component 1 dealt

also with the methodology, procedures for the conduction of energy audits as well as with the responsibilities of Member States (and EnC Contracting Parties) towards the certification of energy auditors.

- **The present Component 2** includes a review and assessment of the Azerbaijani and Georgian relevant EE framework targeting the industry sector with focus on identifying gaps and elaborating proposals for sustainable EE improvement in industry.
- **Component 3** will include the development of four pre-feasibility studies for the implementation of EE measures in typical industries following the completion of short energy audits. Component 3 will conclude with elaboration of recommendations and proposals for energy saving possibilities in the two beneficiary countries.

In more detail, the **aim of the present report, which relates to Component 2 of the study** is to:

- conduct a comprehensive overview of the EE framework currently in force in Georgia and Azerbaijan, focussing especially on their respective industrial sectors;
- carry out an in-depth appraisal of the relevant legal, regulatory, and policy instruments in both countries against the backdrop of the prerogatives set in the EE acquis with the aim to identifying existing gaps that required to be filled in;
- elaborate concrete proposals for improvements on the existing framework regulating EE policies in the Georgian and Azeri industrial sector; and
- set in motion the process of cooperation and exchange of best practices between the two countries through coordinated collaborative actions and joint initiatives for EE in their respective industries.

In addressing these matters, the Report has been divided as follows. Chapters 3 to 5 provide a comprehensive inspection of the Georgian existing regulatory and institutional set-up pertaining to the making of EE investments in industry. Thereafter, a gap analysis of the effectiveness of the current framework is conducted in juxtaposition of the corresponding prerogatives that are set in the EU EE legislation. The results of this assessment are subsequently used as a guiding yardstick in order to formulate concrete proposals that will contribute to the gradual approximation of the national EE policies concerning the local industrial sector with the relevant EU benchmarks.

Chapters 6 to 8 critically scrutinizes the policies, rules, regulations and tools that have been adopted in Azerbaijan towards the implementation of EE initiatives in the local industry. To this end, a detailed account is initially given of the applicable legislative and institutional regime, which is then compared to the standards and requirements that have been imposed on EU Member States. The findings of this comparison form the basis for putting forward a series of proposed mechanisms and measures that are anticipated to increase energy savings in the national industry and bring closer the national practices on industrial EE to the corresponding European norms.

Finally, Chapter 9 recommends the initiation of effective forms of collaboration between Georgian and Azerbaijan in the field of EE in industry with the view to exploring possibilities for establishing joint initiatives and actions.

The Study Team's analysis of the key questions pertaining to Component 2 has been based on two primary sources of information. The first element involved a comprehensive review of existing reports and documents that have addressed and evaluated the carrying-out of EE activities in the Georgian and Azeri industry. Within this step, an identification and assessment of all available

relevant literature, databases and other studies and materials has been performed in order to provide a preliminary description of current practices relating to the conduct of EE investments among local industrial operators.

The second source concerns the meetings held with primary stakeholders in both countries, who are in charge of the design, implementation and monitoring of the relevant EE policies and initiatives. More specifically, in Georgia meetings were held with representatives of the following State bodies and institutions:

- Ministry of Energy;
- Ministry of Economy and Sustainable Development;
- EU Delegation in Georgia;
- EU4Energy project;
- Energy Efficiency Centre (EEC);
- United Nations Industrial Development Organisation (UNIDO); and
- Georgian SMEs Association.

where in Azerbaijan, meetings were held with the representatives of the:

- State Agency on Alternative and Renewable Energy Sources;
- Ministry of Industry and Energy (legal department);
- EBRD;
- World Bank.

The purpose of these meetings was three-fold: first, to fill any information gaps that were not considered in detail by the literature review; secondly, to verify - where relevant - our preliminary findings; and thirdly, to be informed and kept updated of any new legislative and policy developments.

3 Review of the current legislation and policies on EE in the industrial sector in Georgia

3.1 Introduction

This section provides a meticulous overview of the present legislative and institutional set-up governing Georgia's EE sector. In particular, the part dealing with the existing legislative regime gives a detailed description of the system of national laws, regulations, State programmes, action plans and procedures that shape national EE policies, giving special emphasis on the carrying-out of EE investment in the Georgian industry; in addition, it outlines the relevant commitments assumed by the Republic of Georgia under international treaties, conventions and agreements to which the country has acceded. Subsequently, the various State bodies, authorities and institutions, which are involved in the formulation and implementation of the domestic EE policies, are described along with their respective functions, competences and responsibilities. The overriding goal is to portray all facets of the current system governing EE activities, with the focus on the domestic industrial sector, with the view to presenting the system's practical working and to get a better grasp of the steps that need to be taken in order to ensure the present framework's alignment with the relevant EU standards.

3.2 Legislative framework

3.2.1 Georgian legislation

Georgia has not yet put in place any particular legislative framework directly related to the development of its EE policies, let alone any legislation specifically targeting the enhancement of the efficient operation of its domestic industrial sector. However, **references to the need to improve EE are scattered across a number of legislative acts**, which highlight the significance of incorporating EE measures in the national economy so as to advance the country's economic competitiveness and independence.

One of these pieces of legislation is the **Law on Electricity and Natural Gas**[3], which regulates the country's power and gas markets. This Law, which has been amended several times since 2006, currently incorporates some major EU energy law prerogatives - notably reflecting the principles of deregulation and liberalization of the domestic energy market. In the field of **EE**, it stresses the importance to promote growth of efficiency in the areas of electricity generation, transmission, dispatch, distribution, import, export and consumption, as well as in the areas of natural gas supply, import, export, transportation, distribution and consumption and further stipulates for the development and coordination of the implementation of a uniform State programme directed at increasing efficiency in the aforementioned segments of the electricity and gas markets. In addition, it emphasizes the need to prioritize the utilization of RES and to support the **implementation of EE measures relating to an increase in the efficiency of energy resource production**. For this purpose, a State programme for supporting the construction of new generation has been adopted, which has been complemented with several pieces of secondary legislation[4].

[3] Available in its updated form at: http://www.energy.gov.ge/legislation.php?lang=eng&id_pages=33
[4] These include:

Indirectly linked with EE is also the Law on Environmental Impact Permit, which outlines a complete list of industrial activities that are subject to mandatory ecological expertise on the territory of Georgia.

Another key document is the "***Main Directions of the State Energy Policy of Georgia***", which was adopted on June 2015[5] as a new energy strategy[6] with the aim to designing a long-term comprehensive State vision that is anticipated to become the basis for the formulation of short-, medium- and long-term strategies for 2030. The document specifically mentions the **development and implementation of an integrated approach to EE as one of the primary goals of the national energy policy**. In this respect, in light of Georgia's high energy intensity, reflects continued gross inefficiency in energy use, special emphasis is given to the adoption of adequate demand side management (DSM) measures for energy generation, transmission, distribution and consumption as well as for EE programmes to reduce the country's energy consumption. To this end, the document highlights the need to create an appropriate legislative framework that will facilitate DSM initiatives for energy producers and consumers and be oriented towards the development and establishment of EE technologies and equipment.

EE and the efficient use of energy are also incorporated into the Social-economic "***Development Strategy of Georgia - Georgia 2020***"[7], a document that also envisages the introduction of the relevant legislative mechanisms in order to enhance the country's energy security and to promote the rational use of resources in accordance with international and European norms. On another plane, the **"Georgia 2020" strategy** states that small and medium businesses are planned to be supported by the Government through policies and regulations and further support will be provided for the development of entrepreneurship and new businesses. This in turn is envisaged to eventually result in the development of different industry sub-sectors that will require a sustainable energy supply, which must be strengthened with the use of EE measures.

In addition, the Government of Georgia - with the assistance of the USAID - has prepared a **draft National Low Emission Development Strategy** with the view to increasing climate change mitigation through EE and clean energy and to promoting and facilitating private sector investments in EE improvements and green buildings. One of the Strategy's key objectives is to enhance EE in the sectoral fields of agriculture, construction, energy, forestry, waste, transport and industry by, among other things, encouraging the use of sustainable consumption and

- the Resolution No.107 on the "*Approval of the National Programme "Renewable Energy 2008"*", which defines the procedure for initiating and implementing RES project in the country. However, this resolution does not set any RES targets or a national action plan in the sector.
- the Resolution No. 214 on the "*Approval of Rules for Expressing Interest in Conducting Technical and Economic Feasibility Studies for the Construction, Ownership and Operation of Power Plants in Georgia*" which effectively replaced resolution No.107 for new power plant projects and at the same time somewhat modifies the approach introduced by the 2008 resolution.
- the Decree No. 40 of the Minister of Energy of Georgia, which regulates the rules for construction, ownership and operation of WPPs and other renewable energy resources.

[5] Available at: http://www.energy.gov.ge/ministry.php?id_pages=12&lang=eng.

[6] This is the second energy policy document after the first one which was issued in 2006 (also entitled the "Main Directions of the State Energy Policy of Georgia"). In the 2006 energy policy document, the major focus was centred on the full satisfaction of customer demand for electricity with the maximum possible utilization of local hydropower resources, initially alongside imports, and, eventually, by substituting imports with local thermal generation. Added to this emphasis was placed on the need to develop the country's renewable energy sources such as wind, solar, and geothermal energy.

[7] See Social-economic Development Strategy of Georgia "GEORGIA 2020" (2013), which is available at https://www.adb.org/sites/default/files/linked-documents/cps-geo-2014-2018-sd-01.pdf.

production patterns.

Moreover, following its recent accession to the Energy Community Treaty, Georgia - in its capacity as a **full-fledged Contracting Party to the Energy Community** - **is at present in the process of implementing the EU energy legislation by gradually transposing the EU's Third Energy Package in the electricity and gas sectors**. More significantly, the country is currently in the **final stages of adopting a National Energy Efficiency Action Plan (NEEAP)**, which has been elaborated in accordance with the provisions of Directive 2012/27/EC[8].The NEEAP sets the country's indicative national EE targets for 2020, 2025, and 2030 (see Annex 1) and also estimates expected energy and GHG savings by measures according to each sector (see Annex 2).

As regards the national industrial sector, which is not a large consumer of energy[9], the NEEAP has identified the main energy consuming sub-sectors in industry as follows:

- non-metallic minerals with 26% of all consumption;
- chemicals (including petrochemical) with 26% of all consumption if non-energy use of natural gas is included; and
- iron and steel with 25% of all consumption (see also Annexes 3 and 4).

It further contains estimates of production in the domestic industrial sector (see Annex 3) and also identifies special features in energy consumption, especially in the food, beverages and tobacco sub-sectors.

More vitally, it specifies the primary policy measures that can effectively address EE in industry, such as:

- incentivising / mandating EE in industry, which is expected to stimulate interest and improve the financial case for investment even beyond the strong financial parameters present;
- training and education, including energy advisory programmes, which will educate industry's decision-makers on investment options;
- qualification, accreditation, and certification schemes, and potentially to EE investment schemes, which are anticipated to increase the level of certified expertise in the industrial sector to better enable investment planning and implementation; and
- energy audits and management systems, boiler inspections in the industry sector, which will require energy audits/energy management in large industries and encourage them in SMEs.

Furthermore, the draft NEEAP enumerates the major key facets of the implementation of these measures, which include:

- the improvement of the statistical data on industry production and energy consumption;
- a programme of technical assistance for the period 2017-2020;
- the linking of energy audits from the horizontal measures to investments in this sector, which has technical assistance requirements; and
- the making of investment from industry – via a credit line, bank financing, or other financing

[8] This step of the country's first NEEAP is a requirement both for EU Member States under the EU Energy Efficiency *acquis* and for the EnC Contracting Parties.
[9] In 2014, the Georgian industrial sector consumed in total 10.5 TWh of energy (for both energy and non-energy use), which represents 22% of all energy consumed in the country that year.

sources of a total of approximately EUR 106 million over the period of 2017 through 2020.

On top of that, the draft NEEAP details the specific individual measures that are required to be implemented in both the whole industry and in specific sub-sectors so as to increase energy savings, to achieve GHG emissions abatements and to improve the efficiency of industrial operators (see Annex 4). Last but not least, the NEEAP envisages that the amounts of the requisite financing will come from the state budget, donor interventions and, eventually, from the EU (see Annex 5).

In addition, the Government of Georgia plans to develop a "***Climate 2021-2030***" **Strategy** by 2018, which will define the legal instruments, activities, methods and other relevant issues, and with the aim of co-ordinating climate related multi-sectoral activities (including the industrial sector) and provide an effective pathway for reaching the country's climate and energy savings' targets. Three Nationally Appropriate Mitigation Actions (NAMAs) are also being developed that are to be linked with the NEEAP and other overarching policy documents.

Finally, it needs to be mentioned that Georgia is at present **finalizing the development for a new Building Code** that will take into consideration the proposed EE targets and also specify minimum energy performance indicators for buildings[10]. This Code is planned to be supplemented by 1 June 2019 with the issue of technical regulations on buildings' EE.

3.2.2 International agreements

Georgia is a party to a number of international, multilateral and bilateral agreements that require concrete development and establishment of EE actions from their signatories and which can play an important role in shaping the future EE approaches of the country. These include:

- the EU Association Agreement[11];
- the Energy Charter Treaty and the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA)[12];
- the Framework Convention on Climate Change and the Kyoto Protocol;
- the Clean Development Mechanism (CDM) under the Kyoto Protocol[13];
- the European Neighbourhood Policy;
- the European Commission "Green Paper"; and
- the Memorandum of Understanding (MoU) signed with Kingdom of Denmark in 2004.

[10] The current building code includes a statement on EE but does not set up any EE indicators for buildings.
[11]Under the Agreement, Georgia took an obligation of implementing the EU directives in the energy sector and will have to comply with the requirements of the 3rdenergy package. Available at http://eeas.europa.eu/georgia/pdf/eu-ge_aa-dcfta_en.pdf
[12] The PEEREA is a legally binding instrument that was signed together with the Energy Charter Treaty in December 1994, by the same 51 states that signed the Treaty itself, including Georgia. It requires signatory parties to formulate EE strategies and policy aims that establish appropriate regulatory frameworks; moreover, signatories must develop specific programmes for the promotion of efficient energy usage and the reduction of harmful environmental practices in the energy sector.
[13]The Clean Development Mechanism of the Kyoto Protocol is a project-based instrument designed to promote investment in projects that reduce or sequester emissions of GHGs in developing countries, including Georgia. It allows developing countries, such as Georgia, to leverage investments in clean technologies and EE through the sale of CO_2 emission reductions. As Georgia meets the eligibility requirements to sell emission reductions from projects at the international carbon market under the CDM scheme, the utilization of this instrument can be an important tool to develop EE and RE activities in the country.

All these agreements and the concomitant obligations assumed by Georgia[14] can serve as a guiding yardstick for the country to chart its short- and long-term development with the view to effectively incorporating EE into all segments of its national economy.

On top of that, the Ministry of Energy is actively involved in the **promotion of EU Covenant of Mayors initiative**, which is concentrated on the sustainable development, including reduction of emissions, utilization of RES and promotion of EE measures. In this regard, certain Georgian municipalities[15] signed the agreement in 2010 and undertook the commitment to reduce CO_2 emissions by 20% by 2020. More importantly, some of these Georgian signatories[16] of the Covenant of Mayors have elaborated the Sustainable Energy Action Plans, which envisage the implementation of EE/RES measures in various sectors on the local municipal level. Added to this, in January 30th of 2014, the partnership agreement was signed between the Ministry of Energy and the Directorate General for Energy of the European Commission regarding the strengthening of the competence of the Ministry in the promotion of the Covenant of Mayors' initiative among municipalities and to reinforce its support to the municipalities who decide to formalize their commitment to the Covenant.

Lastly, Georgia participates in the Multi-Contributor Fund – **the Eastern Europe Energy Efficiency and Environment Partnership (E5P) for Eastern Partnership countries**[17] (Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine), which aims at pooling funding for supporting EE projects[18].

3.2.3 Institutional framework

The **Ministry of Energy, the Ministry of Economy and Sustainable Development and the Ministry of Environment and Natural Resources are the primary State central bodies in charge of drafting, implementing and monitoring compliance with EE related legislation and in developing and promoting the relevant policies and standards**.

In particular, the **Ministry of Energy** is responsible for regulating the activities of the domestic energy sector and for providing the main directions of the national energy strategy. The Ministry is also vested with the overall responsibility for the development of the national EE framework and, for this purpose, a **Department of Energy Efficiency and Renewable Energy has been recently set up** with responsibility to design the necessary EE strategic policies and actions plans in line with the prerogatives of the relevant EU legislation.

The **Ministry of Economy and Sustainable Development** is in charge of, and has priorities relating to, economic and transport policy, quality infrastructure, sustainable development and green economic growth of the country (including the industrial sector). **In the area of EE**, the

[14] In particular, these agreements oblige Georgia to implement several different actions, including:
- ❖ to harmonize its legislative framework with the relevant EU requirements, by enacting several pieces of legislation (e.g. Law on EE, Law on RES) and by adopting the relevant EU EE and RES standards and practices;
- ❖ to introduce implementing legislation for the Climate Development Mechanism; and
- ❖ to put in place appropriate building standards and codes.

[15] These were the self-governing Tbilisi City, the self-governing Rustavi City, the self-governing Batumi City, the self-governing Kutaisi City, the self-governing Poti City, the Gori municipality, the Zugdidi municipality and the Telavi Municipality.

[16] Namely, the self-governing Tbilisi City, the self-governing Rustavi City, the self-governing Batumi City and the Gori municipality.

[17] The E5P includes IFI loans and grants and the international donor community is expected to provide more than EUR 60 million to enable projects under the E5P Fund.

[18] Georgia joined the E5P in October 2013.

Ministry's duties include the promotion and coordination of EE activities in the industrial, construction and transport sectors and the preparation of any EE policy and standards for these sectors, which are to be included in the NEEAP. More specifically, the Unit of Sustainable Development of this Ministry is responsible for elaboration of the strategy for sustainable development and supporting state programmes. They also coordinate the review and analysis of innovation projects and participate in preparation of legal initiatives supporting sustainable development. In addition to that, the Unit of Research on Industrial and Service Sectors of the Ministry of Economy and Sustainable Development is in charge of identifying and developing new economic activities in different sectors, including industry, to conduct research on different economic sectors and their development potential, to identify barriers in the value chain of private sector and plan the actions to overcome these barriers.

The **Ministry of Environment and Natural Resources** is responsible for establishing, promoting and implementing the policies and strategies for environment protection. One of the Ministry's competences involves the issue of the environmental impact permit for the carrying-out of industrial activities and it has also been appointed as the designated national authority for the implementation of the CDM[19].

Mention should also be made to the **National Statistics Office** (GeoStat) which is in charge of administering the laws on national data services and collects, processes and publishes[20] statistical information, including data relating to the domestic industrial sector. GeoStat is responsible for the preparation - in close co-operation with the Ministry of Energy of energy balances.

Moreover, the Government of the Republic of Georgia has established a number of bodies in order to accelerate the process of putting in place the requisite legislative and regulatory framework for the promotion of EE (and RES) investments. One of these bodies is the Governmental Coordination Committee on Low Emissions Development Strategy that consists of high-level representatives (Deputy Ministers) of climate-related Ministries and national agencies and which is in charge of supporting decision-making on the adoption of a Low Emissions Development Strategy. Another such body is the Coordination Council for Implementation of CDM[21], which is responsible for co-ordinating activities related to the CDM under the Kyoto Protocol in accordance with the commitments assumed by Georgia in its capacity as a signatory party to this Protocol.

Also, the Government of **Georgia set up in 2010 the Georgian Energy Development Fund** as a fully-stated owned joint-stock company to facilitate investment in, and development of, the country's RES sector[22]. A Municipal Development Fund has further been set up in order to support

[19] See the Resolution of the Government of Georgia #2, which was passed on 20 January 2005.
[20] GeoStat publishes monthly, quarterly and annual data on its website in full compliance with international standards and disseminates it widely to large number of public and private bodies, both nationally and internationally.
[21] This Council is chaired by the Minister of Environment and is composed of representatives of the Ministries of Finance, Energy and Economy, among other stakeholders; see the Resolution #172, which was adopted on 29 September 2005.
[22] The main goals of the Fund are to identify prospective RES projects and to promote their development and realization by, among other things:
- carrying out preliminary research works;
- performing preliminary feasibility assessment of RES projects;
- conducting preliminary environmental impact assessment; and
- contacting investors to invest in existing or prospecting projects.

institutional and financial capacity strengthening of local government units and investing in local infrastructure and services, including EE upgrades.

A word is further warranted for the **Energy Efficiency Centre** (EEC), which was established in 1998 by EU with the framework of the EU TACIS project: the EEC is a major Non-Governmental Organisation (NGO) that deals with, possesses strong expertise in, EE related matters and is also the key partner responsible for providing reliable energy statistics for Georgia to the International Energy Agency (IEA). There is also a **Sustainable Development Centre Remissia**, another NGO, which provides expert assistance and support to government agencies and other key stakeholders in preparation of sustainable development strategies and action plans for different sectors of economy and regions of Georgia at both the national and local levels and is involved in EE activities, including energy audits and training. However, these two bodies have not any institutional and legal framework governing their exact scope of competences and responsibilities and, as a result, the studies and surveys they produce are mere recommendations that do not directly impact on Georgia's EE policies.

In terms of academic institutions, reference should be made to the **National Energy Academy** under the Academy of Sciences of Georgia, which is a public institute in charge of developing energy RD&D programmes[23]. Finally, it must be noted that a Chamber of Commerce and Industry has been established (with five regional offices) as an independent public agency, which - among other things - provides business information and consultancy for commercial and industrial companies, supports its members to improve their skills and business planning, promotes exports, etc.

3.2.4 Other initiatives / donor activities

A diverse array of important donor activities has been implemented to promote the use of EE measures and to boost the demand for energy services, including:

- the **Energocredit programme** funded by the EBRD, which - in collaboration with the European Union Neighbourhood Investment Facility - provides funding to financial institutions for financing for EE improvements to industrial facilities and commercial buildings for both Azerbaijan and Georgia;
- the State programme "***Produce in Georgia***" which aims at developing and supporting manufacturing industries of Georgia to enhance their access to finance for adopting new technologies;
- the **State-owned JSC Partnership Fund**, which is involved in the promotion of investment in energy projects, such as the combined cycle thermal power plants;
- the **State-owned Georgian Energy Development Fund**, which mostly focuses on the financing of RES investments;
- Green projects in the framework of **ECO programme financed by the ProCredit Bank**, which aim at encouraging EE investments in the Georgian industrial companies;
- the studies developed within the framework of "*Enhance Capacity for Low Emission Development Strategies (**EC-LEDS**)*" project;
- the studies prepared, and information elaborated in the framework of the projects EU4Energy technical assistance project and the UNIDO project "Reducing Greenhouse Gas (GHG) Emissions through Improved Energy Efficiency in the Industrial Sector in

[23] However, with the exception of some small-scale programmes, no major developments have taken place in recent years due to the scarcity of funds and the Government's low priority on home-grown energy technologies.

Georgia"[24].

4 Assessment of compliance of Georgia with EU norms relating to EE in industry

The driving force for the future developments in Georgia is its accession as Contracting Party to the Energy Community Treaty. **All Energy Community Acquis related to EE must be transposed and implemented**.

The Government of Georgia is committed to increase the level of EE in the country and to unlock the potential for the development of EE across all segments of the national economy, including the industrial sector. To this end, a series of legislative and other initiatives that have already been undertaken and which have culminated in the preparation of the draft NEEAP, have been described.

However, the country still lacks a sound regulatory framework to support EE investments in industry, since the current fragmented legislative regime does not fully address the needs for establishing an effective EE market. In particular, the following deficiencies are noted:

- **Georgia has not formulated a comprehensive and well-elaborated strategic vision for the medium- to long-term direction of its energy and related policies and implementing mechanisms** in line with the country's long-term economic outlooks; as a result, EE, especially as regards the reduction in industrial energy consumption, is not well integrated into the broader policy framework of economic development;
- **there does not exist at present any primary or secondary legislation specifically addressing the carrying-out of any EE activities**: the basic ingredients of an EE policy are dispersed in a diverse collection of legal acts, whose main focus is centred on matters that are not directly relevant to EE issues. Even the draft NEEAP itself, although it sets indicative EE targets and enumerates a series of specific EE measures to be implemented in the various sectors of the economy (including in industry), is not grounded on any legislative dispensation;
- **the legislative references to the promotion of EE improvements are of a very general nature and do not systematically set out the horizontal national policy objectives and instruments in the field of EE**; as such, they are not sufficiently comprehensive and wide-ranging to support on their own the making of EE investments;
- **the present framework does not provide for a lucid and coherent institutional structure and responsibilities regarding the implementation of the EE initiatives** envisaged in the NEEAP; governance is spread across multiple authorities and there does not exist a very clear-cut separation of power. This is especially the case in respect of EE measures pertaining to the industrial sector as the relevant competences seem to be divided between the Ministry of Energy and the Ministry of Economy and Sustainable Development;
- the scope of concrete energy saving and EE instruments that are foreseen in the draft NEEAP is limited: there are **no specific EE measures related to energy labelling, the promotion of energy service companies (ESCOs)**, etc.;
- **no proper incentives and support or voluntary mechanisms have been set up** to encourage the wider use of EE measures in the industrial sector; indeed, the taxation

[24] A comprehensive list of the EE projects conducted in Georgia is provided in Annex 6.

system is no longer supportive of EE development, as in 2005 Georgia abolished tax benefits for EE investment in the country's new tax code[25];

- no concrete scheme for sanctions exists to penalize any breach of EE obligations;
- there is **not in place any monitoring mechanism** that allows for appraising any progress made with the implementation of EE policies and measures.

The main message, which can be extracted from the foregoing analysis, is that **the Georgian legislation regulating the undertaking of EE improvements in the local industry is not, in any way, aligned with the relevant EE dispensations**. This point is clearly validated in the Table 4-1, which provides an appraisal of the level of integration of the major provisions of the EE Directive related to the industrial sector into the domestic legal order.

Table 4-1: Level of transposition of the provisions of the EE Directive parting to industry in Georgia

EE Directive provisions	Georgian legislation
Setting an indicative and quantitative target for energy efficiency	✓
Setting specific binding targets for the delivery of a certain quantity of final energy savings in end-use sectors.	✗
Establishing the criteria and conditions for eligible measures and how savings can be counted towards the stipulated targets.	✗
Establishing an energy efficiency obligation schemes that require energy companies to achieve yearly savings of 1.5% of annual sales to final consumers.	✗
Obligating central authorities to purchase only goods, services and buildings with high EE performance	✗
Promoting and ensuring the use of high quality, cost-effective energy audits and energy management systems (EnMS) to all final customers	✗
Obligating large industrial enterprises to undertake compulsory energy audits every four years	✗
Providing incentives to SMEs to undertake energy audits and implement the resulting recommendations.	✗
Setting quality criteria for the energy audits.	✗
Ensuring the availability of certification, accreditation and/or qualification schemes with a stipulated deadline for providers of energy audits and for energy managers.	✗
Developing and promoting the energy service market, including EPC-based contracting.	✗
Establishing an Energy Efficiency National Fund to finance the EE interventions.	✗

In a nutshell, **Georgia has yet to develop a sound EE strategy and pertinent regulatory framework governing the promotion and undertaking of EE in its national industrial sector that is compatible with the corresponding EU standards**. Doubtless, the draft NEEAP that has set indicative EE targets and enumerated various EE measures is an important step towards the right direction, but its preparation will need to be supplemented with a substantial array of additional policy and incentives measures in order to be attuned to the relevant EU norms and

[25] Tax reductions and local tax exemptions have traditionally been the primary tools encouraging EE upgrades.

practices.

5 Proposed policy initiatives for further uptake of EE in the Georgian industrial sector

5.1 Introduction

This section presents a cluster of potential policy initiatives that could be undertaken by the Government of Georgia (GoG) in embarking on, and pursuing, a national EE strategy for the national industrial sector, which can successfully address the substantial gaps identified in the current framework governing EE investments and further push forward the implementation of EE improvements by local industrial operators. The proposed initiatives take into account the specific features of the various segments of the Georgian industry as well as the existing barriers to improved EE in the national industrial market. They also build on, and assimilate, relevant best practices examples from the EU and they are offered as a guideline for the inter-dependent actions that need to be applied by the GoG as part of its efforts to revamp its present EE strategic vision. In broad terms, these initiatives relate to:

- the **formulation of the appropriate legislative set-up** in line with the EU law requirements related to EE;
- the **development of a more refined institutional framework** for industrial EE within the various competent State authorities;
- the **introduction of certain key policy initiatives**, which will motivate, or even oblige, industrial enterprises to initiate the installation of EE measures that will increase energy savings and reduce their energy consumption;
- the design and implementation of **fiscal and financial EE instruments**;
- the formulation of **information-led and capacity-building policies**; and
- the **monitoring and evaluation of the initiatives** that are selected to be implemented.

The following paragraphs provide a description of the facets of each of these initiatives, along with their respective background details and context.

5.2 Improvement of the existing legislative set-up

Given that Georgia is currently lacking a specific regulatory regime articulating the national EE policies in the various sectors of its national economy (including industry), the Study Team recommends that the Government should **initially put in place a suitable legislative framework** in order to drive EE forward through laws and regulations that will, *inter alia*, compel enterprises (including industrial operators) to take certain actions or face legal consequences. One of the necessary actions towards this direction involves the **preparation of the primary EE legislation** so that the country can meet its commitments under the Energy Community Treaty and the EU Association Agreement and achieve the goals set out in the NEEAP.

In this respect, the first step to be taken by the GoG involves the **adoption of an Energy Efficiency Law**, which - following experiences from EU Member States - will transpose all

prerogatives laid down in the EE Directive (2012/27/EU), particularly those relating to industry such as:

- the setting of indicative national EE target to be achieved through the implementation of the NEEAP[26];
- the imposition of an obligation on large industrial enterprises to carry out energy audits in an independent and cost-effective manner by qualified and/or accredited experts every 4 years[27];
- the formulation of State-backed programmes to encourage SMEs to undergo energy audits and the subsequent implementation of the recommendations from these audits;
- the development of a national scheme for energy audits[28], which should be based on:
  - the appointment of independent authorities under national legislation who shall implement and supervise this scheme including quality control mechanisms; and
  - a body of qualified and/or accredited experts (auditors) according to qualification criteria;
- the introduction of targeted policy initiatives to stimulate energy savings in industry that might include the design and implementation of an Energy Efficiency Obligation Scheme, which will require companies (i.e. energy suppliers, retailers and distributors) to achieve a specified volume of energy savings from their annual energy sales to final consumers by implementing EE measures; and
- the setting-up of qualification, accreditation and certification schemes (e.g. for energy auditors)[29].

As it has previously been pointed out, Georgia has already prepared the national NEEAP, which is a strategic policy document that sets the country's overall and intermediate national indicative energy savings targets for the public and private sectors and proposes concrete measures to meet these targets. However, since the NEEAP currently lacks legislative foundation, it is crucial that the proposed Energy Efficiency Law expressly:

- provides for the drafting of the NEEAP and the national energy strategy as well as any other requisite EE programme;
- introduces specific procedures and mechanisms for the implementation of the EE targets; and
- enumerates the implementation processes of the various policy measures expected to be endorsed by the GoG in the NEEAP.

It is understood that **Georgia is in the process of drafting - with EBRD's assistance - an Energy Efficiency Law**, which will be compliant with the requirements of the EE Directive[30]. However, the GoG must additionally ensure that this piece of primary legislation is complemented with the adoption of all requisite secondary acts, which will further elaborate the legal, regulatory and financial mechanisms, and specify clear and enforceable technical rules, for the implementation of EE investments in industry. Moreover, where necessary, any relevant existing

[26] See Articles 3 and 24.2 of the EE Directive.
[27] Under the EE Directive, industrial operators implementing an energy or environmental management system - certified by an independent body (that includes energy audit) - are exempted from the requirement to conduct a stand-alone energy audit.
[28] The specific framework for the establishment of such schemes, including the minimum criteria for energy audits, is enumerated in Article 8 and Annex VI of the EE Directive.
[29] See Articles 8 and 16 of the Energy Efficiency Directive.
[30] Interview with the representatives of the Ministry of Energy.

legislation and/or technical regulations governing matters relating to EE activities in industry will also have been to be amended in order to be fully compatible with the provisions of the new Energy Efficiency Law.

In addition, the Study Team considers necessary that the GoG gradually transposes a number of pieces of EU legislation so as to strengthen the drive towards EE in the domestic industrial sector. These include:

- the **Industrial Emissions Directive** (Directive 2010/75/EU), which has introduced emission limit values for combustion plants with a total rated thermal input which is equal to or greater than 50 MW; the Directive further stipulates that industrial operators should obtain an integrated permit from the competent authorities for their activities, which can be granted only after number of prerequisites have been fulfilled, such as the entire environmental performance of the relevant industrial plant, its emissions to air, water and land, its generation of waste, its use of raw materials, its EE, its noise, the prevention of accidents, and the restoration of the site upon its closure;
- the **Eco-design Directive**[31] (Directive 2009/125/EC) and the **Energy Labelling Directive** (Directive 2010/30/EU) and their implementing Regulations, which set labelling and energy performance ranking requirements for various individual product groups of household appliances and office equipment, such as dishwashers, refrigerating appliances, washing machines, televisions, air conditioners, tumble dryers, electrical lamps and luminaires, vacuum cleaners, heaters, domestic ovens, and residential ventilation units; and;
- the **Directive 2008/1/EC** concerning integrated pollution prevention and control, which will - among other things - require the amendment of the present permitting process for certain industrial installations[32].

Certain other EU important legislative instruments that will also be progressively required to be incorporated into the national legal order, since they will have some bearing on the implementation of EE interventions in industry, include the Directive 2010/31/EU on the energy performance of buildings and the Directive 2009/28/EC on the promotion of the use of RES. Furthermore, Georgia will need to eventually join the EU Emissions Trading Scheme, which sets limits on the total amount of certain GHGs that can be emitted by the factories, power plants and other installations.

Last but not least, the Study Team strongly advises that the gradual transposition of the aforementioned pieces of EU legislation should be accompanied by their **effective and transparent enforcement by the competent State bodies** and authorized officials in order to ensure actual compliance by industrial operators.

[31]Not included in the Energy Community acquis

[32] This Directive is applicable to:

- the energy and mineral industries;
- the industrial installations involved in the production and processing of metals;
- the chemical industry;
- the industrial installations engaged in waste management activities; and
- the plants that are involved in certain industrial operations, such as the production of pulp from timber or other fibrous materials, the pre-treatment or dyeing of fibres or textiles, the tanning of hides and skins where the treatment capacity exceeds 12 tonnes of finished products per day, the intensive rearing of poultry or pigs, etc.

5.3 Refinement of the present institutional framework

Since EE often cuts across governmental and Ministerial boundaries, for instance when different Ministries have responsibility over different sectors (e.g. buildings, industry, transport and energy), the Study Team recommends that the **GoG has to re-consider the institutional framework for its industrial EE policy**. For effective implementation, **appropriate institutions must be setup** that will be licensed and empowered to plan, implement, monitor and enforce policies, action plans and strategies.

At present, aspects of the **EE policies relating to the Georgian industry are split between the Ministry of Energy,** which has overall charge of the national EE framework**, and the Ministry of Economy and Sustainable Development**, which is, *inter alia*, responsible for matters relating to sustainable development and green economic growth of the country and the promotion and coordination of EE activities in the industrial sector. However, the Study Team advises the GoG to **designate a single authority, which will have full competence** over EE policies and measures in industry, because the placement of a sole dedicated public authority with responsibility of industrial EE could ensure that this matter is a strategic priority and would provide greater co-ordination in the implementation of those policies. It is up to the GoG to make an informed decision as to which of these two Ministries will be licensed to develop and implement the relevant EE policies and measures. In terms of implementation and monitoring though, it might be pertinent to assign responsibility to the Ministry of Economy and Sustainable Development, since - out of the four main sectors requiring EE investment (industry, public and residential buildings, transport and energy) - it supervises, handles and processes the relevant data for three of these sectors (except energy).

Another topic that will need to be investigated by the GoG concerns the potential **designation of a dedicated national Energy Efficiency Agency**, which - as an autonomous public body[33] - will be in charge of stimulating investment in EE in all sectors of the domestic economy (including in industry) and push forward the implementation of EE improvements. The policy experiences from many countries indicate that it would be useful to set up such a central institution to act as a Market Developer for all EE activities. The role and scope of functions of this Agency with regard to EE interventions in the domestic industry might include:

- assisting in the formulation of EE policies and the development of country's strategic documents, such as the EE strategy, the updating of the NEEAP, etc;
- playing an active role in the co-ordination of the work on EE between the competent Ministries and State bodies and institutions;
- assessing the implementation and reach the objectives that are set in the NEEAP by:
  - developing programmes, which will increase the conservation and efficient use of energy in industry;
  - identifying energy savings' opportunities and EE projects;
  - establishing financing mechanisms for the funding of industrial EE investments;
- acting as a "one-stop-shop" for educating, and building the capacity of, industrial

[33] Alternatively, such an Agency could be part of a Government Department or Ministry. However, the adoption of such a solution is not recommended because the field of EE spans many diverse areas that fall under the competences of different Ministries; as such, it is difficult to incorporate the functions of an Energy Efficiency Agency within the confines of a single Ministry. This is also true for the Ministry that is in charge of energy issues (the Ministry of Energy in Georgia's case), because any such Ministry is traditionally concerned with large scale energy supply options and EE can sometimes be lost or under-represented compared to more urgent energy supply matters.

companies, energy auditors, banks and customers to properly prepare, execute and evaluate EE interventions in industrial sites and facilities, including sharing knowledge and experiences respecting the provision of energy services, financing approaches and contracting systems;
- initiating, and even partly financing, pilot EE projects;
- furnishing detailed technical assistance to industrial enterprises in conducting energy audits and adopting guidelines and standards for the carrying-out of such audits;
- acting as independent advisor by engaging in project assessment for proposed EE investments;
- facilitating industrial operators' access to finance by acting as intermediary advisor between them and local or international financial institutions;
- setting up networks between industry representatives, government agencies and international donors, domestic banks and financial institutions and original equipment manufacturers with the aim to accelerating investments through the collaboration between market participants and the coordination of their activities;
- monitoring and verifying progress of implemented projects versus targets/results;
- conducting training and public awareness campaigns to communicate to stakeholders and to the public at large of the diverse benefits of EE investments; and
- undertaking research activities related to EE interventions in all sectors of the national economy (including in industry) in cooperation with domestic and international academic and scientific institutions.

It is understood that the GoG is currently considering the establishment of an Energy Efficiency Agency, as envisaged in the NEEAP, under a separate technical assistance project[34]. This is expected to be a very important milestone in the process of untapping the country's large energy savings' potential and of gradually putting in place a functioning and sustainable local EE market.

5.4 Introduction of certain key policy initiatives

This section enumerates a series of concrete measures and actions, of either a mandatory or voluntary character, that are recommended by the Study Team and whose execution is envisaged to have a swift impact on kick-starting the use of, and increase the demand for, EE investments in the domestic industry. These measures are also designed to address the barriers to implementing energy savings in the national industrial market and further take into consideration a number of important factors, such as:

- the current energy consumption levels in the local industrial sector, as these are presented in the NEEAP;
- the structure and main segments of the domestic industry;
- the energy intensity of industrial enterprises in the country,
- the ratio of SMEs to large companies;
- the availability of financial and human resources in such companies;
- the capabilities to support EE investments, including professional service enterprises, equipment suppliers, energy service providers, etc.; and
- the present legal landscape and its planned evolution following Georgia's accession to the

[34] Interview with representatives of the Ministry of Economy and Sustainable Development regarding the scope of the project entitled "*National Convention on the EU in Georgia*".

Energy Community Treaty.

More specifically, the Study Team recommends to the GoG that the following initiatives are important to also be implemented:

- improvement of the collection and processing system of industrial data;
- carrying-out of energy audits by industrial operators;
- establishment of an accreditation and certification system for energy auditors;
- adoption and implementation of internationally accepted standards on energy auditing and energy management;
- introduction of sub-metering requirements for industrial facilities;
- imposition of minimum energy performance standards; and
- development of industry-wide EE groupings and networks.

5.4.1 Improvement of statistical information related to the national industry

The EE targets set in the NEEAP should be aligned with EE gains potential, based on solid statistical data on both the supply and demand sides at a sufficient level of disaggregation and modelling. As such, in order to support long-term EE policy planning for the domestic industry and to establish baselines for tracking progress, the Study Team recommends that it is **crucial for the GoG to put in place a viable system for the collection, compilation, maintenance and analysis of reliable data on industrial output and energy consumption** that covers all segments and sub-segments of the national industrial sector.

This process has already been pushed forward through the NEEAP, which has identified the most energy intensive segments of the domestic industry and has further proposed a bundle of prioritized EE measures to produce energy savings by industrial operators[35]. However, in addition to improving and maximizing the use of existing data, concrete steps should be taken to acquire, process and keep up-to-date all additional information that is necessary to develop tools for strategic planning and monitoring industrial production and the supply, demand and consumption

[35] The NEEAP foresees that industry energy savings will come from 4 main routes:

a) no/low cost energy-saving from good energy management and control**,** which can result from:
   - understanding site energy consumption patterns through suitable sub-metering and software;
   - identifying and eliminating poor-practices, “good-housekeeping” and behavioural changes;
   - paying attention to planning and scheduling for optimum efficiency; and
   - identifying and financially assessing low-cost technical opportunities;

b) low-cost technical opportunities, which can focus on:
   - thermal insulation on steam/ hot-water/ refrigerant gas pipes;
   - attention to steam leaks, steam traps, maximum condensate returns, etc;
   - compressed air leak detection, water traps, etc;
   - upgrades to building fabric (e.g. glazing, roof and wall insulation); and
   - in the case of lighting, by replacing HID (High Intensity Discharge), incandescent or old style T8 tubes with EE LED lighting;

c) sector specific technical investment opportunities; and

d) cross-sector investment opportunities common to several industrial sectors, which - in the case of industry - could concentrate on:
   - in the case of boilers and steam/ hot water systems: combination of no/low cost EE actions that will replace old, inefficient or over-sized boilers with new, correctly sized EE boilers
   - in the case of refrigeration compressors and distribution systems: again, actions promoting the replacement of old inefficient or oversized refrigeration units with new, correctly sized ones;
   - in the case of motors: actions geared at replacing old, inefficient and over-sized motors with new, correctly sized IE3 or better motors, where applicable with Variable Speed Drive controls; and
   - in the case of lighting: concerted effort to upgrade, particularly incandescent lights with LED equivalents.

of energy throughout the local industry.

An initial step towards achieving this goal should be to **disaggregate the industrial sector into distinct key segments** that have significant economic contribution and share of energy use (with further disaggregating certain segments, such as the food and beverages sub-industry, by type of products) and to record energy use and industrial production. This would involve gathering information from:

- key economic indicators for the local industry (i.e. number of enterprises; number of persons employed; turnover and production value);
- current industry statistics (e.g. products, historic production, trade flows, imports and exports, market developments and drivers, industry sector consumption trends, including energy intensity and use at the sub-sectoral level, fuel mix, and facility level energy use)[36]; and
- existing and future mitigation activities to address resource/energy efficiency and produce energy savings.

The statistical analysis of the data gathered will provide a tangible business-as-usual projection for each group of industrial enterprises and the industry as a whole. On the basis of this projection, a modelling framework can then be developed and applied to track changes of industry performance over time, to assess specific energy savings potential and to design appropriate EE interventions.

This process could be complemented with the development by the competent State authorities (primarily, the Ministry of Energy and the Ministry of Economy and Sustainable Development) of EE indicators as a tool for demand-side management and long-term energy policy planning. Lastly, frequent benchmarking exercises could be undertaken, which - coupled with the sharing of best practices - would provide a clearer picture for determining best performance levels in the local industrial production processes.

5.4.2 Conduct of energy audits

Another critical step for assessing and quantifying existing energy consumption profiles in the domestic industry should involve the **carrying-out of energy audits** by local industrial operators. The performance of such audits, whether in the form of either walk-through[37] or of detailed energy audits, can provide any such operator with valuable feedback on the current status of energy use in its individual industrial plants and spot potential energy savings opportunities, which will generate cost savings and related environmental benefits[38]. The GoG, on the other hand, will be

[36] As there is not at present any disaggregated information available on exact products and processes for industrial production in Georgia and their respective energy consumption, data can initially be collected for large sites, and steadily be rolled out to medium and smaller energy-intensive sectors and facilities, as the Government becomes confident in the process.

[37] A walk-through audit is a basic and cost-effective exercise to identify opportunities for energy cost saving. In short, in this type of audit, readily available data are mostly used for a simple analysis of energy use and performance of some industrial plant. No extensive measurement and data collection is required and the whole process is completed in a relatively short time. Also, the audit's results are more general and the economic analysis is typically limited to calculation of the simple pay-back period, or the time required paying back the initial capital investment through realized energy savings.

[38] Typically, by conducting an energy audit, an industrial operator will be in the position:

- to accurately ascertain its energy consumption baseline;
- to define energy consumption drivers and adjustment factors to normalize its current energy consumption levels;
- to identify important factors directly affecting its energy use; and

able to identify and prioritize industry-wide EE investments for improving energy use in each segment of the national industry.

The NEEAP contemplates that this policy initiative shall at first be of a voluntary character for all industrial enterprises, but it will be accompanied by a system of "carrots" (incentives) and "sticks" (penalties)[39]. Yet, in order to reinforce its efficacy, the Study Team **strongly recommends that the GoG should place a compulsory requirement for energy audits on large industrial operators** as soon as possible. Part of the reason for this lies in such a scheme that will need to be implemented once the EE Directive is integrated into the national legal order. Moreover, the imposition of such an obligation will cover all substantial industrial energy users, thereby achieving a major reduction in energy consumption in a relatively short period of time. In addition, such an instrument will not only create awareness among the management of industrial operators about, but also justify the necessity for, the implementation of EE activities. In this connection, equally important will be the cultural change that mandatory audits are expected to produce by making EE a regular goal at all levels of in an industrial enterprise's operations.

In accordance with the prerogatives set in the EU EE Directive, this compulsory requirement can include an obligation:

- to carry out audits at regular intervals if some energy intensive industrial operators passes a specified threshold of energy consumption, which will be set by the designated State authorities;
- to perform such audits in line with pre-determined yardsticks[40] and according to internationally accepted standards[41];and

- to assess its priorities for the implementation of the most appropriate EE measures.

[39] In particular, under the NEEAP it is proposed that:

- those within the scheme and meeting their targets will be eligible for Government-backed support, such as technical assistance, access to grant funding/interest rate subsidies, etc;
- those outside the scheme, or failing to meet their targets, would not be able to access these support programmes and may have an additional fee for energy or pollutant emissions;
- If a fee system is chosen, it will be valued at around 5-10% of the unit cost of the fuel (as the GNERC already sets fuel tariff rates, the tariff rates can be adjusted so that the process is revenue neutral overall); and
- options will be explored to allow organisations to participate in a "White certificate" or similar trading scheme to (i) trade/ sell their excess energy (or CO_2) savings and/or (ii) purchase kWh (or CO_2) in the case of under-performance, so as to remain within the scheme.

[40] Again, the EE Directive can be used as a benchmark for this purpose, as its Annex VI specifies the minimum criteria that must be fulfilled by obligatory audits.
Annex VI also states that detailed and validated calculations should be presented for the measures proposed in energy audits so that the potential savings are clear. It further stipulates that it should be possible to store the data used in energy audits for historical analysis and for tracking performance.

[41] On this topic, it needs to be mentioned that the EE Directive does not make any explicit reference to any particular standard with respect to the implementation of compulsory audits for large industrial companies. However, adherence to international standards for energy audits can provide a consistent approach and ensure that audits undertaken are of a high quality.
The most relevant standard is the ISO 50002:2014, which specifies the principles and process requirements for carrying out an energy audit (including the audit's deliverables) and in relation to energy performance and can be applied to all types of establishments and organizations and all forms of energy and energy use. Also, the European standard EN 16247-1:2012 Energy Audits General Requirements, which defines the properties of a good quality energy audit, enumerates the audit requirements, lays down a common methodology and defines the deliverables; this standard applies to all forms of organisations and all types of energy consumption, excluding energy consumption in private residences. The European standardization body (CEN) is currently in the process of preparing the standard prEN16247-3, which provides guidance for energy audits of industrial process.

- to report an audit's findings to the competent State bodies, including communication of energy savings results (energy consumption reporting, reporting on proposed and implemented EE measures, etc).

Evidently, the actual operation of such a mandatory scheme will require the enumeration of the segments of the national industry that will be subject to energy auditing and the setting-up of a consistent and **updated database of the obligated industrial operators**[42]. The Study Team recommends that a **single competent State authority should also be designated** that will be in charge of implementing the scheme (including notifying at the appropriate time the relevant enterprises of their regular energy audit obligation) and of monitoring its performance. Moreover, a **reliable system for validating the quality of all energy audits** will need to be put in place, which will further verify that appropriate methods are being used in carrying them out. Lastly, effective, proportionate and dissuasive penalties for non-compliance must be established with the mandatory requirement placed on large enterprises to perform regular energy audits.

Box 1: Best practice example for promoting audits in large industrial operators
In Japan, the Ministry of Economy, Trade and Industry subsidizes energy audits for businesses with an annual energy use exceeding 1.500 kilolitres in crude oil equivalent. The audits are carried out by the non-profit Energy Conservation Centre of Japan (ECCJ), which has no links to equipment or service providers.

Since the Georgian industry has around 6,500 SMEs[43], the Study Team recommends that clear and strong incentives must be provided by the GoG to industrial SMEs to conduct sufficiently high-quality energy audits so that they can accurately assess their current energy use, get an estimate of the potential savings and prioritize the EE improvements that are likely to deliver the most benefits. By way of illustration, subsidies, grants or soft loans could be made available to cover the cost of audits and to partly fund the expenditures of implementation of the resulting recommendations.

Box 2: Best practice example for supporting energy auditing for SMEs
In Germany, the Special Fund for EE, which was set up in 2008 through the Government-owned development bank KfW, provides grants for SMEs to obtain advice and consultation. Audits are split into "initial" and "in-depth"; 80% of the initial audit fee and 60% of the in-depth audit fee can be covered by a grant (up to an upper limit). The programme is administered by the Federal Office for Economic Affairs and Export Control. There was a high implementation rate of audit recommendations and 5,000 audits were conducted each year. Energy savings were around 1.4 TWh/year, equating to around EUR 80 million in energy cost savings. CO_2 savings were 470,000 tCO_2 from a total programme investment of EUR 480 million. Programme costs were EUR 0.5-0.7/MWh energy saved and EUR 0.03-0.06 per EUR of

[42] On this issue, of significance will also be the delineation of the term "*large enterprise/organization*" as the EU definition differ from the relevant Georgian one: under the EU legislation this term encompasses any entity having 250 employees in its payroll (per Member State) or a turnover of more than EUR 50 million and assets of more than EUR 43 million. In Georgia, enterprises are also defined in conjunction with their turnover and with the number of their employees, but the relevant yardsticks are different: a large one must have a turnover of more than 1.5 million GEL per year (approx. EUR 500,000 per year) and over 100 employees, while a medium enterprise must have a turnover of between 0.5 – 1.5 million GEL per year and between 20-100 employees; small enterprises are those with a turnover of less than 0.5 million GEL per year and less than 20 employees.

[43] Data provided in the NEEAP.

Box 2: Best practice example for supporting energy auditing for SMEs

investment induced.
The key success factors were the availability of sufficiently high subsidies to encourage SMEs to participate and the SMEs' own low expenses. Furthermore, delegating responsibilities to regional partners was important, particularly in terms of personal communication between the regional partners and SMEs. The high quality of the energy audits was also cited as a success factor.

Pilot audits with a sub-set of targeted SMEs may also be subsidized by the GoG to aid them in addressing energy consumption data gaps and in providing estimates to use as a basis for further calculations for EE upgrades; such pilot audits will further provide substantial feedback for developing tools and approaches that can be used in the implementation of more detailed audits and also attract other industrial SMEs to undertake energy auditing.

5.4.3 Establishment of a qualification, accreditation and certification system for energy auditors

The performance of energy audits presupposes a **sufficient pool of well-qualified auditors**[44], who will evaluate and analyse how energy is being used in some industrial facility, identify energy conservation opportunities and make recommendations for reducing or optimizing energy consumption. This can be assured by the enactment of legislation[45] that will mandate enforceable standards for the licensing, accreditation[46] and certification of energy auditors in line with specified pre-determined criteria[47]; the establishment of such a system will improve the quality of services provided by auditors and increase trust in them and their reliability.

In reality however, especially in the early phases, too few qualified professionals are expected to be available to handle the large number of industrial facilities to be audited rapidly, especially as regards the proposed mandatory auditing of large industrial operators[48]. One possible solution could be to include issues around audits in the curricula of the higher education levels to demonstrate that the planned rapid impact of compulsory energy audits may take time unless the qualification process is run at the same time.

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[44] Since an energy audit is performed in collaboration with the staff of the enterprise being audited, the implementation of effective energy audits also requires that there exist well-qualified staff in an industrial operator who are responsible for relevant enterprise's energy management (energy managers). This matter is considered in chapter 8 in the context of the Azeri industry, which appear to have a more urgent need for energy managers.

[45] As an alternative, the accreditation of energy auditors can be self-regulated by the industry itself through membership base organizations, which will set guidelines, accreditation and licenses to be voluntarily. However, such a system is more apposite for advanced EE markets and its implementation would be too premature in the case of Georgia.

[46] On this matter, it must also be added up that an accreditation body must be in place for EE products and services. It is understood that Georgia has established the Accreditation Centre as the unified national body of accreditation, which is in charge of accrediting individuals and entities that are involved in audits and energy management systems. However, **it is advisable that the role and activities of this body need to be re-examined**. This could include ensuring that it is part of the Multilateral Recognition Agreement of the World Association of Conformity Assessment Accreditation for EE product and services.

[47] As mentioned in the NEEAP, Georgia is at present lacking such an official scheme for industry.

[48] This problem is also identified and stressed in the NEEAP.

5.4.4 Adoption of standards on auditing

The Study Team considers that the aforementioned measures will be required to be complemented with the **adoption by the GoG of internationally recognized standards for energy audits**, which will define minimum levels of accuracy and duration of data gathering, maintain a structure and methodology that aligns with the requirements for auditors' accreditation and facilitate the introduction of a viable platform on which various Government-backed programme requirements can be based upon. It is anticipated that the adoption of such standards will support scoping and expectation of quality audit outcomes by:

- providing guidance to auditors to deliver effective audits;
- giving clarity to industrial operators around the process for assessing energy use and the confidence that the outcomes meet a minimum standard of quality
- assisting in the identification of the reliable EE opportunities; and
- increasing the effectiveness of converting energy audit outcomes into actual EE improvements.

Allied to this, the Study Team recommends the adoption by the GoG of an **Energy Audit Rulebook for Industries**, which will provide detailed guidelines to industrial operators for the methodology to be used, including the rules and procedures for the regulation of all aspects of the auditing process. Such a Rulebook will be very useful in establishing a reliable and consistent system of homogeneous operating practices to safeguard the quality of all energy audits conducted within the local industry, by defining:

- the preparation of audits (e.g. audit criteria and scope, checklist and plan);
- the process of collecting, measuring and analysing data on energy use and production patterns;
- the conduct of benchmarking and energy performance analysis;
- the identification of EE and energy savings' opportunities;
- the relevant reporting requirements; and
- the enumeration of the post-audit activities (i.e. implementation of proposed EE measures).

5.4.5 Introduction of sub-metering requirements

Georgia's industrial (and household) consumption is metered, which provides the competent State authorities with a good basis for developing demand-side and EE policies. However, large industrial enterprises could - in addition to being compelled to perform energy audits - be advised[49] (and, eventually, required) to fit significant energy consuming equipment (or sections of the plant) with an energy meter to account for its specific energy consumption.

Sub-meters have been widely used in more advanced EE markets owing to the great variety of benefits they offer, especially in setting up and implementing advanced EnMS. Typically, sub-meters are installed after the utility meter in specified locations throughout the facility and are used to measure the amount of energy consumed by portions of the plant where major energy loads are known. Some of these metering systems communicate to a central system (e.g. SCADA) where the information is trended, stored or transferred to a data historian system for

[49] In this connection, this policy initiative could at first be voluntary and supplemented with a system of rewards and sanctions, along the lines that the NEEAP contemplates for the performance of energy audits by large industrial enterprises.

archiving.

In the Georgian context, the Study Team recommends that this measure may initially be applied to new and refurbished energy intensive industrial equipment and, where technically feasible, be extended to older pieces of equipment. Gradually, its scope of application may in the future include significant energy intensive processes of the industrial plant with high energy consumption. Measurement could take the form of direct metering or indirect metering, whereby energy consumption could be obtained from other proxy measurements applicable to the quantification of energy consumption.

On this theme though, it should be stressed that a key matter for the installation of sub-meters involves the identification and implementation of an appropriate hardware and installation configuration. This is because sub-metering at an industrial plant is complex because the current and the voltage feeding the equipment both need to be measured: while current can be measured with clamps and does not require power interruption, voltage measurement typically requires wire installation, which results in a temporary power outage. Sub-meters can also fail or report incorrect data, so a preventive maintenance plan that manually checks all meters, including software and real-time data, must be installed in order to ensure the proper functioning and interacting of the system.

5.4.6 Setting of minimum energy performance standards for industrial equipment

Another recommended initiative by the Study Team concerns the **specification of performance requirements for energy-consuming devices that are used in the local industry**. These co-called Minimum Energy Performance Standards (MEPSs) define the energy performance of equipment and effectively limit the maximum amount of energy that may be consumed by a product, or the minimum level of efficiency, in performing a specified task[50]. By setting the minimum acceptable efficiency levels, MEPSs "label" which products can be marketed and sold and prevent any equipment below a set level of energy performance from entering the marketplace.

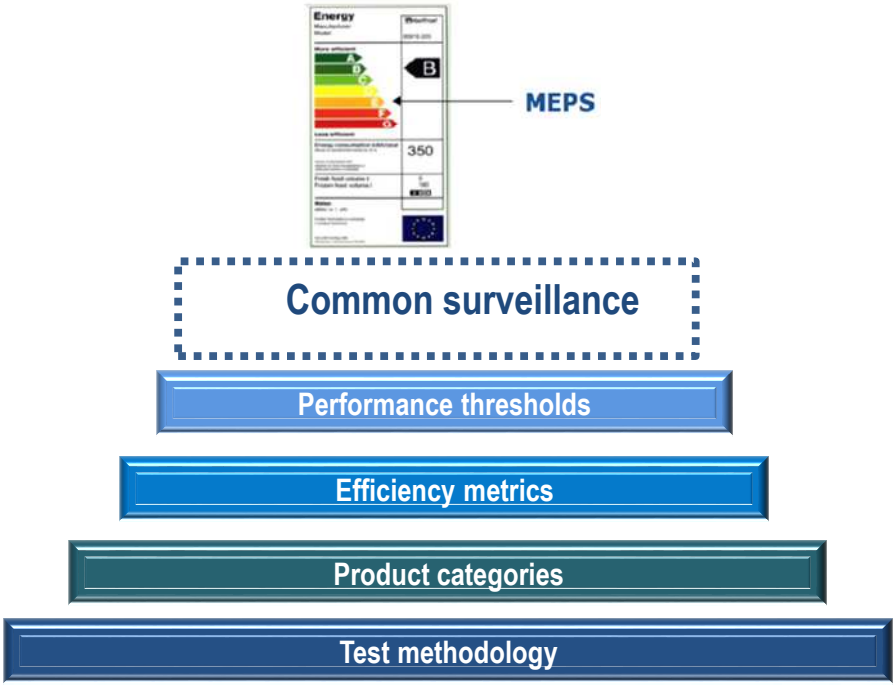
In the context of the Georgian industry, MEPSs can be implemented in respect of several different pieces of industrial equipment, such as lighting, air compressors, heating and cooling equipment, electric motors and drives. Electric motors, in particular, should be a specific target because they are estimated to consume around 60% of the electricity consumption in many industrial sub-sectors[51].

Such standards are expected to be eventually introduced by the GoG following the transposition of the Eco-design Directive, which is the primary piece of legislation for setting mandatory MEPSs in the EU[52]. It needs to be emphasized though, that the imposition

[50]A MEPS may, however, also include requirements not directly related to energy; this is to ensure that general performance and user satisfaction are not adversely affected by increasing EE.
[51] This figure is provided in the draft NEEAP, which states that the main exception is secondary melting of metals (which use electricity for the melting) and Food & Drink (which use a lot of electricity for chillers). The NEEAP further stresses that "*many motors are old (> 20 years), inefficient (IE1 or worse), oversized for their application, fixed-speed and have been re-wound to avoid new capital purchase costs. Secondly, several of their applications are also inefficient: left running when not in use, poorly designed / not maintained systems, or suffer other inefficiencies such as compressed air leaks*".
[52]This Directive and its implementing regulations address products in the area of electric cross-cutting technologies, like lighting, ventilation or pump systems or thermal cross-cutting technologies, such as steam and hot water systems in the industrial sector. Its reach impacts on virtually all industries, as its such

of such compulsory standards requires a substantial amount of administrative and legal effort, not least because MEPS will have to be built on a very specific technical platform. Namely, at first, the Study Team recommends that a test procedure must be enumerated, which will set out the manner in which energy and service levels are to be measured. The relevant products will then need to be divided into product categories so that sufficient homogeneity of service will be provided. Finally, the relevant energy performance thresholds that are appropriate to the local market should be specified, which must be determined according to agreed EE metrics[53] (kWh per day, etc.)[54]. Of course, as Figure 5-1illustrates, such a scheme will only be truly effective if enforcement follows with constant monitoring and surveillance of any non-compliance.

Figure 5-1: Process of developing MEPSs



A pragmatic solution to this problem might be for the GoG to **persuade industrial operators to enter into voluntary agreements as an intermediate step** before the imposition of obligatory MEPS requirements. For instance, under these agreements industrial enterprises could pledge to work together towards meeting the EE targets that are set in the NEEAP and be encouraged - through the provision of financial incentives - to install EE equipment during retrofitting and upgrading cycles.

imposes MEPSs on power transformers, electric motors, furnaces, compressors, steam boilers and industrial fans.

[53]Metrics are a measure of efficiency expressed in terms of energy used per unit of useful service provided.

[54]Typically, efficiency metrics and product categorizations are commonly specified in EE regulations, which reference to the test procedure.
The elements of performance thresholds, selection of efficiency metric and product categorization are set by Government-appointed equipment EE regulators. Test procedures referenced in the regulations are normally derived by national and international standards bodies (e.g. the International Electro-technical Commission, the International Organization for Standardization (ISO) and the International Telecommunications Union), which follow standardized procedures for developing and adopting test and measurement standards.

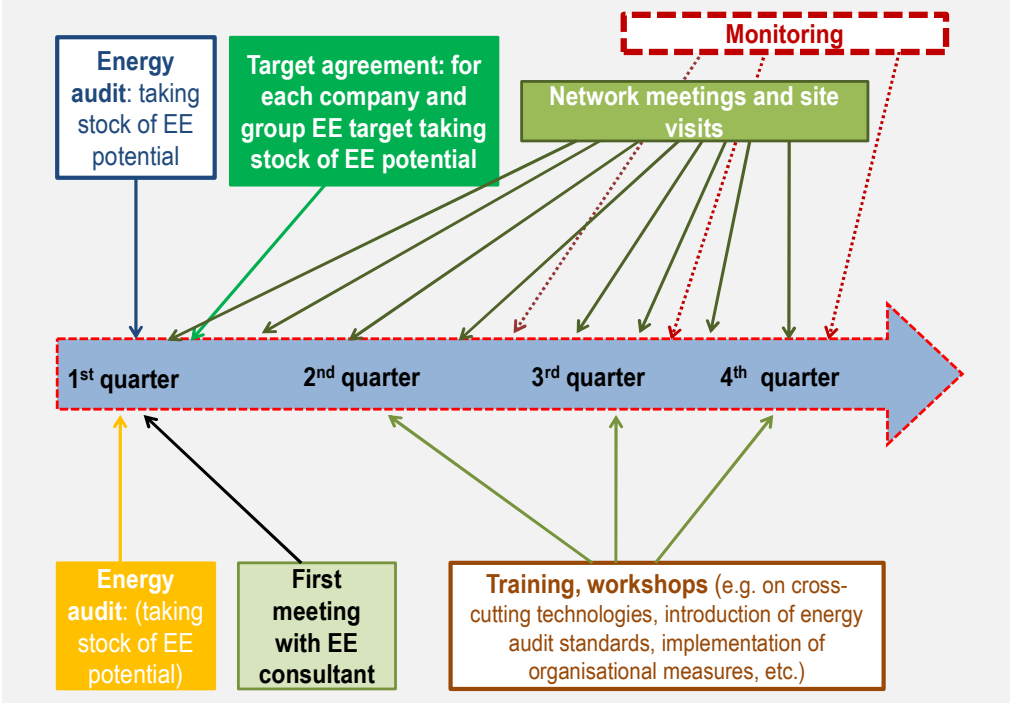
5.4.7 Potential development of industrial energy efficiency networks

As a means to foster industrial operators' participation in key EE initiatives in industry, the Study Team recommends that it would be constructive for the GoG to also put in place **voluntary industry groupings and networks** that will bring companies together to exchange experiences and undertake steps together to improve EE in their facilities. Indeed, examples from different countries show that EE networks are an extremely effective multiplier of best practices and they can also actively engage industries in energy saving efforts.

One of the main advantages of establishing such networks lies in their inherent simplicity and flexibility in terms of their structure, goals, scope and policy context, which can be readily adapted to the conditions of the Georgian market. Typically, industrial EE networks focus both on the information sharing and the exchange of EE experiences and on identifying energy saving potential in industrial operations, which are usually supported by the process of implementing appropriate savings programmes. Some concentrate on the training and certification of their internal auditors, while others also play an advocacy role and liaise with government institutions towards improved EE policy designs.

The network process can vary greatly in terms of the duration and funding of the establishment process, but, as Figure 5-2illustrates, in most cases the basic structure involves the following steps: first, before launching a network, an adequate number of interested companies will need to be involved- usually between eight and fifteen companies. Once launched, the participating companies contract an energy consultant to conduct an energy audit to take stock of the energy saving potential. With these results in hand, companies then meet to agree on both individual and network-wide EE targets, which are non-binding. Based on the agreed target and measures, companies proceed to implementing them and in parallel meet regularly to engage in a moderated exchange, share insights, go on site visits, and monitor progress. The costs of network participation vary depending on the size of each participating company and the country in which they operate.

Figure 5-2: Graphical depiction of the EE Network process



Box 3: Best practice example of industrial network focusing on EE

ENIG is a Swedish EE network, which was initiated in 2009 and targets SMEs in the manufacturing sector. ENIG is run by the Swedish Research Institute for Industrial Renewal and Sustainable Growth (Swerea); the Swedish Energy Agency is a partner and funder. ENIG creates, collects and disseminates information on EE technologies, practices and methods. The network enables cross-industry collaboration in areas of common interest, such as ventilation, compressed air and lighting.
The objective of the network is to save 30% of energy consumption in participating companies by 2015. The evaluation of the initial stage (2009-2012) indicates energy savings of 23,600 MWh in 93 of the participating companies, which had an initial consumption of 341,000 MWh, corresponding to a 7% reduction. The programme has been continued for a second stage.

5.5 Formulation and implementation of fiscal and financial EE instruments

In view of the complex technical character, the high-performance risk and the long payback periods of EE interventions, **the policy initiatives outlined above are unlikely on their own to increase the flow of EE investments in the Georgian industry**. This explains why these initiatives will need to be accompanied - at least, at the early phases of the EE market's development - by additional forms of Government-supported central targeted programmes of fiscal and financial nature, which will lower the high costs of development of EE industrial projects, enhance local access to EE technologies, products and equipment and positively influence the speed with which EE improvements are taken on by industrial enterprises (or discourage retaining the *status quo*).

For instance, financial incentives might include:

- **subsidies** or **grants**, which will be provided within the framework of specific programmes developed by State authorities, to carry out energy audits, to use other energy services and/or the purchase of EE related equipment and products;
- the provision of long-term low or free-interest **loans**, which could be made available by local financial institutions, preferable with the assistance through dedicated credit lines of international financial institutions, to subsidize part of the capital cost of some EE interventions;
- investment **credits** or State-backed **guarantees** for the implementation of EE upgrades or for the adoption of proven EE technologies by industrial operators; etc.

Box 4: Best practices example of Government-backed incentives for the promotion of EE in industry

The Government of the Republic of Korea has been providing preferential long-term and low-interest rate loans to encourage the installation of energy-efficient equipment in industry.

Financial support from the GoG, international financial institutions and development agencies **will also be needed in order to provide requisite technical training and capacity building to various stakeholders' groups** (EE consultants, local financial institutions, industrial operators, etc.), support the research, development, demonstration and deployment of EE technologies, including the realization of pilot projects, improving information dissemination and raising general awareness of the benefits of EE investments in industry.

On the other hand, fiscal policy initiatives could pertain to the provision of **tax refunds, deductions, rebates or profit-tax credits**, which would be made available by the GoG to industrial enterprises and/or original equipment manufacturers, excise, import, property or sales tax exemptions or reductions for EE equipment conversions or acquisition, accelerated depreciation, tax bonuses or the imposition of indirect taxation measures to promote EE improvements in industrial plants[55].

Box 5: Best practices example for tax incentives in industry

The Government of Italy - under its Energy Efficiency Tax Rebate Programme - offered between 2007 and 2013 a 55% tax deduction scaled-up investment in new appliances and equipment by EUR 23 billion in 1.8 million applications. The cost of the scheme, which also targeted the industrial sector, was EUR 13 billion (IEA 2014); see http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014. Another example is provided by the Government of South Africa where – under the so-called Energy Efficiency Tax Incentive - entitled registered companies to claim a USD 0.45 tax reduction for each kWh of energy saved: under the programme, a company must establish a 12-month energy usage baseline before claiming the incentive.

As it can be seen, there is considerable variation between the support measures that may be employed and the GoG should make informed decisions to select which of them are best suited to the local conditions to promote EE by the domestic industrial sector.

Any such incentive may in part be funded through the development agencies that current operate in Georgia (e.g. the Georgian Energy Development Fund, the JSC Partnership Fund, the Georgian Co-Investment Fund) or through a separate dedicated credit facility (i.e. an Energy Efficiency Fund). Financing could also be made available by international donors and international financial institutions and, indeed, the NEEAP has identified the relevant sources of external funding that can offer a combination of grants and loans for EE upgrades in the domestic industrial sector.

However, since State-backed support schemes are unlikely on their own to sustain the long-term viability of EE investment in the local industry[56], the Study Team recommends that the GoG will eventually need to promote the use of specific market-based energy policy initiatives so that industrial operators can have access to more cost-effective EE gains. **A concrete step towards the direction should be the gradual development of an energy service sector through the promotion of ESCOs**[57] and **energy performance contracting (EPC)**. The process of implementation of this initiative falls outside the scope of this Report. Suffice it to say in brief that the establishment of a sustainable ESCO market will require careful advance planning with

[55]Such measures typically entitle end-users or firms, which meet specified EE targets, to claim reductions in energy taxes, CO_2 charges, etc. (and pay increased taxes if their energy consumption is higher). Denmark, for example, imposes a particularly high tax on energy use, which compensates for the fact that energy prices usually do not reflect the long-term and strategic costs for society in terms of pollution and energy dependency.

[56] Typically, financial incentives are best applied to initiate EE investments and should be phased in and out to balance and synergize with other policy priorities; ideally, such incentives thus have a defined exit strategy so they do not displace private funds.

[57] In short, an ESCO develops, implements and provides or arranges financing for upfront EE investments for its clients. The ESCO is compensated for its services (e.g. ongoing savings monitoring, measurement and verification costs and assumption of risks) from the energy savings achieved. The fundamental concept of the ESCO business model is that the client does not have to come up with any upfront capital investment and is only responsible for repaying the investment made or arranged by the ESCO.

several key matters needed to be considered in depth, including:

- setting up an appropriate strategy and legal and institutional set-up for the supply of energy services;
- creating suitable market conditions, which will initially be complemented with the provision of targeted Government support in terms of both funds and technical/capacity building assistance;
- standardizing and popularizing energy performance model contracts and EPC documents; and
- facilitating the establishment of fitting private funding mechanisms, which will ensure an ESCO's financial access to private local banks and financial institutions.

5.6 Formulation of information and capacity building policies

Developing the capacity to identify and implement strategic and operation EE changes is key to unlocking the vast EE potential across the heterogeneous segments of a country's national industry. This is why the Study Team considers imperative to **improve the know-how and capabilities of the Georgian industrial companies** to develop and implement effective EE programmes, as well as the capacities of other actors, such as energy auditors, original EE equipment manufactures and technology vendors as well as of the banking and financial sectors. Such capacity building activities in the form of **training activities, workshops, discussion platforms, working groups, etc will need to be formulated and implemented** not only by the competent State authorities (primarily the Ministry of Energy and the Ministry of Economy and Sustainable Development), but also through international agencies and donors, IFIs and international partnerships. The relevant programmes must include the provision of an integrated menu of capacity building, training and information distribution, stretching from technical methodologies (preliminary and investment-grade energy auditing) and measurement and verification (M&V) techniques[58] and appraisal tools to knowledge dissemination of EnMS, use of different EE technologies, financial evaluation and budget planning, quality control and capacity management.

Allied to that, a sufficient number of trained professionals with a strong understanding of EE, auditing and M&V standards and practices will need to be developed through educational institutes and other training programmes so that industrial companies can hire and maintain skilled staff. Successful approaches that have been adopted for this purpose in other countries include:

- setting up certifications in EE for individual energy auditors and energy managers;
- promoting international exchange in terms of personnel training; and
- creating EE programmes in post-secondary institutions.

The strengthening of skills and know-how of a larger pool of experienced EE experts will provide a greater impetus to domestic industrial operators to invest in EE improvements in their plants,

[58] Measurement and verification procedures are fundamental to an energy service agreement and are needed so that a customer can check whether the guaranteed EE improvement and any other contractual obligations undertaken by an ESCO have been met. The procedure agreed at the making of the relevant contract also includes a monitoring and verification reporting format, reporting intervals and any specific links with the energy management system, which might have been implemented by the customer in question.

while at the same time it will and make available a more diverse portfolio of energy services to them.

At the other end of the spectrum, it is also vital to **increase awareness and understanding among the representatives of the Georgian industry** of the tangible and long-term benefits of EE investment through ongoing and sustained information distribution on a diverse array of different issues, including information on:

- potential EE improvements for specific segments of the national industry;
- guidelines on energy auditors and energy managers of industrial facilities; and
- the carrying-out of demonstration/pilot projects and their successful results in enhancing energy savings.

Information dissemination and general EE awareness campaigns have already been conducted by the Ministry of Energy and the Ministry of Economy and Sustainable Development and by various international agencies. Yet, these should be continued and can be undertaken on an ongoing basis through different channels, such as:

- engaging in capacity building activities for industries, industrial energy managers and auditors through workshops, training courses and exhibitions;
- establishing small, focused industry groups on EE, to engage industry in a sustained manner and convince them of the need to invest in EE upgrades and increase capacity in energy management;
- setting up internet-based EE information portals;
- creating long-standing relationships with existing industry associations to provide information on EE technologies and the successful implementation of EE projects; and/or
- establishing domestic think tanks with government department, public agencies and bodies, industrial associations and academic institutions to implement specific EE actions and initiatives, to promote knowledge sharing and raising awareness and to tackle any emerging barriers.

More importantly, as a means to cultivate and deepen the theoretical knowledge gained from such capacity building activities, the Study Team **strongly advises that their implementation is supplemented with the execution of well-focused small demonstration projects** that are fully supported by the GoG and international financial institutions, so that industrial companies can gain tangible practical experience on energy auditing and management. This is because international experience has illustrated that the adoption of a targeted piloting approach, whose energy savings' results are widely propagated through different communication channels, can serve as a benchmark in improving industrial firms' trust in the performance of EE activities. Such pilot projects are expected to constitute effective references to showcase to other industrial operators the benefits of industrial EE investments; on the other hand, the companies running a demonstration project will act as a pioneering industry "champion" and could subsequently offer training and educational services to other firms, thereby exhibiting strong leadership in its field and improving its public image.

Two words of caution are, nonetheless warranted in order to ensure the success of any such pilot projects. First, their execution must not merely entail the transfer of foreign best practices, but it should be adapted to the circumstances and requirements of the Georgian industry; stated otherwise **any demonstration project will need to be shaped according to the local realities** so that domestic industrial operators will learn by doing during the whole process. Secondly, the

impact, feedback and experiences gained from any such projects will be required to be compared and objectively assessed against the backdrop of the other recommended actions and initiatives, which are proposed in this report, as well as of any relevant plans of the GoG so that any necessary corrective measures will be promptly implemented.

Box 6: Best practices example for piloting programmes[59]

Piloting in the chemicals industry

The CARE+ pilot project, co-funded by the European Commission, was set up by the European Chemical Industry Council to help SMEs that lack experience with energy audits to identify energy saving opportunities. One of the main objectives was to develop and test tools to help SMEs to help themselves to improve their EE. The activities of this programme, which started in 2008 and ended in 2011, included:

Gap analysis:

The partner countries (Bulgaria, Italy and Poland) conducted surveys on energy management performance and provided a gap analysis to help determine the current situation and needs in chemical SMEs.

Tools development:

Based on the survey results and existing expertise, the project then evaluated best practices and appropriate delivery mechanisms for improving EE. The results served to draft the Self Audit Guide and the Best Practice Manual. These can be adapted to individual company needs and combined with existing measures, such as national funding schemes.

National test phase and rollout:

The draft tools were tested with two chemical SMEs in each partner country. The field test enabled further improvements to match companies' needs and expectations. The finalized tools were then promoted through a rollout campaign in the partner countries.

In 2013, the European Chemical Industry Council continued its EE work by launching the Sectoral Platform in Chemicals for Energy Efficiency Excellence (SPICE3) that was co-funded by the European Commission and which aims to boost EE across the European chemicals industry, particularly in SMEs. The consortium brings together 14 partners from 11 countries. The project uses a multi-lingual online platform, industry workshops and tailored training to provide companies with guidance, tools and promote the exchange of best practices. The chemicals sector's strong commitment to the project has prompted SPICE3 to establish an ambitious set of goals after just two years; namely: a) USD 11 million in cumulative investment by European stakeholders in sustainable energy, b) 250 ktoe / year in primary energy savings and c) 100 $ktCO_2$/year reduction in GHG emissions.

5.7 Monitoring and evaluation of the policies and initiatives to be implemented

The outcomes of the actions and initiatives that are selected to be carried out in the industrial EE field will need be measured, reviewed and assessed on a regular basis and the results fed into a re-formulation or even abolition and replacement of any of these actions or initiatives. The Study Team recommends that **the competent Georgian authorities must, therefore, build into the relevant policies and programmes verification systems** and reviews of performance in order to correctly quantify their respective impact and what interventions could, and should, be modified to produce better results. This is especially crucial when such programmes intend to influence investment decisions on industrial EE projects that are envisaged to take time to develop and by

[59] www.cefic.org, www.spice3.eu

their very nature are of a long-term character.

In order to accurately screen and appraise progress, the Study Team considers **useful to adopt a measurement mechanism** that will weigh up the extent of implementation success of each specific implemented initiative in specific time horizon (for instance, in a five-year lifecycle up to 2023). Several different monitoring methods and tools have been developed (and employed) for this purpose, one of which is the so-called "energy efficiency balanced scorecard" system. As the following four figures illustrate, this measurement system encompasses the major success factors in the development of the Georgian EE market, namely:

- the implementation of industrial EE projects (along with the relevant EE measures installed) in both number and value;
- the achievement of the EE targets (toe/y) that are set in the NEEAP;
- the qualification and certification of the people and companies engaged in EE activities (energy auditors, energy managers, etc.); and
- the awareness and training activities to improve knowledge, skills and capabilities of industrial operators and any other relevant stakeholders' group.

Figure 5-3: Graphical representation of the balanced scorecard - Financing

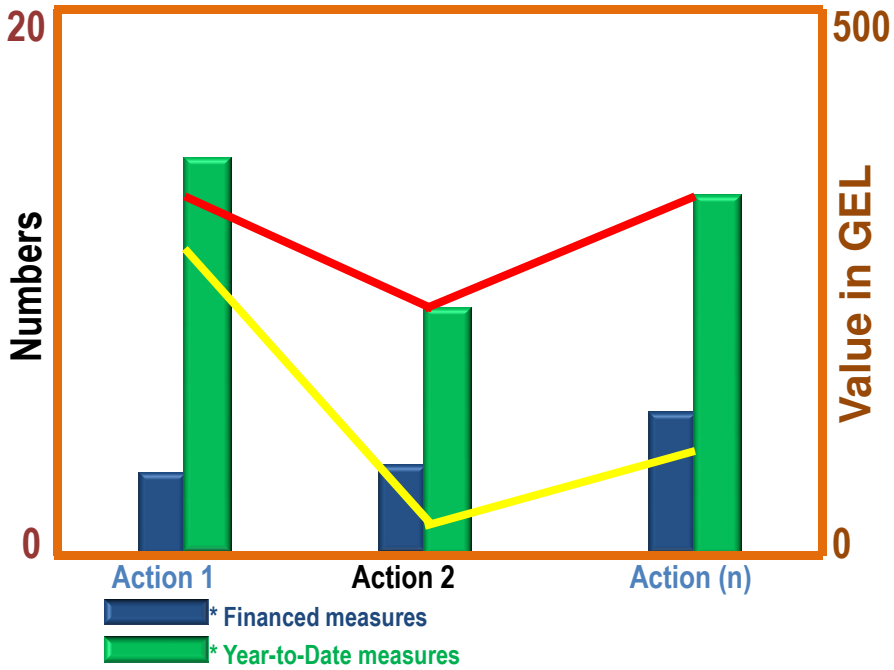


Figure 5-4: Graphical representation of the balanced scorecard – NEEAPs' Targets

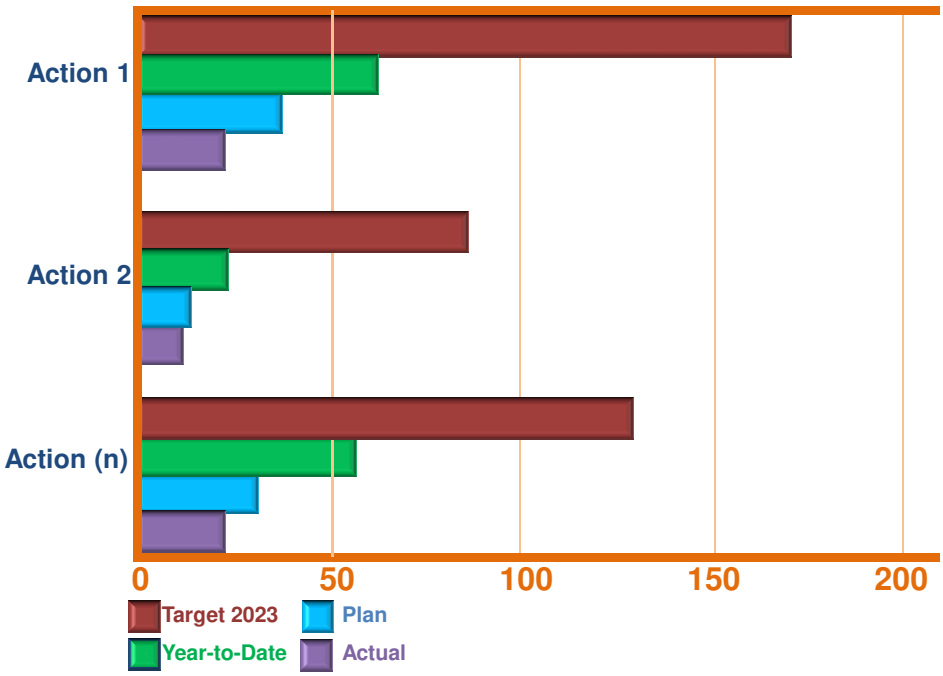


Figure 5-5: Graphical representation of the balanced scorecard – Qualifications/Certification

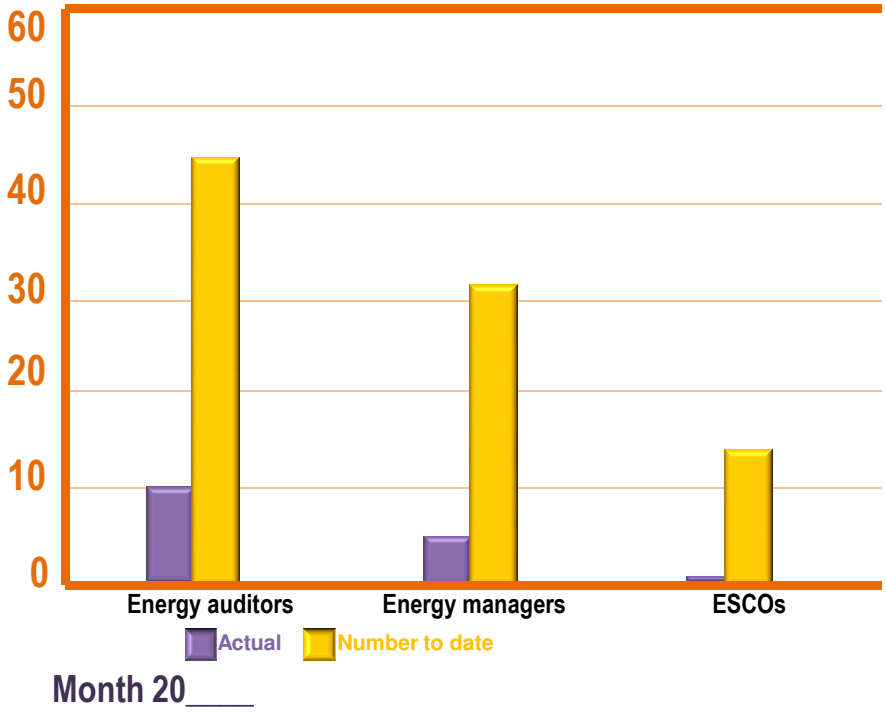


Figure 5-6: Graphical representation of the balanced scorecard – Awareness/Training

Year 20___	Actual	Plan	To Date	2023 Target
Awareness-raising				
Workshops				
Discussion platforms				
Guides, manuals				
.....				
Training				
Training for industrial companies				
Training for energy auditors				
Training for energy managers				
Training for				

The scorecard enumerates the data that must be collected in order to effectively implement this monitoring system. The requirements imposed on industrial operators to furnish the basic data could be expressly imposed under the relevant Georgian legislation. The analysis of the scorecard's outcomes will then confirm the progress that has been made and should draw attention to any areas warranting further action or improvement.

6 Review of the current legislation and policies on EE in the industrial sector in Azerbaijan

6.1 Introduction

This section starts with an in-depth examination of the existing regulatory and institutional arrangements that are applicable to the promotion of EE in Azerbaijan, concentrating especially on the relevant rules and procedures governing the execution of EE investments in the national industry. To this end, all corresponding legal acts and legislative documents are considered in detail along with the relevant international agreements that have an industrial EE component and to which the Republic of Azerbaijan has acceded as a signatory Party. Thereafter, a presentation is given of the State authorities, institutions and public bodies that are in charge of the design and implementation of EE policies in the domestic industry coupled with the scope and range of their respective mandate, competences and responsibilities. The underlying goal of this comprehensive description of the Azeri legislative and institutional set-up, which is at present in force, is two-fold: first, it intends to provide a broad overview of all aspects of the current national EE policies and the manner in which these policies are applied in practice; and secondly, its purpose is to set the background for evaluating its level of concordance with the EU EE norms and as well to form the basis for formulating our proposals for improving the structure, working and operation of the present framework regulating EE interventions in the local industrial sector.

6.2 Legislative framework

6.2.1 Azeri legislation

The Republic of Azerbaijan - like Georgia - is still **lacking any specific national law regulating EE investments**, but EE considerations are included in several pieces of legislation and legal documents.

One of the major legislative acts, which contains a series of EE obligations, is the **Law on Energy (adopted in 1998)**. This piece of primary legislation elucidates the State policies and specifies the key set of rules governing the operation of the Azeri energy sector. In this respect, it regulates all energy sources and activities, including exploration, exploitation, production, processing, storage, transportation, distribution and use of energy sources[60]. It further assigns the primary responsibilities for the supervision and monitoring of the energy market to the President, the Cabinet of Ministers, the Ministry Energy and the Ministry of Environment.

With regard to EE matters, the Law on Energy, which governs all segments of the national energy market (including products and materials used in energy production), stipulates that one of the principal State policies relating to the functioning of the national energy market involves the efficient extraction, production, transport, distribution, storage, use and security of energy as well as the conservation of energy resources and the efficient use of energy and the use of RES. For this purpose, any person engaged in energy activities assumes responsibility for the efficient use of energy and is obliged to comply with the rules established by the Ministry of Energy, which is expressly designated as the responsible State institution for EE issues. Moreover, the competent State authorities are required to set up long-term programmes to implement the objectives of the Law on energy every 5 years with the financing of any such programme being envisaged to come from the State budget, foreign investment and - most notably - from an EE Fund. As regards energy supply and consumption, the Law on Energy makes mandatory for energy distributors to install individual metering equipment and entitles energy consumers to request the installation of such equipment that must be compliant with the rules and technical standards established by the Ministry of Energy.

Another important piece of primary legislation, which captures the vital elements of Azerbaijan's EE policies, is the **Law on the Use of Energy Resources (adopted in 1996)**. This legal act sets forth a common general framework regarding the utilization of the domestic energy sources and the regulation of the relations between the State and natural and legal persons in this field. In this regard, it specifically defines EE as the "*usage of energy sources under the condition of reduction of anthropogenic environmental impact and acquisition of higher economic benefit at the stage of modern development of technology*". It also enumerates a series of guiding principles governing State policy on the use of energy resources, which are required to be premised on the:

- implementation of financial and administrative regulatory measures aimed at reducing energy consumption;
- establishment of mechanisms to improve EE in energy production, transmission, supply and use;
- adoption of energy savings' and EE norms and standards;

[60] More specifically, the Law on Energy states that all activities pertaining to the energy sector are subject to obtaining a prior authorization from the Ministry of Energy; the specific conditions of any such authorization are determined in a contract that is concluded between the Ministry of Energy and the relevant entity wishing to take up the relevant energy activity.

- conduct of mandatory energy audits for new and rehabilitated buildings;
- imposition of economic sanctions in the event of any breach of obligations;
- raising of public awareness on the economic, environmental and social benefits of energy savings;
- provision of education and training in energy conservation matters;
- promotion of international cooperation in the field of energy savings; and
- introduction of incentives for the creation and application of new energy saving technologies.

In particular, **the Law on the Use of Energy Resources** provides for the standardization in the field of energy resources' utilization and the certification of products in connection with the energy resources, including the energy performance certification of certain products, processes and services. It also **requires the carrying-out of State energy audits** and the implementation of monitoring and control mechanisms that must include:

- a mandatory registration system for consumed energy for all legal entities;
- compulsory State certification of energy-intensive equipment, both new and already in operation;
- the performance of mandatory energy audits for enterprises with annual energy consumption above 8,141 MWh[61];
- the imposition of an obligation on enterprises with intensive energy consumption to report consumption statistics; and
- the introduction of a strict control and penalization system for non-compliance.

This legal act also demands the preparation of countrywide, local and other programmes, which should push forward the efficient use of energy resources. It further addresses the direction of the relevant State regulations, which must include management measures for energy conservation and the setting-up of norms, standards, certification, metrology and statistics in the area of utilization of energy resources. In addition, this Law allocates responsibility for waste in energy use and demands the introduction of supportive mechanisms to promote EE. More significantly, it advocates the establishment of an EE Fund[62], which is proposed to be financed by non-State budget, with the aim to funding research and development, to promoting the creation of new EE technologies and to subsidizing the implementation of EE programmes. On top of that, it specifies the framework for creating norms and standards and also defines the roles, responsibilities and scope of State energy inspections (audits) for large energy consumers to ensure the latter's compliance with their respective energy conservation obligations. Last but not least, the Law on the Use of Energy Resources states that foreign investment could be attracted to increase the efficient utilization of the national energy resources with the investors being reimbursed from the cost savings generated from the implementation of EE measures.

Also, in the area of electricity generation, the **Law on Electric Energy** (dated April 3, 1998), which is the key piece of primary legislation governing the functioning of the national electricity sector, mentions norms for efficient energy usage as one criterion for the selection of development projects in the power industry (although it provides no reference on specific norms). Likewise, the **Law on Electric and Heat Stations** (dated December 28, 1999), which sets out general prerequisites for the construction of power plants, states that one of the conditions for the issue a

[61]There is not any time framework during which such audits would be undertaken. It seems that such audits are not in practice carried out.
[62] Under the Law on the Use of Energy Resources, the full name of this fund is the State Fund for Rational Use of Energy Resources.

special permit for the construction of such plants is the compliance with the requirement to meet certain standards, including standards with respect to quality, quantity and frequency. Moreover, the Decree of the Cabinet of Ministers about Rules of the Usage of Electric Energy[63], which addresses a number of issues relating to the electricity market[64], obliges power supplies to avoid inefficient usage and waste of electric energy.

Mention should further be made of the **Law on Environmental Protection** (adopted in 1999) which - as its titles signifies - defines the legal, economic and social framework for the protection of the environment. In this connection, it expressly states that the efficient use of natural resources is of the key principles governing environmental protection and also stresses that such efficient usage should be considered in any construction projects.

Added to this, the Presidential decree, which provided for the setting-up of the Agency for Alternative and Renewable Energy in 2011, called for a new State Strategy on the Use of Alternative and Renewable Energy Sources in Azerbaijan for 2012-2020. The Decree proposes a legal framework to achieve by 2020 the following goals:

- to reduce GHG emissions by at least 20% below 1990 levels;
- to produce 20% of electricity from RES; and
- to increase EE by 20%.

Finally, it needs to be noted that Azerbaijan has **prepared a draft Law on Energy Efficiency** that was developed with EU budget support in 2012[65], but it has not yet been incorporated into the national legal order[66]. This draft legal act, which is divided into 8 Chapters with a total of 33 Articles, purports to regulate the relations in the domain of energy savings and improved energy efficiency and to establish the legal, economic and organisational basis required in order to stimulate EE investment and the effective use of energy resources. To this end, it enumerates a set of guiding principles for State policy in the area of EE. In this respect, it postulates that the State EE policy shall, *inter alia*, be geared at ensuring the:

- protection of human life and health, social and living conditions, and the environment during extraction, production, transportation, transmission and distribution of energy resources;
- carrying-out of State monitoring and supervision in the field of EE;
- encouragement of the use of RES through economic support schemes;
- stimulation and support of energy savings and improved EE;
- imposition of compulsory energy audits for new and rehabilitated buildings;
- promotion of public awareness on the economic, environmental and social benefits of

[63] See Azerbaijani Cabinet of Ministers, Resolution No. 18, dated February 2, 2005.
[64] This Decree governs, among other things, the process of connection to the electricity networks, the making of contracts by electricity consumers, the State's oversight over electric equipment, etc. Its provisions have further been complemented with the adoption of the Rules on the Issue of Technical Conditions to Consumers for Obtaining Electric Power and Connection to Electricity Network (approved by the Cabinet of Ministers as Resolution No. 234 on August 27, 2013), which regulate various technical aspects pertaining to connection to the power grids.
[65]This budget support was provided under the Energy Reform Support Programme within the framework of the Memorandum of Understanding for the Strategic Partnership between the European Union and the Republic of Azerbaijan in the field of energy (MoU) that was signed between the EU and Azerbaijan in November 2006 in the context of the European Neighbourhood Policy.
[66]In June 2012, the Ministry of Industry and Energy submitted this draft Law to the Cabinet of Ministers for review and intergovernmental consultations that resulted in proposals to make changes to the initial draft. However, up to date, **the draft EE law has not yet been adopted by the Parliament**.

energy saving;
- advancement of international cooperation in respect of energy saving issues; and
- formulation of tangible incentives for the creation and application new energy saving technologies.

In addition, the **draft Energy Efficiency Law** includes a number of concrete measures that should be implemented in order to actually realize these principles, such as:

- the metering of energy consumption;
- the establishment of energy consumption and effectiveness standards for construction projects;
- the setting-up of a mandatory EE registry, focusing especially on registering energy consumption in construction projects;
- the standardization in the area of energy resources' utilization;
- the certification of products relating to energy resources;
- the energy performance certification of certain products, processes and services;
- the conduct of State energy audits;
- the elaboration of specific economic incentives for EE, including incentives for foreign investments made for this purpose; to this end, this Law provides for the establishment of an EE Fund and the implementation of financial instruments and mechanisms, which will be primarily funded from the State budget;
- the increase of public awareness on the economic, environmental and social benefits of energy saving;
- the provision of education and training; and
- the promotion of international co-operation regarding EE matters.

Furthermore, the draft EE Law defines the competences and responsibilities of the State authorities in the field of EE, which include:

- the preparation of relevant policies and required draft legislation;
- the adoption of energy consumption standards and the identification of actual energy consumption of technological processes and construction facilities;
- the laying-down of the rules pertaining to the carrying-out of the State energy audits;
- the enumeration of the economic and financial incentive mechanisms for the energy savings;
- the establishment of the EE Fund, including the elaboration of the rules and procedures of its operation;
- the adoption of EE standards for different types of equipment and technology;
- the provision of State-backed financing for relevant investment programmes and energy saving projects and the monitoring and verification of such programmes and projects.

In line with the prerogatives set in the Azeri legislation, specific EE targets and priorities are set through various State programmes, which focus on specific general themes pertaining to the national economy.

In the field of EE, the centrepiece of the country's policy framework in implementing EE improvements, particularly in the power and natural gas sectors, is the **State Programme for the Development of the Fuel and Energy Sector (2005–2015)**, which was developed by the Ministry of Energy. This programme targets the reduction of losses and inefficient use of energy in order to cover the electric power and natural gas demand. To this end, it is stipulated that full

payment of the cost of any consumed electricity and natural gas volumes constitutes one of the factors that would ensure efficient use of these resources[67].

Moreover, the "*Azerbaijan 2020: Look into the Future*" Concept of Development[68], which sets the strategic view and main priorities for the development of the national economy, spells out a number of general goals, some of which focus on EE considerations, such as:

- the transformation of the national economy into an export-oriented one that makes efficient use of energy;
- the reduction of the amount of energy used for the production of one unit of GDP and the amount of CO_2 in line with the appropriate indicators of member countries of the Organization for Economic Cooperation and Development;
- the modernization of the oil and gas sector and the petrochemical industry;
- the diversification and development of the non-oil industrial sectors;
- the expansion of opportunities to promote alternative and RE sources through the introduction of stimulating measures to accelerate the use of RES;
- the refinement of the relevant institutional environment for RES development;
- the strengthening of the scientific-technical potential and of the training of RES specialists;
- the raising of awareness for energy consumers; and
- the flexible regulation of energy tariffs.

Furthermore, the "*National Programme on Environmentally Sustainable Social and Economic Development*" includes the following actions in relation to EE:

- the introduction of highly efficient technologies in heat power plants and the optimization of the structure of the energy system;
- the promotion of modern energy saving technologies in both production and non-production sectors; and
- the development and implementation of national and regional programmes directed at better use of energy saving means in households and the residential sector.

Allied to this Programme, an "*Action Plan on improvement of ecological situation and efficient use of natural resources for 2015-2020*" has been adopted, which stresses the importance of developing, amongst others: (i) a National Adaptation Plan (NAP), and (ii) NAMAs that incorporate elements relating to Measurement, Reporting and Verification systems.

More vitally, in **April 2017 Azerbaijan has adopted a Strategic Road Map in the Public Utilities' Sector**, which sets explicit short-, medium- and long-term goals for the national electricity, gas, thermal energy and water and sewage markets. In particular, the Roadmap, which is supplemented by a comprehensive Action Plan (see Annex 7), stipulates that the overriding objectives in the public utilities' sector are as follows:

- **for the 2016-2020 period**: to improve the normative-legal base, to increase functional efficiency of regulatory agencies, to improve performance effectiveness of service facilities and service quality, to improve the investment environment, to apply international norms

[67] On this theme, though, it should be pointed out that in practice rates for electricity and natural gas are set many times below economically justifiable levels, providing strong disincentives for EE. For example, prices for natural gas are set at level about 8 times below world market prices. Electricity prices are also set at well below market levels with the gas volumes being consumed by gas fired plants being heavily subsidized by SOCAR – the national oil and gas State-owned company.
[68] This document is available at http://www.president.az/files/future_en.pdf.

and standards, to strengthen human resources, to optimize the tariffs and to develop stimulating mechanisms.

- **for the 2020-2025 period**: to form an improved institutional environment and advanced management systems, to use modern technologies and qualified cadre potential and to provide generation and diversification of distribution in all sectors due to investment resources.
- **for the post-2025 period**: to improve performance effectiveness and service quality in the electricity, water and sewerage, heating and natural gas supply.

The roadmap further enumerates a number of specific targets and goals that need to be achieved for each of these sub-sectors, most of which have an explicit EE component; namely:

In the electricity sector:

- to improve efficiency of power plants and to ensure the more efficient use of their available generation potential;
- to increase of net fuel efficiency of the selected combination circuit gas turbine power plants up to 50%;
- to reduce the level of electricity losses from 8.5% to 7% in Baku, and from 12% to 8% in the regions;
- to upgrade, and improve the quality of, electricity transmission and distribution, which must be complemented with implementation mechanisms for enhancing efficiency and with a master plan for modernization measures;
- to use of optimal mechanisms for improving efficiency in electricity production; and
- to supply remote settlements, whose gasification is technically and economically not feasible, with energy by using alternative energy sources.

In the gas sector:

- to minimize all types of losses related to natural gas distribution; for this purpose, a key goal stated is the reduction of technical losses in gas distribution down to 8% in all the regions.

In the district heating sector:

- to increase in thermal energy production level by 427,000 Qcal;
- to expand the areas supplied with heating supply; and
- to increase the number of residential apartment buildings supplied with heating by 50.4%, during 2017-2020.

In the water sector:

- to reduce the ratio of water commercial losses from 20.0% at least to 14.0% and water distribution losses from 31% to 25%;
- to reduce the share of registered water consumers, who do not have meters installed, from 26% to 5%; and
- to ensure efficiency in water consumption by attracting investments for establishing the required infrastructure.

EE considerations are also mentioned in several other policy documents, such as State Programme on Poverty Reduction and Sustainable Development for the Republic of Azerbaijan

(2008-2015)[69], the State Programme on Ensuring Reliable Population in the Republic of Azerbaijan in Food Provision (2008-2015)[70] and the State Programme on Socio-economic Development of Regions (2014-2018)[71].

Finally, it needs to be noted that Azerbaijan has drafted a State Programme of Development, Technical Regulation and Standardisation of Energy Efficiency, which has not yet been officially adopted[72]. The programme is designed to increase economic efficiency and accelerate the introduction of European experience in the energy system. In this regard, its primary objective is to resolve problems concerning saving energy resources, raise EE, ensure effective economic development, improve the environment, increase resource efficiency and the competitiveness of local products and develop national standards on the basis of regional standards[73].

6.2.2 International agreements

Azerbaijan is a signatory to the Energy Charter Treaty[74] and the Protocol on Energy Efficiency and Related Environmental Aspects[75]. In 2000, the country also joined the Kyoto Protocol to the United Nations Framework Convention on Climate Change as a non-Annex 1 country and developed an institutional framework for financing projects through the Kyoto Protocol's Clean Development Mechanism (the "CDM").

Azerbaijan further cooperates with the EU within the framework of the European Neighbourhood Policy and its eastern regional dimension, the Eastern Partnership. EU assistance to Azerbaijan takes mainly the form of country Action Programmes funded every year under the European Neighbourhood Instrument (ENI), which - up to date - do not however have a direct EE component[76]. Azerbaijan also benefits also from regional and multi-country Action Programmes funded under the ENI, mainly in energy, transport and border management.

6.2.3 Institutional framework

The Cabinet of Ministers is the central and highest executive authority that is vested with the overall responsibility for directing and co-ordinating the activities of all competent

[69]This State Programme, which is effectively the county's national sustainable development strategy, primarily focuses on poverty reduction, but it also makes reference to the implementation of EE improvements in the national economy. The programme is available at http://www.refworld.org/pdfid/548eb7034.pdf.

[70] This Programme can be accessed at https://www.google.gr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwi02Y_1vMLWAhUB7RQKHSUQDiEQFggIMAA&url=http%3A%2F%2Fwww.economy.gov.az%2Fdoc%2Fstate-program-en-erzaq.doc&usg=AFQjCNGmMPBbU_QwX7aiA04GwGEl6QPoDw.

[71] This programme can be found at http://senaye.gov.az/content/html/2280/attachments/State%20Program%20on%20socio-economic%20development%20of%20regions%20of%20the%20Republic%20of%20Azerbaijan%20for%202014-2018%20years.pdf.

[72]The programme was prepared by the State Committee on Standardization, Metrology & Patents of Azerbaijan, has been coordinated with the relevant government structures and submitted for consideration to the Azerbaijani Cabinet.

[73]Within this programme 69 pertinent national standards are planned to be developed in line with the relevant international norms.

[74]Azerbaijan signed the Energy Charter Treaty on 17 December 1994 with ratification taking place on 2 December 1997. The Treaty entered into force on 16 April 1998.

[75]The Protocol on Energy Efficiency and Related Environmental Aspects was signed by the Government of Azerbaijan on 17 December 1994 and was ratified on 2 December 1997. The Protocol came into force on 16 April 1998.

[76] EU assistance programmes for Azerbaijan mainly concentrate in the areas of regional and rural development, justice sector reform and education and skills development.

State bodies and institutions, including the design and implementation of the energy policy, together with matters pertaining to EE issues.

The **Ministry of Energy** constitutes the main State body that is in charge of ensuring the implementation of the State policies related to the national energy sector and in exercising the State's monitoring functions over all segments of the energy market. In particular, the Department of State Energy Supervision (in Azeri, *Dövlət Enerjinəzarət İdarəsi*) of the Ministry for Energy has been designated as the competent Government agency with responsibility for the regulation, organisation, supervision and control of the efficient use of the fuel and energy activities; to this end, this Department provides State monitoring of state power energy companies, energy supply companies and independent energy producers, consumers, production, transfer and distribution of electric energy and EE. Also, **the Department of Energy Efficiency, Alternative and Renewable Energy Sources of the Ministry of Energy, which was established in 2014, is - among other things - in charge of the development and implementation of the State policies on energy savings and EE**.

The **Ministry of Ecology and Natural Resources** is responsible for the formulation and implementation, monitoring of the country's environmental policies, the development of environmental protection measures, the screening of projects regarding their potential adverse environmental impacts, the imposition of sanctions for any non-compliance with the established norms set in the national environmental legislation and the administration of a pollution permit system. One of this Ministry's key priorities rests with the "*efficient use of natural resources for meeting the needs of existing and future generations, benefiting from RES through non-traditional methods and achieving EE*".

The **State Agency for Alternative and Renewable Energy** (ABEMDA) is a Governmental agency under the Ministry of Energy mandated by the Cabinet of Ministers. It serves as the principal regulatory institution in the sphere of alternative energy and RES and it is tasked with assessing the sustainable energy potential, shaping relevant policies, including tariff policy, and elaborating on and enforcing relevant procedures, such as issuing special permission to the public and private entities to construct power generation facilities in the country.

Another important actor is the Tariff Council, which is an executive authority whose scope of competences has been enumerated in the Presidential Decree (26 December 2005), the Regulations on the Tariff (Pricing) Council and the Resolution by the Cabinet of Ministers (9 March 2006). Its primary responsibility is to implement the State regulation of prices (tariffs), service fees and collections where State regulation is applied. The Tariff Council's functions can be summed up as follows:

- to establish the energy price regulation and the relevant tariff methodology;
- to approve the tariff level proposed by the regulated companies;
- to propose changes to the legal framework as it relates to pricing; and
- to settle disputes regarding price regulation and tariff application.

As such the Tariff Council is responsible for tariff policy that affects EE and is further empowered to set tariffs for any type of RES[77].

The **State Statistical Committee** prepares the country's official statistics, including data for the

[77]However, up to now, the Tariff Council has only set feed-in tariffs for wind energy and small hydropower production.

energy and industrial sectors. The Committee provides information to the Cabinet of Ministers, the State Agency on Alternative and Renewable Energy and other government bodies, as well as international organisations, including the Joint Organisation Data Initiative, BP Statistical Review of World Energy, ECO National Statistical Offices, United Nations Statistical Division, the Asian Development Bank and others.

The State Committee for Standardization, Metrology and Patent is the central executive power authority, which is responsible for realizing the State policy and regulation in the fields of technical regulations, standardization, metrology, conformity assessment, accreditation, quality management as well as in the field of the protection of industrial property objects[78].

Finally, a word is required for the state-owned Azalternativenerji" Limited Liability Company, which was set up at the same time as the ABEMDA for the purpose of financing large infrastructure projects in energy generation, transmission and distribution as well as funding the purchase of up-to-date EE equipment and of implementing RES and EE investments.

In addition, there are several scientific and technical institutions whose activities have some focus on EE interventions. These include:

- the **Strategic Research Centre** that was set up by the President of Azerbaijan Republic for coordinating strategic studies and for supplying to State bodies various scientific-analytical data. The Centre's scope of work includes the formulation of policies relating to the domestic economy and international relations and has further developed expertise in organizing seminars related to EE[79];
- the **International EcoEnergy Academy**, which conducts research - in collaboration with national, regional and international research institutions - on applied problems associated with energy development and the functioning of energy systems, especially in the field of renewable energy, but also mentions EE as one of the areas of its interest[80];
- the **Azerbaijan Scientific Research Institute of Energy and Power Design**, ("AzSR&DPPEI" Ltd) that has been created following the merging of three institutes working within the structure of OJSC "Azerenerji", the dominant player in electricity generation and transmission. The Institute's work centres, among other things, on the optimization of structure and efficiency of the domestic power industry[81];
- the **Caspian Centre for Energy and Environment**, which is a joint venture between the Azerbaijan's Diplomatic Academy and the State Oil Company SOCAR and its focus rests on teaching, research and outreach activities, such as conferences, workshops and round-table discussions, some of which deal with EE issues[82];
- the **Baku Cleaner Production and Energy Efficiency Centre**, which was established with the support of the Norwegian Society of Graduate Technical and Scientific Professionals (TEKNA) and the Energy Saving International AS (ENSI) and for several years it has been organizing trainings on cleaner energy production and EE matters[83];
- the **State Committee of City Planning and Architecture**, which regulates and monitors

[78] The competences of the State Committee for Standardization, Metrology and Patent are defined in the "*Law on Ensuring of uniformity of measurements*", the Statute of the State Committee for Standardization, Metrology and Patent and the Statute of the Metrology Department.
[79] See the Centre's website at www.sam.az.
[80] See its website at www.ieacademy.org.
[81] The Institute's website can be accessed at www.pei.az.
[82] The Centre's website can be found at www.adafund.org.

[83] The Centre's website can be accessed at www.cpee.az.

the construction activity in Azerbaijan, reviews the project designs, defines construction standards and norms and provides licenses[84]; and

- the **Association of Engineers and Power Engineering Specialists of Azerbaijan**, which specializes in small hydropower and thermal power plants and which mentions its capacity to assess EE projects and to provide relevant consultancy services[85].

Last but not least, in the absence of direct governmental implementation of concrete EE measures, certain independent national NGOs play some role in the promotion and development of EE. One of them is the **Social Development Public Union** (UMID), which is predominantly working with the low-income population with the aim to finding solution for socio-economic problems, to promoting education, to conducting micro-financing and repair projects, as well as to targeting EE improvements in the residential sector[86]. Also, the non-governmental organization "**Ecological Stability**" has long been engaged in informing the Azeri public on environmental topics, some of which have certain EE facets. Reference should further be made to Azerbaijan **Youth Union** that was formed as an NGO in 2002 under the SPARE (School Programme for Application of Resources and Energy) programme and which, *inter alia*, provides various types of EE training in schools.

7 Assessment of compliance of Azerbaijan with EU norms relating to EE in industry

Azerbaijan is a country with an energy intensive economy that is fuelled by its oil and gas deposits and in which **EE technologies have not at present any momentous market penetration**. There, hence, exist considerable prospects for the development and implementation of EE investments in its national industry in order to ensure greater efficiency in energy use, not only in its oil, gas, electricity and heat production sectors, but also in other segments of its industrial complex (chemicals, building materials, cement production, metal processing and machine building).

The need to reduce energy consumption by supporting EE promotional policies and programmes has long been realized by the Government of Azerbaijan (GoA), which has introduced an array of different initiatives to increase energy conservation. For instance, as the Study Team already mentioned, administrative and financial measures have been provided for in the national legislation, such as those stipulated in Law on the Use of Energy Resources, to encourage the efficient utilization of energy, and specific national EE targets have been set for the domestic electricity, gas, thermal energy and water and sewage operators. Considerable technical assistance support has also been secured through various international donors and financial institutions, which have aided the national authorities in identifying energy savings opportunities and in selecting EE interventions that need to be implemented to realize the declared national sustainable development goals[87]. As a result of these initiatives, the country has achieved a

[84]See the Committee's website at www.arxkom.gov.az.

[85] See the Association's website at www.azerenergy.com.
[86]See UMID's website for Azerbaijan at http://www.umid-sid.az.

[87] The list of international technical assistance projects having an EE ingredient, which have been carried, or being carried out, in Azerbaijan is presented in Annex 8.

significant decrease in energy intensity in all sectors of its economy - thanks, primarily to the replacement of oil with natural gas in power generation coupled with the installation of new more energy efficient technologies. Furthermore, Azerbaijan has undertaken a number of efforts aimed at replacing obsolete equipment at power plants with highly-efficient facilities with the view to decreasing the use of fuel oil, to modernizing transmission grids and to decreasing transmission losses.

Nonetheless, **these positive developments remain largely isolated**, principally because **there is not any all-encompassing and focused approach** to influence energy demand and **to promote energy savings** in the national economy, and particularly in industry. The key reason for this rests with the lack of a robust regulatory set-up that should be supplemented by a solid institutional regime for the design and implementation of EE investments: despite that the current legislation sets out a general system for promoting energy conservation, **a coherent and concrete EE strategy at both the policy and regulatory levels is still missing**. More specifically, the following weaknesses of the present framework have been identified:

- **there is not yet in place any law that lays down a fully adequate set of common rules in the field of EE**; the main body of the relevant primary legislation was drafted in the mid- to late-1990s and it is now outdated;
- **references to EE obligations are diffused in a number of different and disparate legal acts and State programmes**, which address EE considerations in a piecemeal fashion and have failed to establish an effective regulatory structure for the implementation of EE investments;
- the **enforcement of the legislation currently in place remains challenging**, largely due to the lack of well-elaborated secondary legislation detailing rules and procedures for the carrying-out of EE projects. More vitally, even enacted legislative provisions are not implemented: for example, although the Law on Energy contemplates the establishment of an EE Fund, no such fund has yet been set up or operated;
- unlike in Georgia, **no consolidated Action Plan has been prepared** that enumerates the national EE strategic objectives and which sets out the array of incentives for the wider use of energy savings' measures;
- **there is not a clear and sound institutional framework** that specifies in detail the respective mandate and duties of the competent State bodies in the field of EE: although institutional responsibility related to EE lies with the Ministry and Energy, which is in a position to insist other executive bodies with discretionary resources or revenue raising powers to follow the policy direction of the Parliament and legislature, it does not define which State entity shall be concretely responsible to assume the implementation of EE interventions;
- **the EE measures contemplated in the present legislation are characterised by weaknesses in terms of the degree of their implementation details**: for instance, little guidance is provided respecting the metering of the energy consumption of industrial installations. More importantly, monitoring of compliance with existing EE obligations and standards is at the best sketchy, especially as regards State inspections related to the energy use levels of industrial enterprises to make sure that the energy consumption of both energy and manufacturing equipment remains within the accepted limits;
- the **system of accounting energy consumption is inaccurate**, which makes it difficult to assess the need for EE improvements. This problem is further aggravated by two key factors, first because the current trends in the design of EE policies remain energy supply side prone; and secondly, because energy policy preferences are based on annual Gross

Domestic Product (GDP) growth targets rather than on actual energy statistics-based growth potential or sector performance patterns; and

- **no verification and reporting regime exists** that allows for monitoring progress made with the implementation of envisaged EE policies and measures.

The conclusion flowing from the foregoing analysis is that Azerbaijan's regulatory legislative framework governing EE investments in industry is not compatible with the relevant EU norms. This is evidently illustrated in Table 7-1, which provides a comparative assessment of the Azeri legislation with the major requirements set in the EU EE Directive.

Table 7-1: Level of transposition of the provisions of the EE Directive parting to industry in Azerbaijan

EE Directive provisions	Azeri legislation
Setting an indicative and quantitative target for energy efficiency	✓
Setting specific binding targets for the delivery of a certain quantity of final energy savings in end-use sectors.	✓
Establishing the criteria and conditions for eligible measures and how savings can be counted towards the stipulated targets.	✗
Establishing an energy efficiency obligation schemes that require energy companies to achieve yearly savings of 1.5% of annual sales to final consumers.	✗
Obligating central authorities to purchase only goods, services and buildings with high EE performance	✓[88]
Promoting and ensuring the use of high quality, cost-effective energy audits and EnMS to all final customers	✗
Obligating large industrial enterprises to undertake compulsory energy audits every four years	✗
Providing incentives to SMEs to undertake energy audits and implement the resulting recommendations.	✗
Setting quality criteria for the energy audits.	✗
Ensuring the availability of certification, accreditation and/or qualification schemes with a stipulated deadline for providers of energy audits and for energy managers.	✗
Developing and promoting the energy service market, including EPC-based contracting.	✗
Establishing an Energy Efficiency National Fund to finance the EE interventions.	✗

To sum up, Azerbaijan has already made some important efforts to reduce energy consumption and improve the levels of EE in key sectors of its national economy, including in industry. However, these efforts to promote and implement a more sustainable use of the national resources have, to a considerable degree, been undermined by the **limited and inadequate enforcement of the relevant EE obligations**, particularly those that have been placed on large industrial operators. Allied to that, **the lack of a coherent national EE strategy** coupled with the largely obsolete legislation, which is at present in force, necessitates the adoption of more integrated approach in the area of industrial EE at both the regulatory and policy implementation levels in order to attain the national EE targets that have been set in the domestic legislation and

[88]There exists specific obligation imposed on large industrial operators to conduct audits, but there is not any time framework during which such audits would be undertaken. On top of that, it seems that such audits are not in practice carried out.

the various State programmes.

8 Proposed policy initiatives for further uptake of EE in the Azerbaijan's industrial sector

8.1 Introduction

This section provides a clear set of solid recommendations to policy makers in Azerbaijan, which are anticipated to support and foster a favourable climate for the making of investments in EE by domestic industrial operators. The proposed recommendations take into account the weaknesses of the current framework, which we have earlier identified, as well as the present outlook and characteristics of the national industry. They further rely on, and intend to integrate, best practices and expertise from Europe and other countries with the view to putting forward a bundle of tangible steps that will be appropriate for the conditions and circumstances of the Azeri industrial sector and which be relatively quickly, cheaply and reliably adopted by local industrial companies. In a nutshell, these steps, which the GoA could follow in order to create a suitable environment for the promotion of industrial EE and to reach the national EE targets, concern the implementation of a series of initiatives that focus on:

- the **collection of concrete and consistent EE data relating to the local industry**, which is proposed to be at first effected through an industry-wide review on energy consumption and end-use;
- the **upgrading of the existing regulatory base** by means of the adoption of specific EE legislation;
- the **improvement of the present institutional set-up**;
- the **development of a State Programme** for the promotion of EE in industry;
- the **imposition of specific requirements on industrial operators** to boost up energy conservation;
- the **introduction of specific EE measures**, which will be geared at improving the efficient use of energy by industrial companies;
- the facilitation of the **establishment of industrial clusters to enhance EE**;
- the **formulation of incentives' packages** for implementing identified energy savings opportunities in industry;
- the **development of capacity building and training activities** targeting the increase of industrial EE; and
- the **management and monitoring of the EE policies** that are planned to be executed.

In the next chapters of this section, each of these initiatives will be considered.

8.2 Carrying-out of an industry-wide review on energy end-use

Since accurate data and information on industrial energy consumption in the country is at present lacking, the Study Team recommends that an initial step towards the design of an EE policy in industry could involve the undertaking by the GoA of a **scoping study**, which will provide a broad overview of how the various segments of the national industry currently operate and perform,

explore the cost-effectiveness of existing practices and appraise the prospects for EE improvements and investments in different industrial facilities. The study is recommended to include benchmarking against both in-country and international examples and should aim to identify those sub-industries that will most benefit from the implementation of energy end-use efficiency applications. It should address a series of important topics, such as:

- an estimation of the level of energy consumption in each industrial sub-sector and the potential for the volumes of energy savings that could be realized by implementing EE policies;
- an assessment of local sources of EE technologies, which are either already available or could be developed for use by domestic companies;
- an appraisal of existing EE applications, both domestically and in other countries, to understand the lessons learned and to build on experience,
- an evaluation of local manpower resources required to support the introduction of EE measures in the national industry and the potential to import and train skills not currently available within the country;
- information on relevant national and international standards and regulations applicable to the industrial use of EE technologies with identification of the need for additional economy specific standards and regulations; and
- information on the availability of suitable training courses for industrial operators and on the options to arrange for new or special programmes.

In this connection, a **number of energy audits could be undertaken** by State-owned industrial operators so as to gain a preliminary understanding of the tangible prospects for economy-wide implementation of EE improvements and to develop an understanding of specific needs of domestic industrial operators in terms of standards and regulations, skilled manpower and finance.

The **scoping study should also specifically consider in detail certain vital financial issues**, such as the actual availability of State-backed funding for EE investments in industry, the relevant taxation regime (in terms of tax exemption, deductions, rebates, etc. offered) and the ability of industrial companies to finance with their own capital EE investments in their respective facilities.

The results of this study could then be used by the GoA as a cornerstone to progressively build up a stable energy data collection regime for each segment of the national industry, which will be supplemented with adequate data gathering and processing resources coupled with the vesting of authority in the State body to require data reporting by industrial operators[89].

8.3 Enactment of specific energy efficiency legislation

It is earlier highlighted that the establishment of a sound, transparent and well-integrated regulatory and legal framework that successfully promotes the carrying-out of EE activities, and which is accompanied by a balanced and efficient enforcement regime that mandates or prohibits certain courses of action, is a central tenet to the effective implementation of any EE strategies and policies. It is, thus, recommended by the Study Team that the present regulatory framework - in light of its already mentioned shortcomings - should be strengthened through the **consolidation by the GoA of the existing and disparate laws that affect EE investments**

[89] On this matter, see the relevant section in chapter 5.

into a single legislative act; this act is envisaged to constitute a solid statutory base, which will provide a durable mandate that shall signals the government's commitment to boost up energy savings in the national economy and enable ongoing plans and polices to be firmly established.

Box 7: Best practice example for an instrument of primary legislation on EE outside the EU

The Law of the Republic of Belarus on Energy Conservation No. 190-3, which was enacted on July 15, 1998, provides the key legal foundation for EE policies in the country. Directives and decrees for policy actions supplement the Law, as the country's needs and EE policy progressively evolve. Since the law was introduced in 1998, energy intensity has halved; information obtained from: http://www.unece.org/fileadmin/DAM/energy/se/pp/eneff/IEEForum_Tbilisi_Sept13/Day_2/ws1/Minenkov_e.pdf.

This piece of primary legislation, which could be based on the current draft EE Law or be an entirely new legal act, is recommended to serve as an umbrella legal instrument that will enumerate a set of coherent rules, which will expressly and comprehensively address all key matters related to EE in each sector of the national economy, such as:

- elucidating the national EE strategy's objectives, key policies and instruments in field of EE, focussing particularly on:
  - the definition of concrete national medium- and long-term energy savings' and consumption targets;
  - the development of a national EE action plan and specific State programmes; and
  - the steps to be taken in order to achieve the targets set;
- clearly delineating the institutional structure, responsibilities and competences required in order to secure the implementation of these objectives, policies and instruments, including especially responsibilities and competences pertaining to regulatory control;
- specifying the EE measures that shall serve to implement the EE policies[90] and providing guidance on the said measures' respective attributes and scope of application; and
- defining a monitoring mechanism that allows to adequately monitor the progress made with the implementation of the envisaged EE policies and measures.

This **Law must also serve as legal basis for the GoA to draft and adopt any secondary legislation, operational instructions, tools, standards and procedures** that are necessary to implement this Law's provisions and any corresponding strategic documents, action plans and programmes.

More importantly, in light of the low enforcement levels of the legislation that is at present in force, the Study Team recommends that the Ministry of Energy **puts in place an effective compliance system**, which will uphold observance and conformity of the relevant requirements and obligations: information and prevention along with any designated inspection and enforcement actions in the narrower sense (i.e. improvement notices, fines, prosecutions, etc) arising in connection with regulatory inspections by the competent State authorities and officials should be detailed in this Law's provisions and in practice be strictly adhered to.

[90] In this regard, given that Azerbaijan's economy relies heavily on oil and gas production and exports, these measures must also reflect the country's export-orienting economy and, hence, should not be centred only on demand side/end user energy savings, but also target energy production- and transmission- side EE improvements.

8.4 Improvement of the institutional set-up

As it has already been pointed out, the **proposed Law on EE should define and organize the institutional structure within the GoA by designating the State bodies and authorities**, which will be in charge of planning, executing and monitoring EE policies and programmes, and by explicitly describing their respective competences and responsibilities. In particular, the Study Team recommends that the Law must spell out in detail:

- **which Ministry will take the operational lead** in coordinating the design, implementation and enforcement of such policies and programmes across the GoA;
- which other State entities at both the national and at local level will be involved in the field of EE and what will be their corresponding role and functions; and
- how these competent bodies and authorities should cooperate and manage their respective activities.

In general terms, the Study Team **recommends maintaining the leading responsibility for EE issues with the Department of Energy Efficiency, Alternative and Renewable Energy Sources of the Ministry of Energy, which was established in 2014**. However, the interaction of this Department with other State bodies, and the institutional assignment and division of their respective competences and duties, should be elucidated with more clarity and coherence. In the longer-term, though, **the GoA may consider to eventually set up a dedicated agency**, which will be responsible for the implementation of EE policies and national and local EE State programmes and action plans[91].

8.5 Development of a State Programme for the promotion of EE in industry

The Study Team recommends that the GoA prepares a national programme that is specifically geared at the stimulation of the uptake of EE measures by the local industry. Such an initiative, which should integrate industrial EE objectives into the general State energy policy, will give clear signals to local industrial operators that the GoA is totally committed to the implementation of EE investments so that energy consumption by industrial installations is substantially reduced. The programme is recommended to **initially target key sub-industries** that need to increase the levels of energy savings, concentrating particularly on **energy intensive industrial operators with large capital investment requirements for machinery and change of outdated equipment**, like the petrochemical, metallurgy and building materials production industry. For these operators, a menu of EE opportunities could be identified by industrial operators, which should not only be limited to simple EE measures (i.e. lighting retrofit, electricity and heat demand reduction), but also gradually include more integrated EE interventions, such as the upgrade of process lines with more energy efficient ones, upgrade / replacement of the heating or cooling systems, etc. In order to assist such operators to consider and install more complex EE measures, the Study Team considers it vital that the Programme should further include the definition of certain performance indicators that can be tracked before and after the implementation of EE investments, such as specific energy consumption, life cycle estimations, changes in required maintenance cost and frequency and manpower requirements. On top of that, the proposed programme could set and publish benchmarks for EE in each sub-industry so that industrial operators will be provided with EE targets that they will be capable of achieving. Such benchmarks

[91] See chapter 5 regarding the establishment of an Energy Efficiency Agency in Georgia.

may relate to:

- best practice in the economy;
- norms in other countries at a similar stage of development;
- international norms;
- international best practice; and/or
- best available EE technologies.

Of course, the financial impact of this Energy Efficiency State programme must be estimated in advance by the GoA and the competent State authorities (primarily, the Ministry of Energy), which should also give consideration to the need for establishing concrete and realistic incentives for its execution. The Study Team further recommends that the GoA and the competent State authorities regularly evaluate the economy-wide impact of any such programme, set specific EE targets for each industrial sub-segment and establish concrete timelines for its implementation. It may even be appropriate to identify some of the larger industrial operators with the financial capacity to implement significant EE projects and to reward them by providing them with one-time incentives during the initial phases of implementation in order to provide good examples to the rest of the industrial sector.

It should also be pertinent to recognize in this State programme that the needs of SMEs for financial incentives may be different from those of large industrial companies in the same industrial segment or in a different industry. The design of the incentives provided under the programme must, therefore, take into account these differences and monitor the success or otherwise of the incentives in each case.

The Study Team further recommends that the aforementioned programme is supplement with an **Implementation Plan**, which can be adopted by the GoA - in consultation with industry representatives and supporting sectors - and which will cover all aspects of the programme's execution with appropriate sections for different parts of the industrial sector and for other agencies and organizations, including the GoA itself. The Plan should set **reasonable and appropriate targets for each industrial sub-sector** in order individual industries and companies to be aware in advance of the energy savings that will respectively need to achieve. It must also ensure coordination of all relevant activities across national, State, regional and local agencies with a commitment to review the stipulated EE targets and measures periodically so that changes can be made to improve the outcomes.

8.6 Imposition of EE obligations on industrial operators

In order to accelerate the uptake of EE practices by the national industry, the Study Team recommends that the GoA should consider the **placement of specific requirements on industrial operators** that will compel them to improve the efficiency and energy conservation levels of their respective facilities. Such compulsory obligations may take a variety of different forms, some of which are considered in detail in the next paragraphs.

8.6.1 Implementation of Energy Management System(s) by large industrial companies

It has long been acknowledged that a better level of energy management can substantially improve an industrial operator's energy performance, not least because proper metering and understanding of energy costs can help any such operator to more accurately estimate potential energy savings and increase its interest in investing in EE interventions. The Study Team

therefore, **recommends that the GoA places an express obligation on energy intensive large industrial operators to adopt specific energy management measures** that will reinforce their more efficient operation and improve the maintenance and reliability of existing equipment. Such measures might include:

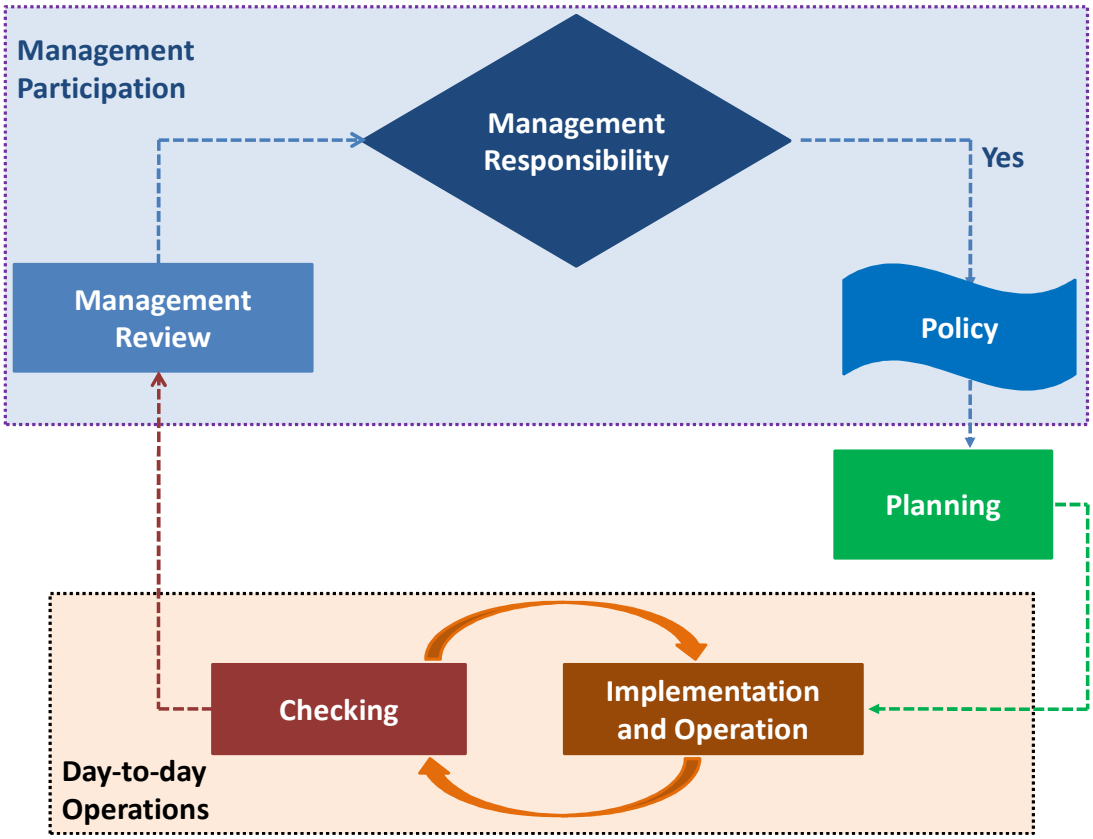
- incentivizing them to replace, refurbish, modify or make additions to existing equipment;
- requiring them to prepare EE improvement plans and submit them to the competent State authorities;
- compelling them to carry out energy audits[92] and constantly monitor and report energy use;
- encouraging them to identify and appraise prospective energy saving opportunities by measuring their individual energy consumption and comparing measurements to benchmarks;
- giving them incentives to act on identified EE investments deemed to be financially feasible; and
- forcing them to publicly report the EE improvements identified and the actions taken to capture them.

These types of measures are usually integrated in the set-up and implementation of an EnMS, which enables a company to develop a policy and action plan to enhance its performance by using less energy. Local large industrial enterprises should, hence, at first be incited[93] - and progressively be obligated – by the GoA and the Ministry of Energy to conform to a recognised national or international EnMS protocol in order to ensure that they will be committed to integrate EE into their operations. Such a system refers to a set of interrelated or interacting elements to establish specific processes that are necessary for the purpose of improving an enterprise's energy performance and consumption. An integrated EnMS is normally based on the so-called Plan-Do-Check-Act methodology, which encompasses the development of an energy policy, planning, implementation and operation, checking and management review.

Figure 8-1 gives a simplified overview of an EnMS that is premised on the Plan-Do-Check-Act approach:

[92] For the performance of energy audits and the issues involved in their performance, see the relevant Section in chapter 5.
[93] Such an incitement may take the form of some government-led support scheme: by way of illustration, industrial operators that intend to implement an EnMS may be provided with technical assistance and/or some type of financial support (e.g. grants, soft loans, cheaper prices for fuel purchases, etc.).

Figure 8-1: Depiction of an EnMS (Plan-Do-Check-Act)



Normally, an EnMS has several requirements, such as:

- a well-defined company energy policy with a person responsible for its implementation;
- the performance of scheduled internal energy assessment (energy audits) to survey the development in the company's energy consumption and use;
- the establishment of preventive and corrective actions to reduce or eliminate inefficient use of energy;
- the provision of information and education to staff to be conscious about energy;
- evaluation of the company's EE performance; and
- consideration of EE and lifetime consumption when purchasing new equipment.

The primary benefit of implementing and operating an EnMS will be that Azeri industrial operators will focus on generating tangible energy cost savings, since its implementation will safeguard that potential EE improvements will be continually identified and assessed in supporting the relevant operator's effort in enhancing energy performance. Moreover, energy performance will be formally evaluated at board level (i.e. energy performance and EE improvements will potentially have equal visibility as other business objectives at decision making level); as such the benefits of any selected EE interventions could be aligned, optimized and further exploited along core business objectives, thereby yielding further strategic non-energy benefits (e.g. increased revenue/market share due to improved competitiveness, increased output capacity due to excess energy available, reduction of carbon intensity, improved working environment, etc.).

On a practical level, **this obligation could cover all domestic large industrial enterprises with a final energy consumption equivalent or over a prescribed threshold** that will be set by the competent authorities (mainly, the Ministry of Energy) and which be expressed in monetary terms

or tonne of oil equivalent (toe). Gradually, energy intensive medium industrial operators could also be included, as the benefits of an EnMS are largely dependent on energy consumption rather than financial turnover or number of employees.

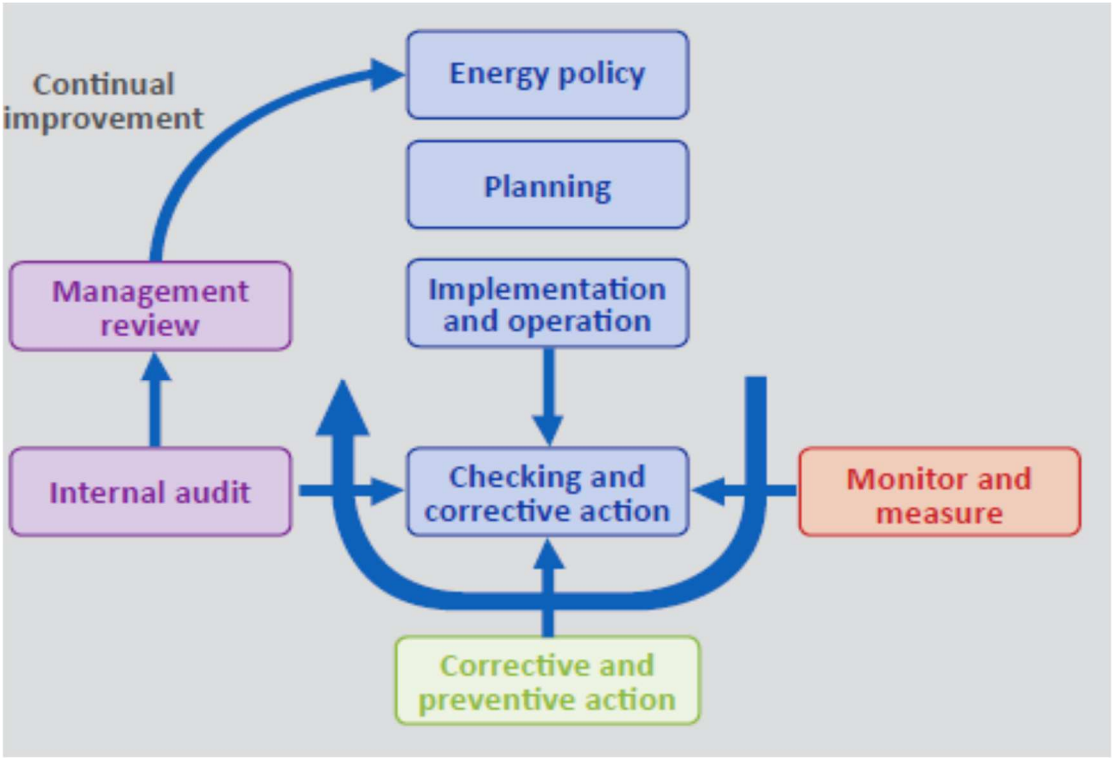
Box 8: Best practice example for introducing EnMS to SMEs

The Hong Kong Electronic Industries Association and Hong Kong Productivity Council, with funding from the Singapore Government's SME Development Fund, has developed a programme to show that EnMS are relevant for SMEs. The programme has adapted training designed for large organisations so that SMEs can use the ISO 50001 standard for energy management. Its main goal has been to introduce the benefits of energy management and the skills needed for successful implementation. The programme includes a telephone hotline and a subsidized energy review of SME operations. Short seminars explain the main requirements of the ISO 50001 standard. For SMEs that want to go further, a reference guide and training sessions are provided to support companies through the implementation process.

8.6.2 Introduction of energy management standards

Evidently, since different energy management protocols save energy using different methods, the Study Team considers also important for the GoA to **put in force a widely acceptable national standard** for this purpose. In this respect, it is recommended to adopt the ISO 50001, which is the reference international standard for an EnMS and is particularly applicable to larger businesses and energy intensive processes. As Figure 8-2 illustrates, this standard encompasses a management approach to improving energy productivity in businesses, starting from the energy policy to planning, implementation, monitoring and the taking of any corrective action.

Figure 8-2: ISO 50001 diagram



As such, ISO 50001 effectively tackles a range of operational challenges in an integrated way. More significantly, its application in the field of industrial EE has a number of advantages,

including:

- it provides a tangible framework for enterprises to take a systematic approach in continually improving their energy performance, consequently maximizing profit and improved environmental benefits;
- it is written based on a relatively simple structure, which is easily adapted to existing legal or business requirements and other management systems, even non-ISO standards;
- it adds further technical requirements, such as energy review (essentially an energy audit framework), energy baseline and energy performance indicators;
- it requires top management commitment on an energy policy which has to be constantly assessed and reviewed;
- it requires the mandatory appointment of a management representative, who is responsible for establishing, implementing, maintaining and continually improving the EnMS;
- it ensures that an industrial enterprise communicates its energy policy, energy objectives and energy performance within its organisation, especially to significant energy users; allied to this, it enables any individual within this enterprise to suggest improvements to the EnMS; and
- its implementation itself is extremely low risk, since the main cost elements of operating and maintaining an EnMS is largely a commitment of resources to establish, implement and maintain the EnMS.

Of course, as earlier noted, **a certification body will need to be designated**, which will formulate and implement the process that will assess the compliance of industrial operators against the minimum requirements of the adopted energy management system standard.

8.6.3 Mandatory engagement of energy managers by large energy intensive enterprises

Another obligation that could be imposed on large industrial operators by the GoA concerns the **compulsory appointment of a dedicated qualified energy manager within obligated energy intensive facilities** so as to safeguard that any such facility has committed resources to meet the enterprise's energy targets. Such facilities are proposed to include any industrial site with a final energy consumption equivalent or over a prescribed threshold expressed in monetary terms or toe, which will be set by the relevant competent authorities (most probably, the Ministry of Energy).

The energy manager's role will be to act as the "in-house" expert or auditor for administering the relevant facility's energy needs and performance by:

- supervising the installation, implementation and maintenance of the agreed EE measures;
- reporting on the company's energy performance needs and target goals to top management;
- ensuring that EE measures fall in line with the company's business activities;
- defining, communicating with, and facilitating resources within the relevant industrial operator to maintain EE;
- establishing O&M criteria and procedures required to improve the energy performance in the industrial site in question; and
- promoting awareness of the relevant industrial operator's energy policy and energy objectives.

Box 9: Best practice example for the work of an energy manager

An energy manager is successful, when he/she is able to:

- understand and gain control over the way energy is used;
- ensure that energy is being purchased in the most economical way and promote good housekeeping and waste reduction;
- measure and monitor energy performance and compare it with previous years as well as internal and external benchmarks;
- report energy performance simply and clearly to line managers and supervisors as well as to senior management in a format that is integrated into other planning and business reporting processes; ensure that investment requests are backed by data and a realistic business plan;
- involve staff, seek their input and ideas and share the credit for achievements with those who have contributed to them;
- promote achievements to senior management and publicize success to staff to ensure on-going support and enthusiasm for the selected EnMS.

It is of course understood that one of the major impediments to the implementation of this measure in Azerbaijan's industry lies in the shortage of competent human resources in handling the complex topics involved in the performance of an energy manager's functions, since energy managers require multi-disciplinary skills, both engineering (electrical, electronics, thermal, mechanical, civil, IT, etc.) and management (e.g. knowledge of EnMS, economics, energy contracts, project management, energy purchase). Moreover, they need to be strong in addressing technical issues as well as in communicating complex information concisely to an industrial company's decision-makers. The Study Team therefore recommends and considers crucial that the **relevant certification, accreditation and/or equivalent qualification scheme is put in place by the GoA for engineering professionals wishing to become energy managers**. Obviously, such a scheme will further need to be accompanied by the **provision of suitable training and capacity building programmes** that will focus on establishing the framework and internal processes for managing energy use with the view to assisting qualified energy managers in re-skilling and up-skilling in industrial energy management issues.

Box 10: Best practice example for training of energy managers

The European Energy Manager Network is a standardized training course of further education that focuses on enhancing the skills of technical experts in the field of EE improvement. The scheme consists of alumni of a training programme and is offered in 30 countries covering nearly all the energy-relevant issues that can arise in companies. The target group for Energy Manager Training is technical experts, company managers and energy service providers. The training is usually held extra-occupational and consists of face-to-face training (160 units) and a final project work (80 units). Trainees receive access to an Internet platform that acts as a social community. There are currently more than 4,000 energy managers in the network, which also organizes various events and further provides awards for energy management excellence to help build momentum.
See http://www.ihk-eforen.de/display/eurem/About+EUREM.

8.7 Introduction of specific EE measures

The previously described obligations recommended by the Study Team to be imposed on industrial operators will need to be strengthened with the implementation of additional

requirements, which could involve:

- the carrying-out of energy audits by local industry on a voluntary basis at least with this measured gradually becoming mandatory for large industrial companies;
- the designation by the Ministry of Energy of the basic principles and quality requirements guiding the process of energy auditing in industrial facilities[94];
- the design by the GoA of support measures for industrial SMEs to cover costs of an energy audit;
- the establishment by the GoA of an accreditation scheme for energy auditors;
- the development by the Ministry of Energy of streamlined methodologies for energy savings calculations;
- the adoption by the Ministry of Energy of internationally recognized procedures for the ex-ante monitoring and verification of such savings;
- the adoption by industrial operators of standardized full cost accounting systems for industrial EE investments;
- the introduction by the GoA of mandatory minimum performance standards for a range of energy consuming equipment within the industrial sector, such as motors and boilers[95]; and
- the design and implementation by the GoA and the Ministry of Energy of a labelling scheme for the products produced by each industry in terms of their efficient use of energy and their energy footprints.

8.8 Facilitation of the establishment of industrial clusters to enhance EE

Another possibility that might be explored by the GoA involves the assessment of the prospects for agglomerating energy intensive industrial enterprises, which produce and sell related or complementary products and services, into **cluster formations**[96]. Under this approach, EE process and equipment integration opportunities within an industrial segment and between sub-industries could be spotted with the view to identifying possible avenues (e.g. in terms of EE technology, investments in new production units, products etc.) to increase resource efficiency. International experience from both developed and developing countries has clearly proved that a cluster structure can effectively incite the participating enterprises to adopt more efficient technologies and to implemented energy savings' interventions that can jointly be acted upon so as to economize on production costs and achieve of higher productivity and greater competitiveness.

Obviously, **the development of a sustainable clustering scheme will require the setting-up by the GoA of an appropriate legal framework** that will expressly recognize and define clusters in terms of the number of enterprises, scale of output, etc. Also, the GoA will need to **put in force mandatory standards and labelling for industrial products and equipment**, which should further be supplemented with the formulation of cluster specific policies that will be geared at

[94] On this matter, see the relevant section in chapter 5.
[95] *ibid*.
[96] Typically, clusters are identified by means of a statistical methodology or by a primary method. Literature on cluster identification methodology also supports the combination of both methods because of each of these methods' limitations. Most industrially developed countries, particularly USA, UK and Italy have used statistical methods that tend to measure the sectoral and geographical intensity of enterprises drawn from national statistics available about enterprises.

promoting EE investments within the relevant cluster.

Box 11: Best practice example for industrial clustering

In India, many SME operations have emerged in natural clusters, based around local resources. There are about 350 such clusters in India. The size in terms of the number of units and the quantity of output of these clusters vary significantly. Within each cluster, however, there is a high degree of similarity across units in the level of technology being employed, operating practices and even trade practices. This homogeneity creates opportunities to develop standardized approaches to stimulating EE; improvements demonstrated in one unit can be easily replicated in other units and mainstreamed within the cluster; on the topic of cluster in India.

The development of the needed infrastructure for clustering has been entrusted by the Government of India to the Infrastructure Leasing and Finance Corporation, which has established the Cluster Development Initiative (CDI) as a strategic business unit to undertake cluster development schemes across various industries. This programme is designed to enhance the competitiveness of SMEs through a cluster-based, public-private partnership approach by tackling such matters, as infrastructure, market access, technology, and finance requirements of SMEs in textiles, pharmaceuticals, leather, light engineering, agro-food processing, crafts and other vertical industries across the country; see www.unido.org/cp.html and www.clusterobservatory.in.

8.9 Designing of suitable incentive package(s)

The Study Team recommends that the GoA synergizes the aforementioned policy priorities with **fiscal and tax benefits** to render more financially attractive any proposed EE investments and to boost the actual implementation of the changes needed to improve the efficiency with which energy is used in industrial plants. As described in chapter 5, there exists internationally a diverse array of options for policies and actions to promote the introduction of EE improvements in industry. By way of illustration, fiscal measures can target energy/fuel production and supply, the sales or import of equipment and infrastructure. For instance, **relevant financial facilities may be available to support the performance of energy audits in industrial installations and plants**, the purchase of high-efficiency equipment and systems, such as energy management hardware (e.g. the installation of sub-metering equipment) and/or appliances meeting minimum energy performance standards (i.e. motors, high efficiency boilers, compressors, steam turbines, etc.), the streamlining of process and plant management practices (e.g. implementation of EnMS, engagement of energy managers) and the preparation of EE projects, including the provision of training and awareness raising. Incentives may also be provided for funding research and development of EE technologies and for facilitating the implementation of demonstration projects**.**

Taxation measures, on the other hand, which should be complementary to any regulatory incentives, could be applied by the GoA to a wide variety of taxes and duties and may take the form of some indirect subsidy, a tax relief, deduction, rebate or investment tax credit; conversely, fines and penalties for non-compliance may be provided for, so that EE projects can be priced competitively and industrial enterprises are forced to pursue energy savings' opportunities.

Once again, it will be **up to the GoA to decide which of these different facilities will be made available**, which will be the respective recipients and how the selected measures will be implemented. The point to be borne in mind, though, is that such regulatory initiatives and financial support programmes must be maintained for a specified time period and be framed in a way that they can be readily be modified or removed when their impact has been successfully tested.

Also, of significance is the **prior identification of the funding sources for their**

implementation, since the availability of capital is crucial to enable large industrial operations and SMEs to purchase and install new EE equipment and to install EE improvements. In this regard, in addition to incentive packages directly provided from the State funds, the Study Team recommends that the GoA should examine the potential introduction of alternative funding mechanisms that would provide flexibility to implement low-cost, high-impact EE projects in industry. For example, **State-backed guarantees and Government-led risk sharing schemes for industrial EE could be developed** that will offer underwriting for the perceived risks in EE investments at a wholesale level. **Revolving loan facilities** could also be put in place that will provide borrowed capital to industrial operators for financing EE project at a lower market rate. Implementation programmes targeting the domestic banking sector might further been introduced that will supply interim measures to commercial lending institutions, such as low interest loans, loan guarantees or capital contributions or on-lending, to mitigate the risks involved in industrial EE interventions.

Box 12: Best practice example for establishing a revolving fund facility

Thailand introduced the Energy Efficiency Revolving Fund in 2002 in order to stimulate EE investment in large-scale energy consuming segments of its domestic industry. The Fund engaged local commercial banks to develop and streamline procedures for appraising and financing EE projects in industry. For this reason, it provided State funded credit lines of between USD 2.5-10 million to 11 million Thai banks at zero interest rates and 7-year final maturity period; bank could then on- lend to EE projects' developers and energy service companies at a maximum interest rate of 4%.

The scheme consisted of 3 three-year terms with an initial allocation was USD 60 million. As finance volumes grew and local banks increasingly co-funded the loans, the scheme was phased out in 2011 after leveraging total EE investments of USD 521 million from USD 236 million.

On this theme, since this matter is contemplated in the existing legislation, it might be the time for the GoA to **consider setting up an Energy Efficiency Fund** with appropriate guidelines and governance structure to focus entirely on the financing of EE investments.

Box 13: Best practice example for the establishment of an Energy Efficiency Fund

Bulgaria set up its national Energy Efficiency Fund, (which has now been renamed the Energy Efficiency and Renewable Sources Fund - EERSF) in 2004 pursuant to the Energy Efficiency Act, after the Government of Bulgaria entered into inter-Governmental agreements with the Global Environment Facility (through the World Bank) and the Government of Austria[97]. The Fund, which is operated with a profit-oriented outlook, is the sole domestic institution for financing EE investment projects by offering local companies, municipalities and private individuals:

- technical assistance and consulting services for EE investments, and
- lending facilities either directly through loans[98], or indirectly through the provision of investment credits below market interest rates[99] or project guarantees[100] that mitigate risk to commercial lenders.

[97] However, private donors and contributors (such as the DZI Bank, Lukoil AD, Brunata Bulgaria, Enemona AD) also now provide capital contributions to the Fund.

[98] Loans are made available with a repayment period of up to five years.
Where loans are provided through co-financing with a commercial institution, project developers are only required to contribute 10% of the project's costs through equity.

[99] Interest rates charged on these soft loans are between 5 and 10% depending on the status and creditworthiness of the relevant borrower.

[100] The EE Fund of Bulgaria offers two basic types of credit guarantees: partial credit guarantees and portfolio guarantees. Under a partial credit guarantee, the Fund promises to repay investors a portion of their outstanding loans if there is a default. These guarantees are offered in two varieties, each with a maximum coverage up to approximately USD 53,000. The first option covers up to 80% of a project's total cost on a *pari passu* basis, which gives equal ranking and repayment rights to each investor involved in the

Yet, as it was earlier underlined, appropriate market-oriented instruments should be gradually developed that will help self-finance demand side management measures in the national industry by capturing future energy savings. The Study Team has previously noted that such measures might include the furnishing of support for the provision of specialized energy services through dedicated companies (ESCOs) and the promotion of EE lending in Azerbaijan's banking sector.

8.10 Development of capacity building and training activities on industrial EE[101]

As it has earlier been emphasized, boosting abilities and competences by means of skills and knowledge transfer to local experts is a **key ingredient** for the promotion of EE in industry. The Study Team recommends that the capacity building measures selected to be implemented should be geared at improving both internal capabilities (the abilities and know-how of the staff of domestic industrial operators regarding, especially, the quality of energy management within the relevant enterprise) as well as external ones (involving outside stakeholders, such as energy auditors and EE specialist consultants, equipment providers and installers as well as local banks and financial institutions).

In the case of **internal capacity building**, the relevant programmes must seek to promote operational, organizational, and behavioural changes within industrial companies that will advance understanding and awareness of the benefits of energy savings' gains on a continuing basis. One way to achieve this objective is to increase acceptance of EE technologies within industry, to demonstrate to industrial operators in simple and concise terms the value of EE projects in increasing company competitiveness and productivity, and to incite the senior management to establish internal company platforms for continual identification, prioritization and implementation of energy savings opportunities through high-impact and low-cost adjustments in corporate culture and operational and maintenance improvements. For example, the Study team recommends that industrial operators should **make available to their senior managers technical assistance** to understand the tangible benefits of deploying high efficiency equipment and industrial processes and/or to streamline their existing energy management practices by developing fitting energy baselines, energy performance indicators and metering capabilities. To this end, since many industrial companies are State-owned and have the financial and management capacities to pursue new technologies, the GoA can offer leadership by introducing such EE improvements in the State-owned industrial plants. Consideration may also be given to the introduction of EE initiatives in all Government and public facilities (e.g. office buildings) in

loan. The second option covers up to 50% of a project's total cost on a first-loss basis after the bank creditor. In this option, the financial institution providing the loan is not reimbursed for any losses until the defaulted amount reaches 50% of the total loan value, at which point the partial credit guarantee covers any additional losses. For both types of partial credit guarantees, an annual fee between 0.5-2% of the project cost is levied in return for EE Fund's guarantor services.
Portfolio guarantees are provided for energy service companies as well as residential clients. In the former case, the EE Fund reimburses an energy service company for up to 5% of defaults that occur in its portfolio of projects, creating a buffer to reduce shocks from late payments. This allows the energy service company to acquire its own loans at a lower interest rate. For residential portfolio guarantees, the EE Fund provides a mechanism for buildings containing multiple residential units to upgrade in a way that will share costs among the units. In these arrangements, a project developer implements the selected EE upgrades and each unit makes payments proportional to the benefits they receive. The EERSF covers up to 5% of defaults to the project developer for failed or late payments from the portfolio of residents.

[101] On the topic of capacity building and training, see also chapter 5.

order to demonstrate consistent commitment.

The Study team also advises that particular attention should be centred on **gradually building an adequate pool of qualified experts that can support EE investments within industrial enterprises**. For this purpose, appropriately trained and experienced in-house personnel of industrial operators should be provided with the requisite technical assistance by means of education courses, on-the-job and online training, dissemination of concrete information and guidance materials, such as handbooks, seminars, workshops, participation in energy audits and accreditation and certification schemes for energy management and energy auditing. In this regard, as the Study Team has previously noted, special attention must be given on the provision of support for the placement of on-site energy managers in industrial facilities or with the corporate office, who are familiar with the operational and technical processes of the relevant workplace.

The aforementioned capacity building and training activities for industrial operators and their staff will further need to be complemented with continual and targeted outreach of all relevant stakeholder groups. In this connection, the Study Team recommends enhancing **the understanding and knowledge of local banks and financial institutions by supplying them with both industry-wide and industry specific information about the main features and risks of industrial EE projects**. This is because it is understood that Azeri banks are unfamiliar with such projects, which substantially differ from mainstream investments in that they rely on cost savings opportunities, not on revenue generating assets. It is, therefore, important to assist lending institutions to develop their in-house capabilities to assess the bankability of EE investments in the medium- and long-run and to develop appropriate financial products so that industrial enterprises can have improved accessibility to loan funding. As part of the capacity building activities for banks, **demonstration projects** could be conducted with the assistance of international organizations and the GoA whose successful results must be widely publicized.

Box 14: Best practice example for financing by international institutions of local banks for EE projects

The EBRD Sustainable Energy Financing Facility provides dedicated credit lines coupled with training and capacity building for staff in local financial institutions that seek to develop sustainable energy financing as a permanent area of business. This includes:

- how to promote new sustainable energy products;
- how to recognize eligible EE projects;
- marketing the benefits of the finance programme;
- creating standards for environmental and social due diligence; and
- encouraging clients to originate investment opportunities.

Finance for sustainable energy projects is provided for two key areas: EE and small-scale renewable energy. Local financial institutions on-lend the funds which they have received from the EBRD to their clients, which include small and medium-sized businesses, corporate and residential borrowers, and renewable energy project developers.

In this regard, the Study Team recommends that initially focus should be given to the participation of one or two banks only that have some experience in EE lending. The success of such projects will most likely incite other local banks to enter the EE market and allow a wider number of industrial companies to gain access to external financing.

On top of that, the GoA will need to **combine all these capacity building and training activities with high-profile information dissemination and educational campaigns**, which will scale up public awareness of the benefits of EE gains and the necessity to give tangible incentives for the

national industry to pursue EE improvements. It is strongly recommended that such campaigns in the form of regular communications, such as TV, radio and newspaper advertising, web site posts, newsletters, bulletin, etc. constitute a major element of the overall EE initiatives' package for two key reasons; first, because the industry as a whole and key stakeholders (e.g. EE technology suppliers) will be kept abreast of successful projects and emerging energy savings' opportunities, which will themselves will be motivated to emulate; and, secondly, because they are an effective instrument for drawing the general public's attention to the economic and the environmental advantages of rational use of energy by the national industry and to the reasons for, and importance of, incentivizing the industrial operators to promote energy conservation. Last but not least, it should be stressed that - apart from the Government and the competent State authorities – the industry itself should be encouraged to be part of any such information campaign: for instance, **large industrial enterprises, especially the State-owned ones, could be persuaded to establish public information programmes and resource centres to advertise what they are doing to improve EE of their operations**.

8.11 Management and monitoring of the planned EE policies[102]

The Study Team recommends that the policies, initiatives and programmes, which the GoA opts to implement, should be regularly and thoroughly monitored and evaluated to ensure their efficient and effective carrying-out. In particular, policy makers will need to safeguard that the relevant dedicated budgetary resources are spent with care and that EE targets in the whole industry and in specific sub-industries are met. In this respect, it is highly advisable to put in place a scheme to assess the level of implementation of the various policies and measures, which should be constantly updated and revised, as the need arises. This scheme must identify milestones, responsibilities, budget needs, deadlines, next steps and expected results for each practical sub-action and, especially, it should:

- allow to regularly track the progress made towards achieving the established quantified medium- and long-term EE targets to be reached in the various segments of the domestic industrial sector;
- oblige the competent State authorities to report at set intervals the progress made towards realizing the defined national targets to the Government and to the national Parliament;
- periodically publicize the progress made towards meeting the defined industrial EE targets.

It is anticipated that the Department of Energy Efficiency, Alternative and Renewable Energy Sources of the Ministry of Energy will be the key State body to manage and supervise the proposed scheme's implementation and coordinate activities with all other competent State bodies and authorities.

[102] On this matter, see also chapter 5.

9 Recommendations

This section summarizes the recommendations already proposed by the Study Team so as to further promote EE in the industrial sector of Georgia and Azerbaijan. These recommendations are in line to those proposed in Component 3 report, which are based on discussions held during the implementation of the walk-through energy audits with the management of the industries.

Additionally, this section proposes forms of collaboration and common initiatives that can be undertaken by both countries in the field of industrial EE.

9.1 Summary of recommendations / policy initiatives for further uptake of EE in the industrial sector of Georgia

As it already stated, Georgia lacks a sound regulatory framework to support EE investments in industry, since the current legislative regime does not fully address the needs for establishing an effective EE market.

Potential recommendations, proposed by the Study Team, that could be undertaken by the Government of Georgia are:

- the improvement of the **existing legislative framework**;
- the refinement of the **present institutional framework** for industrial EE;
- the introduction of **certain key policy initiatives**, which will motivate, or even oblige, industrial enterprises to initiate the installation of EE measures;
- the formulation of **fiscal and financial EE instruments**;
- the formulation of **information and capacity building policies**; and
- the **monitoring and evaluation** of the policies / initiatives to be implemented.

As regards the improvement of the **legislative framework, t**he Study Team recommends that one of the necessary actions involves the **preparation by the GoG of the primary EE legislation** so that the country can meet its commitments under the Energy Community Treaty and the EU Association Agreement and achieve the goals set out in the NEEAP. The first step should be the **adoption of an Energy Efficiency Law**, which will transpose the EE Directive (2012/27/EU). In addition, the **Energy Efficiency Law** currently drafted, should be complemented with the adoption of all the necessary secondary acts, which will further elaborate the legal, regulatory and financial mechanisms, and specify clear and enforceable technical rules, for the implementation of EE investments in industry. It will be also necessary that the GoG commences the process of gradually transposing a number of pieces of EU legislation, whose implementation is expected to have a very favourable impact in the area of industrial EE, such as:

- the **Industrial Emissions Directive** (Directive 2010/75/EU);
- the **Eco-design Directive** (Directive 2009/125/EC) and the **Energy Labelling Directive** (Directive 2010/30/EU);
- the **Directive 2008/1/EC** concerning integrated pollution prevention and control.

It is imperative however, that the pieces of the EU legislation should be accompanied by their **effective and transparent enforcement through the competent State bodies**.

From an **institutional perspective**, EE matters are split between **the Ministry of Energy** and the **Ministry of Economy and Sustainable Development**. However, the Study Team

recommends **designating a single authority to have full competence** over EE policies and measures in industry. Another topic that will need to be investigated concerns the potential **designation of a dedicated national Energy Efficiency Agency**, which - as an autonomous public body - will be in charge of stimulating investments in EE in all sectors of the domestic economy (including in industry) and push forward the implementation of EE improvements. The establishment of this Agency, already envisaged in the NEEAP, is expected to be a **very important milestone** in the process of untapping the country's large energy savings' potential and of progressively putting in place a functioning and sustainable local EE market.

Other initiatives recommended by the Study Team to be implemented are:

- the improvement of the **collection and processing system of industrial data**;
- the **carrying-out of energy audits** by industrial operators;
- the establishment of an **accreditation and certification system** for energy auditors;
- the adoption and implementation of internationally accepted **standards** on energy auditing and energy management;
- the introduction of **sub-metering** requirements for industrial facilities;
- the imposition of **minimum energy performance standards**; and
- the development of **industry-wide EE groupings and networks**.

The above-mentioned initiatives should be accompanied by Government-supported central targeted programmes of **fiscal and financial nature**, which will lower the high costs of development of EE industrial projects, enhance local access to EE technologies, products and equipment and positively influence the speed with which EE improvements are taken on by industrial enterprises. In this respect, financial incentives might include: **subsidies** or **grants** to carry out energy audits, to use other energy services and/or the purchase of EE related equipment and products; long-term low or free-interest **loans**, which could be made available by local financial institutions to subsidize part of the capital cost of some EE interventions; investment **credits** or State-backed **guarantees**, which could be furnished to support the implementation of EE upgrades or for the adoption of proven EE technologies by industrial operators; etc.

Financial support from the GoG and the competent State authorities, international financial institutions and development agencies **will also be needed in order to provide technical training and capacity building to various stakeholders' groups**, support the research, development, demonstration and deployment of EE technologies, including the carrying-out of pilot projects, improving information dissemination and raising general awareness of the benefits of EE investments in industry. On the other hand, **fiscal policy initiatives** provided by the GoG could include the granting of **tax refunds, deductions, rebates or profit-tax credits** to industrial enterprises and/or original equipment manufacturers.

However, the GoG will eventually need to promote the use of specific market-based energy policy initiatives, like **the gradual development of the energy service sector through the promotion of ESCOs** and **energy performance contracting (EPC)**.

Training activities, workshops, discussion platforms, working groups, etc. will need to be formulated and implemented not only by the competent State authorities, but also through international agencies and donors, IFIs and international partnerships. These activities are vital so as to enhance **the know-how and capabilities of the Georgian industrial companies** so as to develop and implement effective EE programmes. More importantly, the Study Team strongly suggests to the GoG that their implementation is supplemented with the execution of well-focused

small demonstration projects, so that industrial companies can gain tangible practical experience on energy auditing and energy management.

Finally, in order to accurately screen and appraise progress, **it would be useful** that the State authorities having competence over EE industrial policies **adopt a measurement mechanism** that will weigh up the extent of implementation success of each specific implemented initiative in specific time horizon (for instance, in a 5-year lifecycle up to 2023). Several different monitoring methods and tools have been developed (and employed) for this purpose, one of which is the so-called "energy efficiency balanced scorecard" system.

9.2 Summary of recommendations / policy initiatives for further uptake of EE in the industrial sector of Azerbaijan

Azerbaijan's current legislation sets out a general system for promoting energy conservation, however **a coherent and concrete EE strategy at both the policy and regulatory levels is still missing**. Potential recommendations that could be undertaken by the Government are:

- the carrying-out of an **industry-wide review on energy end-use**;
- the enactment of specific **EE legislation**;
- the improvement of the present **institutional set-up**;
- the development of a **State Programme** for the promotion of EE in industry;
- the imposition of **EE obligations on industrial operators**;
- the introduction of **specific EE measures**;
- the facilitation of the establishment of **industrial clusters to enhance EE**;
- the **design of incentives' packages** for implementing identified energy savings opportunities in industry;
- the **development of capacity building and training activities** on industrial EE; and
- the **management and monitoring** of the planned EE policies.

As regards the **industry-wide review on energy end-use**, an initial step could be the undertaking of a **scoping study** by the Government, which will provide a broad overview of how the various segments of the national industry currently operate and perform. The study is recommended to include benchmarking against both in-country and international examples. In addition, a **number of energy audits could be undertaken** by State-owned industrial operators so as to gain a preliminary understanding of the tangible prospects for economy-wide implementation of EE improvements. The **scoping study should also specifically consider certain vital financial issues**, such as the actual availability of State-backed funding for EE investments in industry, the relevant taxation regime and the ability of industrial companies to finance with their own capital EE investments.

In relation to **EE legislation**, the Study Team recommends the **consolidation into a single legislative act of the existing and disparate laws that affect EE investments**. This act could be based on the current draft EE Law or be an entirely new legal act. It **must also serve as legal basis for drafting and adopting any secondary legislation, operational instructions, tools, standards and procedures** that are necessary to implement the Law's provisions.

The proposed Law on EE should define and organize the **institutional structure** within the Government by designating the State bodies and authorities, which will be in charge of planning, executing and monitoring EE policies and programmes. The Study Team recommends that **the**

leading responsibility for EE issues is retained in the hands of the Department of Energy Efficiency, Alternative and Renewable Energy Sources of the Ministry of Energy. In the longer-term, though, the Government of Azerbaijan may consider to eventually set up **a dedicated agency**, which will be responsible for the implementation of EE policies as well as national, local EE State programmes and action plans.

The Study Team also recommends that the Government of Azerbaijan prepares a national programme for the uptake of EE measures. The programme should **initially target key sub-industries** that need to increase the level of energy savings, concentrating particularly on **energy intensive industrial operators** with large capital investment requirements for machinery and change of outdated equipment. It would further be recommended to supplement it with an **Implementation Plan**, which can be adopted by the Government - in consultation with industry representatives and supporting sectors.

In addition, the Government of Azerbaijan should consider the **placement of specific requirements on industrial operators** that will compel them to improve the efficiency and energy conservation levels of their facilities. Such compulsory obligations may be the implementation of **Energy Management System(s)**, such as ISO 50001 and the mandatory **engagement of energy managers** by large industrial companies. However, it is also crucial that the Government puts in place a corresponding certification, accreditation and/or equivalent qualification scheme for engineering professionals wishing to become energy managers, since **currently there are not available competent human resources** experienced to handle the energy manager's functions.

The previously described obligations will need to be strengthened with the implementation of additional requirements, which could involve:

- the carrying-out of energy audits by industrial operators on a voluntary basis at least with this measured gradually becoming mandatory for large industrial companies;
- the designation by the Ministry of Energy of the basic principles and quality requirements guiding the process of energy auditing in industrial facilities;
- the design of support measures for industrial SMEs to cover costs of an energy audit;
- the establishment by the Government of an accreditation scheme for energy auditors;
- the development by the Ministry of Energy of streamlined methodologies for energy savings calculations;
- the adoption by the Ministry of Energy of internationally recognized procedures for the ex-ante monitoring and verification of such savings;
- the adoption by the local industry of standardized full cost accounting systems for industrial EE investments;
- the introduction by the Government of mandatory minimum performance standards for a range of energy consuming equipment; and
- the design and implementation by the Ministry of Energy of a labelling scheme for the products produced by each industry.

Another possibility that might be explored by the Government of Azerbaijan involves the assessment of the formation of **industrial clusters**, where participating enterprises can act jointly to minimize production costs and achieve higher productivity and greater competitiveness.

The aforementioned policy priorities should be synergized with **fiscal and tax benefits**, which would be elaborated by the Government and competent State bodies (e.g. the Ministry of Energy

and the Ministry of Finance) to render more financially attractive any proposed EE investments. **Taxation measures** could be applied to a wide variety of taxes and duties and may take the form of some indirect subsidy, a tax relief, deduction, rebate or investment tax credit.

It would also be pertinent for the Government of Azerbaijan to **consider setting up an Energy Efficiency Fund** with appropriate guidelines and governance structure to focus entirely on the financing of EE investments. In addition, like in Georgia, suitable market-oriented instruments (e.g. ESCOs) should be gradually developed under the guidance of the Ministry of Energy that will help self-finance demand side management measures.

As regards capacity building and training, the Study Team recommends that the Ministry of Energy should select the most appropriate activities with the aim to improve both internal capabilities (the abilities and know-how of the staff of the national industrial operators regarding, especially, the quality of energy management within the relevant enterprise) as well as external ones (involving outside stakeholders, such as energy auditors and EE specialist consultants, equipment providers and installers as well as local banks and financial institutions).

On top of that, the Study team recommends that the Ministry of Energy **combines** all these capacity building and training activities **with high-profile information dissemination and educational campaigns**, which will scale up public awareness of the benefits of EE gains and the necessity to give tangible incentives for the national industry to pursue EE improvements.

The proposed policies, initiatives and programmes to be developed, should be regularly **monitored and evaluated** in order to ensure their efficient and effective carrying-out. In this respect, the Study Team recommends **putting in place a scheme,** managed by the Department of Energy Efficiency, Alternative and Renewable Energy Sources, **to assess** the level of implementation of the various policies and measures, which should be constantly updated and revised, as the need arises.

9.3 Recommendations on collaborative initiatives that can be undertaken by Georgia and Azerbaijan in the field of industrial EE

This chapter provides a set of recommendations for putting in place joint initiatives and actions for collaboration between Azerbaijan and Georgia in the general area of EE and - more specifically - in the promotion of EE investments in these two countries' respective industrial sector. This matter is considered to be of great significance, not least because - as international experience has repeatedly demonstrated - strongly committed cooperation between States can play a pivotal role in accelerating the widespread use of EE technologies, in creating synergies and building partnerships among national, regional and international experts and in contributing to optimizing the use of their energy resources at a bilateral and regional level.

In formulating the recommendations, the Study Team has taken into consideration that, even though Georgia and Azerbaijan are neighbouring countries, **their EE sector is at a different level of development:** Georgia, as already stated, is a Contracting Party of the Energy Community Treaty and all Energy Community *acquis* related to EE must be transposed and implemented, while on the other hand, Azerbaijan is not a Contracting Party and there does not exist any plan at the moment, to accede to the Energy Community Treaty. In addition, the Study Team kept in mind that **the two countries' respective industrial sectors have different features and characteristics and that their dependence on energy imports is entirely**

dissimilar; Georgia is an importer of energy, while Azerbaijan is fully supplied from locally available hydrocarbons' resources and is a net exporter of oil and natural gas, particularly for European markets.

On the other hand, the Study Team has also taken into account several common facets in the field of EE, which Azerbaijan and Georgia share. In the legislative front, **both countries are members of the Energy Charter Treaty and the PEEREA** that support cooperation in the area of EE. In more detail, article 3 of the PEEREA, requires Contracting Parties to cooperate and, as appropriate, to assist each other in developing and implementing EE policies, laws and regulations. It is further expressly provided that any such cooperation may take any appropriate form and its scope can cover a diverse array of different issues. Additionally, both countries are members of the Eastern Europe Energy Efficiency and Environment Partnership (**E5P**). The E5P is a 180 million EUR multi-donor fund that was initiated during the Swedish Presidency of the European Union in 2009 to encourage municipal investments in EE and environmental projects in the Eastern Partnership region. Also, they are participating in the **EU4Energy initiative**, which builds upon the INOGATE programme. EU4Energy supports the elaboration and implementation of energy policies that reduce their energy dependence and intensity, bolster their resilience and open up new opportunities for efficient low-carbon economies that further advance citizens' well-being.

Finally, on a practical level, a **number of donors** such as the EBRD, the World Bank, USAID are active in both countries, offering technical assistance programs in the energy sector, some of which focus on EE investments.

9.3.1 Potential forms of collaboration

As part of its sovereign rights, each State is entitled - subject to the obligations it has assumed under international agreements it has signed and to any requirements imposed under customary international law - to enter into any forms of collaboration with other States on any specific matter(s). As such, Azerbaijan and Georgia are free to make any binding agreement that will delineate the nature and ambit of their potential collaboration in the area of industrial EE.

Evidently, the bounds and strength of such cooperation will be decided in unison by the Governments of both countries. **Various approaches can be adopted**:

- either a **mutually agreed high-level coordination structure** which will be geared at solidifying the multi-faceted aspects of their joint courses of action in promoting EE in their respective national industrial sectors, or
- a looser type of collaboration, such as a **joint international platform**, which will primarily aim at improving knowledge, developing exchanges of information, sharing best practices and evaluating experiences.

It is noted however that the **development of a joint EE centre is not proposed** due the different state of development in the EE sector between both countries.

The **mutually agreed high-level coordination structure**, will need to be implemented by means of a written arrangement, which could be achieved through an **Inter-Governmental Agreement** that will enumerate in detail the framework for cooperation through the selected formalized structure. A structure of this type is envisaged to encompass a single dedicated inter-governmental body (e.g. in the form of a **Steering Committee**), which will be in charge of direct bilateral policy dialog on EE topics with the aim to reinforcing institutional and regulatory capacity

of the competent State authorities in both countries. The Steering Committee could be co-chaired by Azerbaijan's Minister of Energy and Georgia's Minister of Energy or the Minister of Economy and Sustainable Development and consist of high level officials of competent Ministries from both countries. It is advisable that the proposed Steering Committee meet regularly to take stock of progress, address problems, coordinate activities and provide guidance. Furthermore, under the umbrella of this Steering Committee, a number of **Task Force Groups** may also be put in place, which will deal with specific issues relating to energy conservation, including the promotion of EE in the two countries' respective industrial sectors. These task force groups would bring together EE experts from State bodies and academic institutions to share their experiences on EE initiatives pertaining to specific sectors, learn lessons and look for solutions to address any emerging challenges. In this regard, the Study Team strongly recommends that representatives from large industrial companies, both State- and private-owned ones, from both countries as well as other stakeholders, including consumer groups, should be given the opportunity of participating in these task force groups. This is because industrial operators will pay for, and reap the benefits of, any EE investments and they are thus likely to be able to give significant input into any process of cross-border collaboration in the area of EE. The views of other stakeholders, especially consumer associations, will also be particularly useful in the context of activities designed to raise awareness about the advantages of EE improvements.

The **joint international platform** could be based on a **Memorandum of Understanding** that will be signed by the Governments of both countries and which will be mainly directed at facilitating the mutual sharing of information, expertise and good practices on a variety of EE matters.

Independently of the form of cooperation between Georgia and Azerbaijan, the scope of activities and initiatives undertaken could be extremely wide and diverse; such initiatives could include:

- identifying priorities of cooperation between the two countries in the domain of EE and considering proposals for further development of the cooperation;
- introducing new legislative and policy initiatives in enhancing EE, especially in the industrial sector, at the national level;
- elaborating coordination and supervision mechanisms for joint actions and initiatives that will increase technical capacities and ensure appropriate communication and collaboration between the relevant State bodies;
- improving knowledge on EE matters, particularly in industry, by means of common measurement tools and methodologies coupled with the promotion of joint comparative analysis and related relevant indicators;
- assessing the effectiveness of different policy measures and initiatives in promoting EE;
- establishing tools, for instance a knowledge bank of different EE measures and practices, to enhance energy conservation and to reduce energy intensity;
- examining ways to jointly promote data sharing in the area of EE;
- organizing peer reviews to follow progress in the implementation of EE measures;
- encouraging consumers' EE by supporting the use of energy-efficient products through the implementation of internationally recognized energy labelling and eco-design requirements; and

Other activities that could be implemented are the organisation and conduction of common promotional and awareness raising activities, such as high-level workshops, seminars and business to business meetings. Stakeholders that could participate in such type of dissemination activities may be government agencies, universities, research centres and technological

organizations with the scope to exchange information on EE issues and share best practices from both countries.

In addition, design and organisation of common training activities could also be undertaken. These trainings will mostly be addressed to State bodies authorities in order to enhance their capabilities and knowledge to tackle the national challenges linked to increasing energy savings.

Last but not least, another important joint initiative that could be organised is the implementation of energy audits and Energy Management Systems according to ISO 50001, especially in the industrial sector of both countries. This initiative could be organised in a framework of a common programme and include the development of common non-binding guidelines and/or streamlined principles and even handbooks of good practice and trainings for energy audits and the development of EnMS.

Especially, the Study Team recommends that the EnMS concept, according to ISO 50001 could also be disseminated to the other countries of the Eastern Partnership through common trainings, exchange of guidelines and good practice handbooks.

Annex 1: Georgia's Indicative Energy Efficiency Targets for 2020, 2025, and 2030

Year	2014		2020		2025		2030	
Category	Primary Energy (GWh)	Final energy (GWh)	Primary Energy (GWh)	Final energy (GWh)	Primary Energy (GWh)	Final energy (GWh)	Primary Energy (GWh)	Final energy (GWh)
Business as Usual (BAU)	54,894	46,758	63,185	57,426	85,542	70,201	101,810	83,710
Savings from measures	-	-	6,316	3,618	12,541	7,241	16,359	10,359
With measures	54,894	46,758	56,869	53,808	73,002	62,959	85,451	73,351
% energy reduction from the BAU	0%	0%	10%	6%	15%	10%	16%	12%

Annex 2: Expected Energy and GHG Savings by Measures on a Sector-By-Sector Basis Under the Draft NEEAP (Georgia)

Sector	2020			2025			2030		
	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO_2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO_2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO_2eq)
Horizontal measures	95	84	26,036	892	1,030	280,928	2,043	1,931	631,153
Building sector measures	237	169	59,249	305	239	83,571	175	139	48,719
Public sector measures	154	60	32,444	339	138	74,364	391	173	89,785
Industry sector measures	819	770	265,634	1,489	1,373	463,212	2,711	2,491	834,699
Transport sector measures	2,439	2,444	554,661	4,171	4,181	1,010,738	5,151	5,163	1,250,150
Energy transformation, transmission, distribution, and demand response measures	2,572	91	1,201,611	5,344	281	2,267,260	5,887	463	2,487,247
Total savings	**6,316**	**3,618**	**2,139,637**	**12,541**	**7,241**	**4,180,073**	**16,359**	**10,359**	**5,341,753**

Annex 3: Estimates of Production in Georgia's Industrial Sector

Sector	Approximate tonnes	Comments on sources and information
Aggregates	12,602,861	Tonnage data from Geostat
Iron & steel	188,737	Tonnage data from Geostat
Chemicals/ petrochemicals	45,397	Tonnage data from Geostat
Non-metal Minerals	6,161,029	Approximately 1.6 Mt of cement is produced each year, but there appears to be multiple counting of same product as: clinker, cement then concrete products. Additionally, there may be some multiple counting of aggregates.
Food & drink	1,518,612	Comprising 874 kt of food and 645 t of drink
Wood based	59,202	Mixture of units – back estimated by the NEEAP preparation team
Paper based	21,985	Mixture of units – back estimated by the NEEAP preparation team
Clothing	8,302	Very rough back-estimate based on economic production
Engineering	55,866	Mixture of units – back estimated by the NEEAP preparation team
Construction	n/a	No information

Annex 4: Overview of Individual Measures Proposed in the NEEAP for Georgia's Industrial Sector

No.	Title of the energy saving measure	End-use targeted	Duration (years)	2020			2025			2030		
				Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO_2eq)
1	Attention to base year data: energy and production	All industry	1	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated
2	Industry data disaggregation	Improved baseline information	1	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated
3	Conversion of wet-cement process to dry cement process	Cement sector production process	2	584.6	584.6	206,629	744.0	744.0	262,964	1,190.0	1,190.0	420,578
4	Energy saving activities at metal manufacturers	Secondary steel/ aluminium processors	4	61.8	50.6	18,201	198.2	171.8	61,769	406.0	355.3	127,740
5	Improved boilers and steam/ hot water distribution systems	- Food and drink -Chemicals - Paper - Other process sub-sectors	3	51.8	48.6	10,678	173.6	165.0	36,237	355.9	341.2	74,939
6	Attention to motors, fans, pumps, compressors	All Industry	3	50.7	36.2	12,676	156.9	122.9	43,017	319.5	254.2	88,961
7	Energy efficient refrigeration systems	Existing food & drink, chemical manufacturers	4	4.8	3.4	1,203	14.9	11.7	4,084	30.3	24.1	8,446
8	Efficient lighting	All industry	3	65.0	46.4	16,248	201.1	157.5	55,142	409.5	325.8	114,035
Total				**818.7**	**770.0**	**265,634**	**1,488.7**	**1,373.0**	**463,212**	**2,711.3**	**2,490.7**	**834,699**

Annex 5: Financing of Horizontal Measures in Georgia's Industrial Sector

No.	Title of the energy saving measure	Implementing body	Source	Type of financing	Required financing in the coming period (2017-2020)					Longer-term financing required
					2017	2018	2019	2020	Total 2017 - 2020	2021 - 2030
1	Attention to base year data: energy and production	Geostat	Central Government	In-kind	€ 6,000	€ 0	€ 0	€ 0	€ 6,000	€ 0
			Total		**€ 6,000**	**€ 0**	**€ 0**	**€ 0**	**€ 6,000**	**€ 0**
2	Industry data disaggregation	Geostat	Central Government	In-kind	€ 6,000	€ 0	€ 0	€ 0	€ 6,000	€ 0
			Total		**€ 6,000**	**€ 0**	**€ 0**	**€ 0**	**€ 6,000**	**€ 0**
3	Conversion of wet-cement process to dry cement process	Cement and mineral processing industry	Central Government	N/A	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0
			Industry/ Private companies	Investment	€ 41,209,000	€ 41,209,000	€ 0	€ 0	€ 82,418,000	€ 50,736,000
			Total		**€ 41,209,000**	**€ 41,209,000**	**€ 0**	**€ 0**	**€ 82,418,000**	**€ 50,736,000**
4	Energy saving activities at metal manufacturers	Large steel/metal manufacturers	Central Government	N/A	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0
			Industry/ Private companies	Investment	€ 0	€ 1,633,000	€ 1,665,000	€ 1,699,000	€ 4,997,000	€ 18,971,000
			Total		€ 0	€ 1,633,000	€ 1,665,000	€ 1,699,000	€ 4,997,000	€ 18,971,000
5	Improved boilers and steam/ hot water distribution systems	Industry with boilers & steam/hot-water systems	Central Government	N/A	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0
			Industry/ Private companies	Investment	€ 0	€ 802,000	€ 914,000	€ 1,038,000	€ 2,754,000	€ 20,711,000
			Total		**€ 0**	**€ 802,000**	**€ 914,000**	**€ 1,038,000**	**€ 2,754,000**	**€ 20,711,000**
6	Attention to motors, fans, pumps, compressors	Industrial companies	Central Government	N/A	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0
			Industry/ Private	Investment	€ 0	€ 1,593,000	€ 1,750,000	€ 1,919,000	€ 5,262,000	€ 31,330,000

No.	Title of the energy saving measure	Implementing body	Source	Type of financing	Required financing in the coming period (2017-2020)					Longer-term financing required
					2017	2018	2019	2020	Total 2017 - 2020	2021 - 2030
			companies							
			Total		**€ 0**	**€ 1,593,000**	**€ 1,750,000**	**€ 1,919,000**	**€ 5,262,000**	**€ 31,330,000**
7	Energy efficient refrigeration systems	Industrial companies	Central Government	N/A	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0
			Industry/ Private companies	Investment	€ 0	€ 151,000	€ 166,000	€ 182,000	€ 499,000	€ 2,974,000
			Total		**€ 0**	**€ 151,000**	**€ 166,000**	**€ 182,000**	**€ 499,000**	**€ 2,974,000**
8	Efficient lighting	Industrial companies	Central Government	N/A	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0
			Industry/ Private companies	Investment	€ 0	€ 3,062,000	€ 3,365,000	€ 3,690,000	€ 10,117,000	€ 60,241,000
			Total		**€ 0**	**€ 3,062,000**	**€ 3,365,000**	**€ 3,690,000**	**€ 10,117,000**	**€ 60,241,000**
Total					**€ 41,221,000**	**€ 48,450,000**	**€ 7,860,000**	**€ 8,528,000**	**€ 106,059,000**	**€ 184,963,000**

Annex 6: Technical Assistance Projects in Georgia Relating to Energy Efficiency

Organization	Program/ project title	Project timeframe (planned or actual)	Sector focus	Funds allocated to the program	Implementation status/ Results achieved
DANIDA and NEFCO	Support to Energy Efficiency and Sustainable Energy in Georgia	12/2015 – 06/2020	➢ EE Building Regulation ➢ EE Product labelling ➢ Energy Statistics for EE and RE ➢ Grid code for integration of RES into the national power system ➢ Feasibility study for EE in public Buildings ➢ Awareness raising and training of energy	• 30 million DKK for TA (EUR 4.0 million) • 37.5 million DKK for NEFCO loans (EUR 5.0 million) • 25 million DKK from E5P as an expected grant (EUR 3.4 million)	Under implementation
KfW	Pre-Feasibility Study for introduction of an Energy Efficiency Framework and Short-Listing for Municipal Buildings	06/2016 – 12/2016	**Buildings:** Residential, municipal (public) and tertiary (commercial) buildings in Batumi	Not defined – 20 person-months (likely EUR 300 – 400,000) in TA Investment not defined	Ongoing
UNIDO	The UNIDO Regional Resources Efficient and Cleaner Production (RECP) Demonstration Project	2013 – 2016	**Industry:** Energy audits and improved human capacity	Unknown	The project has been finalized. A number of energy audits (10+) were carried out. Some investments were carried out, but the full scale is not known. UNIDO is also in the process of expanding TA in the industrial sector.
UNIDO	Reducing Greenhouse Gas (GHG) Emissions through Improved Energy Efficiency in Industrial Sector in Georgia	2016-2019	- Promotion and support of Industrial EE - Energy Management Systems and Motor System Optimization - Financing mechanisms for investment in Industrial Energy Efficient and low carbon technologies	EUR 900,000	Under implementation
	FINTECC and other bi-lateral lending to industry	2015 -	**Industry:** Technology transfer of climate technologies to SMEs	USD 10 million in grants for TA and investment	4 projects supported in Georgia

Organization	Program/ project title	Project timeframe (planned or actual)	Sector focus	Funds allocated to the program	Implementation status/ Results achieved
			and large corporate Clients	(only part for Georgia) At least USD 77 million for lending committed (only part for Georgia)	
EBRD	Caucasus Energy Efficiency Program (CEEP) (Regional)		**Industry & SMEs:** Credit line through local banks to support: EE for SMEs, residential buildings (appliances) and renewable energy	USD 125 million in financing EU grants and Technical Assistance: EUR 5.1 million EBRD Special Shareholders Fund: EUR 3 million grants Austrian funded Technical Assistance: EUR 5 million	Approx. 70% allocated. Expected to be fully utilised by mid-2017
	DCFTA EU- EBRD Credit line (Regional)		**Industry & SMEs:** Support the modernization of local SMEs in accordance to AA/DCFTA requirements; local SMEs will be supported in improving product quality and modernize their services to meet EU standards.	EUR 380 million finance with EU contribution of EUR 56.6 million in investment grants and EUR 19 million for technical assistance	One bank recently adhered
	Green City Action Plan (Tbilisi)	2016 -	**Various** – Supporting municipality in prioritizing green investments	TBD	Kick off meeting occurred in November 2016
	Technical Assistance on public buildings in Tbilisi	2016 -	**Public:** Supporting municipality in prioritizing and quantifying public building investments	TBD	Kick off meeting occurred in November 2016
	Tbilisi Bus Project	2015 – 2016	**Transport:** Changing of buses from diesel to LNG	EUR 40 million in loans	Tbilisi has applied for the loan
	Market Assessment of the Residential Sector in Georgia: Policy, Legal, Regulatory, Institutional, Technical and Financial	2016	**Buildings:** Support the Government in identifying existing barriers, benefits and saving potential achievable through EPBD	Technical Assistance	Completed October 2016

Organization	Program/ project title	Project timeframe (planned or actual)	Sector focus	Funds allocated to the program	Implementation status/ Results achieved
	Considerations				
	Support for the preparation of the National Energy Efficiency Action Plan (NEEAP)	2017	**All sectors:** The aim is to set the foundations for primary EE legislation prioritizing key interventions for the country	Technical Assistance	Expected completion in April 2017
JICA	Green procurement related to transport – buses and cars	2015	**Transport:** Changing of buses from diesel to LNG	JPY 500 million in grants (EUR 4 million) for improving the transport fleet	Grant being coordinated by the Ministry of Economy and Sustainable Development and the city of Tbilisi
The Council of Europe Development Bank	Rehabilitation of state schools in Tbilisi	2016 -	**Buildings:** Ministry of Education – Education System Infrastructure Development Agency and public schools in Tbilisi	EUR 14 million loan to the national Government EUR 6 million grant from E5P for TA and investments in EE	Under implementation
Asian Development Bank	Georgia: Sustainable Urban Transport Investment Program	2010 -	**Transport infrastructure:** Most recent tranche for: (i) Batumi coastal protection (5 km) to defend urban infrastructure and roads against severe erosion; (ii) setup of a management information system for the executing agency; and (iii) consulting services for feasibility studies and detailed engineering design for sustainable urban transport projects.	Up to USD 300 million for sustainable urban transport programs	Under implementation
USAID	Institutionalization of Climate Change Adaptation and Mitigation in Georgian Regions	2012 – 2016	**Various:** Supports the integration of environmental and climate change considerations into policy priorities of local authorities through the establishment of special units on climate change, environment, and sustainable agriculture.	Uncertain	Under implementation
	Enhancing Capacity for	09/2013 – 09/2017	**Various, focusing on three**	Uncertain	Under implementation.

Organization	Program/ project title	Project timeframe (planned or actual)	Sector focus	Funds allocated to the program	Implementation status/ Results achieved
	Low Emission Development Strategies (EC-LEDS) Clean Energy Program		**activities:** EE in Georgian Municipalities, Green Building Rating and Certification Systems, and Advisory assistance to the national LEDS development process.		MARKAL model developed, Sustainable Energy Action Plans developed in a number of municipalities, and the LEDS is currently being developed.
Women in Europe for a Common Future (WECF)	Efficient use of biomass for equitable, climate proof and sustainable rural development	2016 – 2022	**Residential/Primary energy:** Promoting solar hot water heaters and efficient biomass stoves for the rural residential sector.	Uncertain – the planned project is USD 12.7 million with 2.7 million in grants to be identified	Feasibility study conducted, pilots carried out, NAMA published, and currently seeking funding.
EIB	Water Infrastructure Modernization Program I	2010-2016	**Water sector:** Reducing energy consumption in pumping stations through the reduction of water losses	EUR 40m loan EUR 4m Technical Assistance grant	Project implementation has been completed
	Water Infrastructure Modernization Program II	2013-2018	**Water sector:** Reducing energy consumption in pumping stations through the reduction of water losses	EUR 40m loan EUR 8m Investment grant	Under implementation
	Rehabilitation of the water supply network in Tbilisi	2017-2019	**Water sector:** Reducing energy consumption in pumping stations through the reduction of water losses	To be confirmed	Project under appraisal
	Georgia Urban Reconstruction and Development	2015-2019	**Municipal investments:** various sub-sectors	EUR 100m	Under implementation
	Georgia upgrade of Municipal Infrastructure	2016-2020	**Municipal investments:** various sub-sectors	EUR 100m	Under implementation

Annex 7: Azerbaijan Action Plan for Meeting the Objectives of the Strategic Road Map in the Public Utilities (Electric and Thermal Energy, Water and Gas) Sector

№	The name of action	Main executioner	Other executioners	Result indicators	Implementation period
Strategic objective 1: Provision of sustainability and effectiveness in regulation of the public utilities sector					
1.1.	**Establishment of an independent regulatory agency and a purposeful fund, effective service and collection mechanisms, cadre provision**				
1.1.1.	Considering establishment of a common regulatory agency in the public utilities sector	President Administration	Ministry of Energy, Ministry of Economics	Development of Communal Service sector Reducing the burden on state budget	2017
1.1.2.	Considering establishment of a purposeful fund in the public utilities sector	President Administration	Ministry of Finance, Ministry of Economics		2017
1.1.3.	Continuing actions on improvement of the public utility services	State Agency for Public Service and Social Innovations	'Azerenergy' JSC, "Azerishiq" JSC, "Azersu" JSC, SOCAR, "Azeristiliktechizat" JSC		2017-2020
1.1.4.	Improvement of collection of the utility debts	Ministry of Economics	Regulatory body		2017-2018
1.1.5.	Raising of the cadre potential in the public utilities sector	Ministry of Labour and Social Protection of Population	Ministry of Education		2017-2020
1.1.6.	Improving the legal and regulatory framework for the public utilities sector	Ministry of Economics	Regulatory body, Ministry of Justice		2017
Strategic objective 2: Provision of fully diversified and environmentally clean electricity generation					
2.1. Increasing spare capacity of national production portfolio					
2.1.1.	Forecasting domestic demand for electricity	Ministry of Energy	Ministry of Economics, 'Azerenergy' JSC, 'Azerishiq" JSC	Enhancement of production capacity by 1000 MVt	2017
2.1.2.	Development of feasibility studies for identification of strategic priorities on energy sources	Ministry of Energy	Regulatory body, Ministry of Economics, ABOEM, 'Azerenergy' JSC, ARDNŞ		2017

№	The name of action	Main executioner	Other executioners	Result indicators	Implementation period
2.1.3.	Identification of financing sources for investments	Ministry of Energy	Regulatory body, Ministry of Economics, Ministry of Finance, SAARES, 'Azerenergy' JSC		2017-2018
2.1.4.	Creation of additional power generation capacity	Ministry of Energy	Regulatory body, Ministry of Economics, Ministry of Finance, SAARES, 'Azerenergy' JSC		2017-2020
2.2 Diversification of the National Production Portfolio					
2.2.1.	Assessment of potential for alternative and renewable energy	SAARES	Ministry of Energy, Ministry of Economics, ANAS, 'Azerenergy' JSC	Establishment of alternative energy sources – 350 MW wind and 50 MW solar energy in order to diversify the energy portfolio	2017
2.2.2.	Selection of an operation and financing form of power stations requiring investments	SAARES	Regulatory body, Ministry of Energy, Ministry of Economics, Ministry of Finance		2017-2018
2.2.3.	Informing the public about the taken measures	SAARES	Ministry of Energy, 'Azerenergy' JSC		2017-2020
2.3. Review of net electricity export prospects in the short-term perspective with consideration of surplus supply					
2.3.1.	Exploring export opportunities	Ministry of Energy	Regulatory body, Ministry of Economics, 'Azerenergy' JSC		2017-2018
2.3.2.	Preparation of feasibility studies for realization of the export potential	Ministry of Energy	Regulatory body, Ministry of Economics, 'Azerenergy' JSC		2017-2018
2.3.3.	Organization of the working group on export-related measures	Ministry of Energy	Ministry of Economics, 'Azerenergy' JSC		2017
Strategic objective 3: Application of the world average efficiency and quality standards and launch of mechanisms for achieving the goals					
3.1. Improvement of efficiency of power stations and more efficient use of available potential					
3.1.1.	Ensuring efficient use of the power stations' potential	'Azerenergy' JSC	Regulatory body, Ministry of Energy, Ministry of Economics, Tariff Council	Increase of net fuel efficiency of the selected combination circuit	2017-2020

№	The name of action	Main executioner	Other executioners	Result indicators	Implementation period
3.1.2.	Review of privatization options of the power stations	State Committee on Property Issues	Regulatory body, Ministry of Energy, Ministry of Economics, 'Azerenergy' JSC	gas turbine stations up to 50.0%	2017-2020
3.1.3.	Announcing tenders for selection of an investor	Ministry of Energy	State Committee on Property Issues, Regulatory body, Ministry of Economics, 'Azerenergy' JSC		2017-2020
3.2. Reducing electricity losses, improving quality of electricity transmission and distribution					
3.2.1.	Determination of implementation mechanisms for improving efficiency	Ministry of Energy	Regulatory body, 'Azerenergy' JSC, 'Azerishiq' JSC	Reduction of technical loss level to 7.0% in Baku Reduction of technical losses down to 8% in the regions	2017
3.2.2.	Development of a master plan for modernisation measures	'Azerenergy' JSC, 'Azerishiq' JSC	Regulatory body, Ministry of Energy, Ministry of Economics		2017
3.2.3.	Application of key performance indicators (KPI) monitoring the quality of electricity transmission	Ministry of Energy	Regulatory body, 'Azerenergy' JSC, 'Azerishiq' JSC		2017
3.2.4.	Installation of meters to reduce losses	'Azerenergy' JSC, 'Azerishiq' JSC	Regulatory body, Ministry of Energy, Ministry of Economics		2017-2018
3.2.5.	Taking the necessary measures in the power networks for meeting the projected demand for electricity	'Azerenergy' JSC, 'Azerishiq' JSC	Regulatory body, Ministry of Energy, Ministry of Economics		2017-2020
3.2.6.	Upgrading the electricity transmission and distribution system	'Azerenergy' JSC, 'Azerishiq' JSC	Regulatory body, Ministry of Energy, Ministry of Economics		2017-2020
3.2.7.	Creating a data bank on the transmission and distribution network	'Azerenergy' JSC, 'Azerishiq' JSC	Regulatory body, Ministry of Energy, Ministry of Economics		2017-2020
3.2.8.	Informing the public about the losses	'Azerenergy' JSC, 'Azerishiq' JSC	Regulatory body, Ministry of Energy, Ministry of Economics		2017-2020
3.2.9.	Prioritization of projects aimed at loss reduction	'Azerenergy' JSC, 'Azerishiq' JSC	Regulatory body, Ministry of Energy,		2017-2020

№	The name of action	Main executioner	Other executioners	Result indicators	Implementation period
			Ministry of Economics		
3.3. Use of optimal mechanisms for improving efficiency in production					
3.3.1.	Contemplating optimal prices for reconciliation of interests of consumers and producers	Tariff Council	Regulatory body, Ministry of Economics	Export of natural gas saved due to improvement of efficiency in electricity consumption, to Europe through the TAP/TANAP projects	2017-2020
3.3.2.	Discussing models on electricity use	Tariff Council	Regulatory body, Ministry of Energy, Ministry of Economics		2017
3.3.3	Review of forecasts on consumer consumption	Tariff Council	Regulatory body, Ministry of Energy, Ministry of Economics		2017
3.4. Developing effective regulatory and auction mechanisms					
3.4.1.	Improvement of the primary regulatory law and other relevant documents in the electroenergetics sector	Ministry of Energy	Ministry of Justice, Ministry of Economics, Regulatory body	Development of electric energy sector by using "Development of 'State-Private-Partnership' (SPP) mechanisms	2017
3.4.2.	Creation of the wholesale market	Regulatory body	Ministry of Energy, Ministry of Economics		2017-2020
3.4.3.	Prioritization of production assets for realisation of privatization	Regulatory body	State Committee on Property Issues, Ministry of Energy, Ministry of Economics		2017-2020
3.4.4.	Development of 'State-Private-Partnership' (SPP) mechanisms	Regulatory body	State Committee on Property Issues, Ministry of Energy, Ministry of Economics		2017-2020
Strategic objective 4: Establishment of efficient and effective natural gas distribution infrastructure					
4.1. Minimizing all types of losses related to natural gas distribution					
4.1.1.	Developing a plan on comprehensive assessment and development of the existing network	SOCAR	Ministry of Energy, Ministry of Economics, Regulatory body	Reduction of technical losses during gas distribution down to 8% in all the regions Export of natural gas saved due to	2017
4.1.2.	Announcing a tender for construction of gas distribution lines	SOCAR	Ministry of Energy, Ministry of Economics, Regulatory body		2017-2020
4.1.3.	Identifying key performance indicators (KPI) for construction works	SOCAR	Ministry of Energy, Ministry of Economics, Regulatory body		2017

№	The name of action	Main executioner	Other executioners	Result indicators	Implementation period
4.1.4.	Maximizing debt collection and deliberating charging fines for illegal natural gas consumption	Ministry of Energy	SOCAR	improvement of efficiency, to Europe through the TAP/TANAP projects	2017-2018
4.1.5.	Supplying remote settlements, whose gasification is technically and economically not feasible, with energy by using alternative energy sources	Ministry of Energy	Ministry of Economics, SOCAR		2017-2018
Strategic objective 5: Establishment of high quality water management structure					
5.1. Expanding the use of drinking water and sewerage infrastructure					
5.1.1.	Implementing assessments in areas lacking infrastructure	'Azersu' JSC	Ministry of Economics, Regulatory body	Reduction of the commercial loss rate from 20.0% at least to 14.0% Increase of waste water collection level from 46% to 65% Reduction of the share of registered consumers who do not have meters installed from 26% to 5%	2017
5.1.2.	Increasing the metering level and its completion for the non-residential group.	'Azersu' JSC	Ministry of Economics, Regulatory body		2017-2018
5.1.3.	The announcement of tenders for infrastructure investments	'Azersu' JSC	Ministry of Economics, Regulatory body		2017-2020
Strategic objective 6: Reducing losses and ensuring efficiency					
6.1. Minimizing losses, optimizing water tariffs, and ensuring efficiency in water consumption by attracting investments for establishing the required infrastructure					
6.1.1.	Conducting a thorough evaluation of the network to minimize losses	'Azersu' JSC	Ministry of Economics, Regulatory body	Reduction of distribution losses from 31% to 25%	2017-2020
6.1.2.	Taking measures to ensure the efficient use of water resources	Cabinet of Ministers	Ministry of Economics, Tariff Council, Ministry of Ecology and Natural Resources, Ministry of Emergency Situations,		2017

№	The name of action	Main executioner	Other executioners	Result indicators	Implementation period
			'Irrigation and Water Management' JSC, 'Azersu' JSC, Regulatory body		
6.1.3.	A review of the optimal tariff levels for water and sewerage services.	Tariff Council	Ministry of Economics, 'Azersu' JSC		2017-2020
6.1.4.	Development of social programs on water and sewerage services for specific consumer groups	Ministry of Economics	Ministry of Labour and Social Protection of Population, Tariff Council, Regulatory body		2017-2020
Strategic objective 7: Development of the sustainable and reliable heating supply infrastructure					
7.1. Expansion of optimal heating and hot water supply in the country with consideration of geographical, social and economic characteristics					
7.1.1.	Establishment, recovery and reconstruction of heating sources	'Azeristiliktechizat' JSC	Ministry of Energy, Ministry of Economics, SAHC, Regulatory body	Considering the efficiency, the produced amount of thermal energy will be increased amount of 427 000 Gcal, comparing to 2015 The scope of the heating supply will expand and the number of residential buildings provided with heating will reach to 5689 by increase 50,4% Improvement of heating supply by providing the overhaul of the	2017-2020
7.1.2.	Usage of Alternative and Renewable Energy Sources	'Azeristiliktechizat' JSC	Ministry of Energy, Ministry of Economics, ABOEM		2017-2020
7.1.3.	Improvement of energy efficiency and energy saving	'Azeristiliktechizat' JSC	Ministry of Energy, Ministry of Economics, Regulatory Body		2017-2018
7.1.4.	Execution of specific measures for protection of environment during usage of thermal energy	'Azeristiliktechizat' JSC	Ministry of Ecology and Natural Resources, Ministry of Energy		2017-2020
7.1.5.	Identification of utilization capacity of energy sources for heating supply.	Ministry of Energy	Ministry of Economics, Regulatory Body, 'Azeristiliktechizat' JSC		2017-2018

№	The name of action	Main executioner	Other executioners	Result indicators	Implementation period
				heating supply systems in about 550 residential buildings with technical malfunctions	
7.2. Improvement of the normative-legal framework, implementing institutional measures and optimizing heating tariffs					
7.2.1.	The improvement of the normative legal base in the field of heating supply	Ministry of Energy	Ministry of Economics, Regulatory Body, 'Azeristiliktechizat' JSC	Providing the reliable and stable power supply infrastructure	2017
7.2.2.	Institutional measures in the heating supply sector	Ministry of Energy	Ministry of Economics, Regulatory Body, 'Azeristiliktechizat' JSC		2017-2020
7.2.3.	The review of the improvement of tariffs for heating supply	Tariff Council	Ministry of Economics, Regulatory Body, 'Azeristiliktechizat' JSC		2017-2020
7.3. Assessment and elimination of the current problems in the centralised heating system, ensuring efficiency of the system					
7.3.1.	Provision of the efficiency in the heating supply system	'Azeristiliktechizat' JSC	Ministry of Energy, Ministry of Economics, Regulatory Body	To increase the heating household income total of 2,1 million AZN	2017-2020
7.3.2.	The optimization of limits considered for budgetary organization on heating services	Ministry of Finance	Ministry of Energy, Ministry of Economics, Regulatory Body, 'Azeristiliktechizat' JSC		2017-2020
7.3.3.	Liberalization of tariffs for hot water service	Cabinet of Ministers	Ministry of Economics, Tariff Council, 'Azeristiliktechizat' JSC		2017
7.3.4.	A review of the price of natural gas used for the generation of heating power	Cabinet of Ministers	Ministry of Economics, Tariff Council, 'Azeristiliktechizat' JSC, SOCAR		2017

Annex 8: Technical Assistance Projects in Azerbaijan Relating to Energy Efficiency

Donor/Initiative	Project Title	Description
European Union	"*ENPI - INOGATE Technical Secretariat and integrated programme in support of the Baku Initiative and the Eastern Partnership energy objectives*" (completed)	The purpose of this project was to deliver technical assistance in the following fields: • convergence of energy markets on the basis of the EU internal energy market principles; • efficiency of the energy supply infrastructures, in particular gas and electricity infrastructures; • energy institutional governance in relation to sustainable energy and in particular to the use of RES and EE measures; and • energy economic planning through enhanced use and harmonisation of energy statistics in line with European standards.
European Union	"*Energy cooperation between the EU, the littoral States of the Black and the Caspian Seas and their neighbouring countries*" (completed)	The objective of this project was to enhance integration of the energy markets of participating countries with the EU energy market and to create transparent energy markets, capable of attracting investment as well as of improving security of energy supply.
European Union	"*Energy Saving Initiative in the building Sector in the Eastern European and Central Asian Countries (ESIb)*"	The project, which was implemented under the EU INOGATE umbrella, provided technical assistance and support relating to the promotion of EE measures in buildings in several countries, including Azerbaijan (other beneficiaries were Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine and Uzbekistan).
European Union	"*Support in development of the Road Map for development of centralised heat supply in Azerbaijan till 2020*" (completed)	The project's aim was to assist the district heating company in Azerbaijan to develop the Road Map 2020 for the establishment of a more efficient district heating system in the country, since district heating can play a significant role in a future energy system, by increasing use of renewable energy and enhancing efficiency of energy supply. Thus, this project's objective was to bridge the gap and cover the need for bringing the existing strategy up to date and provide insight into the future of this sector to 2020 for a more efficient system and increased comfort levels for the country's citizens.
European Union	"*Energy support Programme – Azerbaijan*"	This technical assistance project focused on the provision of EC budget support to the Azerbaijani Energy Reform Support Programme (ERSP). Its role was, among other things, to furnish technical advisory support on a number of energy issues to the Government of Azerbaijan, with particular focus on the Ministries involved in the ERSP such as the Ministry of Energy and the Ministry of Finance.
European Bank of Reconstruction and Development	"*Modernization of AzDRES TPP*"	Pursuant to this program, EBRD contributed to the preparation of a €165 million investment facility to upgrade AzDRES TPP (the country's largest thermal power station), for which the bank has provided in 2006 a loan of €147 million. This project also applied for carbon credits under the CDM.
European Bank of Reconstruction and Development/European Investment Bank	"*EBRD-EIB Multilateral Carbon Credit Fund (MCCF) in Azerbaijan*"	The Fund was set up in 2009 in order to promote EE investments in the Azeri power generation sector in co-operation with Azerenerji JSC, the dominant electricity player in the local electricity market. For this purpose, Azerenerji and Stichting Carbon Purchase Intermediary, a special purpose vehicle created to acquire carbon credits for the participants in the MCCF, have signed an

Donor/Initiative	Project Title	Description
		emission reduction purchase agreement for the sale and purchase of certified emission reductions to be generated by the rehabilitation of the Azerbaijan Thermal Power Plant in Mingäçevir, in north-western Azerbaijan.
European Bank of Reconstruction and Development	"*Caucasus Energy Efficiency Program*"	As part of this program, EBRD made available US$ 3 million loan to Muganbank, a local bank, to finance EE projects in the country. The facility is provided for on-lending to qualifying corporate and individual customers in order to fund, among other things, the acquisition and installation of more energy efficient equipment, appliances and materials, including modern production facilities, double-glazed windows, insulation, gas boilers, solar water heaters and rooftop solar panels.
European Bank of Reconstruction and Development	"*Sustainable Energy Financing Facility in Azerbaijan*"	Under this programme, which was launched in 2013, EBRD has set up a dedicated EE credit facility for on-lending through local banks to support EE projects in the country. As part of the package of this credit line free-of-charge technical assistance on energy audits and training is provided.
World Bank	*"Azerbaijan - Power Transmission Project."*	The primary goal of the project was to improve the efficiency of the power transmission operation in Azerbaijan through technical and institutional strengthening of the generation and transmission utility.
Asian Development Bank	*"Azerbaijan: Preparing an Enabling Environment for Private Sector Participation in the Power Sector"*	The project's objective is to provide best practice for private sector participation in the power sector and to assess the potential application and benefits specific to Azerbaijan's power sector. The outputs to be completed under this project include: (i) a road map for private sector participation in Azerbaijan's power sector; (ii) a report recommending policy, legal, and regulatory changes required to create enabling environment; and (iii) a project structure and development plan for an example private sector participation project(s).
Asian Development Bank	*"Azerbaijan: Preparing a Power Sector Financial Recovery Plan" (to commence very soon)*	This project purports: (i) to calculate the real cost of electricity supply (power generation, transmission, and distribution); (ii) to design a new tariff structure for power generation, transmission, and distribution, with differentiating tariffs for different customers and different generation sources (hydro, solar, water, gas) in existence and in development, and to replace the current single tariff for all customers; (iii) to develop a financial recovery road map for gradual increase in tariff, to achieve a full cost recovery level by 2022; and (iv) to undertake a public information campaign on tariff reform, case studies of good practices in other countries, and institutional strengthening.
Asian Development Bank	"*Technical Assistance in Preparing the Power Transmission Enhancement Project*" (completed)	This project's goal was to help the Government of Azerbaijan in preparing the Power Transmission Enhancement Project that would be suitable for ADB financing. The assignment involved financial and economic analysis of the investment project, which constructed a double circuit 220 kV transmission line with a total length of 280 km between the "Mingechaur" hydro power plant and the 500/330/220 kV "Absheron" substation.
Republic of Norway	"*Sustainable Buildings in*	In 2011, SAARES in a partnership with Norsk Energy (Norway) started a project "Sustainable

Donor/Initiative	Project Title	Description
	Azerbaijan; Technical Assistance and Capacity Building" (completed)	buildings in Azerbaijan: Technical Assistance and Capacity Building" which will be implemented in the period of 2011-2014. The project aims at providing technical assistance and capacity building trainings on energy audit, certification and management of buildings, utilisation of renewables in public and private buildings and provide support for development of the new regulations and norms of EE and renewable energy. Within the last few years SAARES has conducted extensive research into renewable energy potential of Azerbaijan. For implementation of pilot retrofitting projects in May 2013 SAARES signed an agreement with the Black Sea Economic Cooperation Hellenic Development Fund for supply of energy efficient equipment. The purpose of this program, which was implemented in collaboration with the State Agency on Alternative and Renewable Energy Sources of Azerbaijan, was to supply technical assistance and capacity building on: • energy auditing; • certification and management of buildings; • utilisation of renewable energy in buildings; and • support on development of new regulations and norms for EE and RES in buildings.
Republic of Norway	"*Clean Development Mechanism (CDM) Program of Activities for reduction of greenhouse gas emissions in the building sector in Azerbaijan*"	The objective of this study was to identify specific solutions for establishing a CDM Programme of Activities (PoA) in educational buildings of Azerbaijan, including: • to increase the awareness within the Designated National Authorities about application of CDM PoA in the building sector; • to identify main barriers; • to raise awareness among local consultants on supporting development and implementation of suitable projects; • to prepare recommendations for establishing the framework for a CDM PoA in the building sector and propose the methodologies for practical application of CDM PoA in Azerbaijan.

Annex 9: Support Mechanisms for Improving Energy Efficiency in Selected EU Member States

Following a request by a number of stakeholders, in this Annex are provided best practice examples of policy initiatives that have been successfully initiated by certain EU Member States regarding the promotion of EE investment in their national industry. In particular, the focus will be centred on the relevant specific measures that have been adopted for this purpose by the Czech Republic, Greece and Ireland and also briefly expound on the sources of funding of these measures' implementation. In addition to these countries, best practice policy initiatives for Germany, Denmark, Romania, Croatia, Serbia and FYROM are provided in the **Component 1 "EU policy framework and measures for EE in industry"** report.

THE CASE OF CZECH REPUBLIC

Measures

For the last 10 years, the promotion of EE improvements in the Czech industry has been primarily premised on financial measures that are implemented through two major programs:

- the Operational Program Industry and Enterprise 2007-2013, which has ended; and
- the Operational Program Enterprise and Innovation for Competitiveness 2014-2020 (OP EIK)[103], which is at present being applied.

The OP EIK program has four priority axes, one of which focuses on the shift to an energy-efficient, low-carbon economy consisting primarily of increasing the EE in industry and using renewable energy sources. The program's target groups encompass all industrial business entities (small, medium-sized and, where appropriate, large enterprises) and provides for two basic types of support measures: a) increasing energy performance in buildings and b) increasing EE in technology. The measures have a service life of at least ten years.

Specifically, the EE activities to be supported under the OP EIK program for the period 2014-2020 include:

- the modernization or replacement of existing energy production installations for internal use, leading to an increase their efficiency;
- the introduction and modernisation of measurement and control systems;
- the modernisation, reconstruction and loss reduction in electricity and heat distribution systems in buildings and production plants;
- the implementation of measures to improve energy performance of buildings in the business sector;
- the re-use of waste energy in production processes;
- the improvements in energy performance and EE in production and technological processes,
- the installation of renewable energy sources for an industrial undertaking's own consumption; and
- the installation of cogeneration units with maximum use of electricity and thermal energy.

The aforementioned measures may be carried out either separately or as a set of combined

[103]This program follows the previous Operational Program Industry and Enterprise.

measures based on the recommendations made following the conduct of an energy audit.

In addition to the OP EIK program since the beginning of 2017 it is possible to fund projects for reducing industrial energy intensity by using a new financial instrument in the form of the so-called ENERG Program. This is a pilot financial instrument that is financed from the proceeds of emission allowance sales and which purports to support the realization of energy savings in final consumption in the SME sector (including small- and medium-sized industrial companies)[104]. Under the Program soft loans are made available for the implementation of projects reducing the energy intensity of SMEs operating in the City of Prague. The objective of the program is to facilitate access by SMEs in the City of Prague to funding for projects aimed at reducing the energy intensity of their activities in order to achieve energy savings in final consumption, thereby contributing to increasing their competitiveness in line with the European Union's environmental policy for sustainable development.

Moreover, the Ministry of Industry and Trade has been developing voluntary agreements between industrial operators as an alternative measure to grant programs and financial instruments.

Funding

The measures outlined above are financed by using the conventional subsidy scheme, which has already been established by the Government of the Czech Republic for providing grants and co-financing for EE projects, as well as by financial engineering instruments. According to original estimates, the OP EIK program's budget during the 2014-2020 period is expected to be funded with a total of CZK 20 billion, which will come from the State budget and from the EU Operational Program for Competitiveness and Cohesion 2014-2020.

THE CASE OF GREECE

Measures

The initiatives that have been introduced by the Greek Government in order to improve EE in industry have been grounded on several interlinked support schemes. One of them is the "*Relocation of enterprises to industrial business zones and business parks*" program, whose purpose is to enhance competitiveness through economies of scale by transferring industrial facilities in designated areas, so that they can operate in organised premises and –in parallel – to eliminate the nuisance caused and the problems faced by manufacturing firms that are located within the urban fabric. Allied to that, the program aims at managing environmental resources in a sustainable way, strengthening entrepreneurship and support structures and at streamlining the industrial companies' infrastructure through the reduction in the intensity of their energy use.

Participation in this program is open to existing manufacturing enterprises[105], which started operating before 1 January 2009 and have a turnover of more than EUR 30,000 in the last fiscal year or more than EUR 100,000 cumulatively over the last three fiscal years. The key measures that could be financed include energy saving interventions[106] as well as the procurement costs

[104]This program is solely applicable to SMEs operating in the City of Prague given that – pursuant to the conditions of the European Structural and Investment Funds - support is provided in geographical terms to businesses throughout the Czech Republic except Prague.

[105]For the purposes of this program, an "existing manufacturing enterprise" is defined any industrial firm having completed at least three years of operation.

[106]e.g. installation of the building envelope insulation, heat insulated window frames, energy class A air-conditioning units, energy saving light bulbs, high-efficiency burners and boilers, exhaust heat recovery, etc.

for the installation of equipment for power generation from RES for a facility's own energy consumption and/or the substitution of fuels with natural gas or LPG. More specifically, funding can be obtained under this program for the following EE investments:

- high-efficiency burners and boilers;
- equipment to substitute oil with natural gas or LPG;
- equipment for exhaust heat recovery from boilers, air discharged from ventilation units, cooler condensers, etc.;
- equipment to substitute electricity or other conventional fuels with natural gas or LPG;
- equipment to install heat and power cogeneration systems;
- equipment to install systems for electricity generation from RES;
- equipment to install combined heating and cooling systems that use solar energy and biomass for own consumption purposes;
- equipment to install biomass combustion system for heating purposes;
- equipment for building energy management systems (BEMS).

Another pillar of the Greek EE policy in industry is the "*Innovative Entrepreneurship, Supply Chain, Food, Beverages*" program whose focus centres on supporting investments that encourage technological innovation and/or improve the competitiveness of products and service companies; in this respect, special attention is paid to the promotion of investments by secondary processing food industries, particularly those that are active in organic products or products with a designation of origin or local products Eligible to join the program are very small-, small-and medium-sized enterprises pursuant to Commission Recommendation 2003/361/EC, or Annex I to Regulation EC No 800/2008 (L 214/3/09.08.2008), which are entitled to have access to soft loans with very favourable borrowing terms[107]. Financing is made available for the purchase and installation of new modern machinery and other equipment and facilities, especially environment-friendly ones, which can effectively reduce energy consumption and are equipped with modern process-automation and quality control technologies.

Another significant measure is the "*Green Enterprise*" program, which is directed at creating the conditions for integrating environmental concerns into a company's business operation in order to make interventions in production chain processes. This program's specific goals are:

- to reduce the energy footprint and particularly the environmental footprint of manufacturing enterprises,
- to develop and market 'green' products and services;
- to improve the environmental and social profile of businesses; and
- to reduce the lack of social acceptance for manufacturing activity.

Existing enterprises active in the Greek manufacturing and ancillary services market are entitled to take part in the "Green Enterprise" program. Financing is especially provided for the funding of energy and water saving recovery interventions, such as:

- the development and implementation of systems for the recovery/saving and/or substitution of conventional energy and water in the production process;
- the making of bioclimatic and small-scale building upgrades to save energy/heat/water; and

[107]Qualified companies can borrow a loan amount from EUR 50,000 to EUR 500,000. The loan duration can be 5-10 years with a possibility of an interest-bearing grace period up to two years, while the annual interest rate is stable during the entire period of loan and equal to 4.53%.

- the installation of small-scale RES systems for a facility's own consumption.

Moreover, four other initiatives specifically target the enhancement of EE in the national industrial sector. The first one is the "*Incentives for obligatory implementation of Energy Management Systems*" program, which is geared at promoting the implementation of Energy Management Systems in all industries that are not included in Energy Services Directive. As in Greece, most industrial companies have already installed Environment Management Systems in their facilities, such as ISO 14000, EMAS, internal EMS and HACCP, this measure focuses on the direct extension of these systems in order to include the energy management, too. All industrial operators are qualified to participate in this program and the Greek Government plans to subsidize 1,000 industrial installations with €10,000 per industry.

The second one is the "*Support for improving energy efficiency in manufacturing enterprises" program*", whose aims are to improve the EE of manufacturing enterprises, particularly of SMEs, to decrease their energy costs and boost their competitiveness, and also to reduce the impact of climate change resulting from the excessive use of energy. The types of support contemplated include capital grants to implement energy saving investments, interest subsidies on loans, guarantees to obtain bank financing, or a combination of the above. The EE measures that can be financed under the umbrella of this program can be summed up as follows:

- to conduct energy audits and benchmarking;
- to streamlining equipment, to upgrade industrial facilities and/or to install new energy efficient technologies;
- to provide education and training of staff on EE issues;
- to implement market control standards and mechanisms;
- to fund the certification, materials quality control, rules and procedures and/or calibration of laboratories;
- to assist in the certification of experts and the setting-up of energy auditors' registers;
- to finance the development, standardization, design, demonstration, testing and promotion of new equipment and new materials;
- to furnish education and training of civil servants who will be handling market control, standardization issues, etc; and
- to support ESCOs in implementing energy saving investments.

This program also places particular emphasis on the *ex-post* evaluation and assessment of the results of any action financed, as well as on the competitive standing and energy saving performance of any applied intervention as well as on the periodic *ex-post* evaluation of the measures implemented and the formulation of proposals for their improvement.

The third relevant initiative relates to the "*Promotion of voluntary agreements in the industrial sector*" program, which is geared at establishing voluntary arrangements between industrial operators based on existing EU projects with the view to installing EE upgrades and to reducing energy consumption of the participating installations. The program is planned to be implemented in all industries that are not included in Emission Trading Scheme and any proposed EE investments may cover some or all of the production systems. Industrial companies wishing to become partners to any such voluntary agreement will receive financial aid, advice and technical assistance from national contact points, which are scheduled to be situated in various regions of the country. This program requires that any voluntary agreement between industrial operators must be complemented with a detailed Action Plan, which will enumerate the EE goals to be achieved, the approach of selecting the parties to the scheme, the incentives to be used (except

of subsidies) and the particular EE measures to be implemented along with the associated benefits in reducing the participating facilities' energy consumption.

Last but not least, the "*Energy upgrading of existing buildings through third-party financing arrangements, energy performance contracting and public and private joint ventures - Industry Sector*" intends to set up an institutional framework for third-party financing and for operational matters pertaining to ESCOs and well to regulate existing public/private partnerships and joint ventures, focusing especially on the industrial market.

Finally, in April 2017, the Ministry of Environment and Energy of Greece has officially published the *Regulation for the Operation of the Energy Efficiency Obligation Scheme*[108], under which energy distributors and/or retail energy sales companies are obliged to achieve a cumulative end-use energy savings target by 2020 in order to contribute to the achievement of national EE targets. Pursuant to this piece of legislation, the list of obligated parties includes electricity, oil and natural gas providers and the achievement of the stipulated targets can be realized with the implementation of EE measures either by the obligated parties or by third parties - to whom the implementation of such measures can be outsourced - on residential buildings, the tertiary sector and industrial facilities and infrastructure**.** The measures include actions for the improvement of users' behaviour and technical interventions, such as insulation, higher efficiency equipment, etc.

Funding

Financial support in the form of grants and soft loans are provided by the State budget through the Ministry of Development, Competitiveness, Infrastructure, Transport and Communications and the Ministry of Finance. Greece also benefits from the funds allocated to EU Member States for EE projects under the Operational Program for Competitiveness and Cohesion 2014-2020. Nonetheless, national funding in the form of investment grants has at present substantially decreased owing to the current economic recession, which has also resulted in a related considerable reduction in service and industrial output[109]. The present limited investments in EE have also adversely affected the national level of public funding to which the country is entitled under EU programs, which has further increased the obstacles for implementing EE upgrades in the domestic industry.

THE CASE OF IRELAND

Measures

The Government of the Republic of Ireland has put in place an array of different support mechanisms to facilitate EE improvements in the national industry, all of which are implemented under the guidance of the national Sustainable Energy Authority of Ireland (SEAI)[110]. One of these mechanisms relates to the so-called "Energy Audit Scheme" that has established the framework for industrial companies to abide by the energy audit requirements of Article 8 of the EE Directive. In particular, this scheme sets out the relevant rules for compliance, including the standards of training and qualification for energy auditors to register for the scheme, extensive guidance for

[108] See Official Gazette 1242B/11-4-2017.

[109] On the other hand, though, the decrease in industrial production has increased the level of energy savings.

[110] SEAI was set up as the country's national energy authority under the Sustainable Energy Act 2002. This institution's mission is to play a leading role in transforming Ireland into a society based on sustainable energy structures, technologies and practices. To this end, SEAI delivers a range of programs efficiently and effectively, while engaging and motivating a wide range of stakeholders and showing continuing flexibility and innovation in all activities.

companies on quality audit standards and interpretation of the legislation as appropriate. Moreover, SEAI has developed and published an Energy Audit Handbook, which is a comprehensive best practice manual that furnishes additional support to business and industrial operators that intend to undertake energy audits. On top of that, SEAI has developed an interactive SME guide, which targets smaller industrial companies that wish to implement EE and energy management measures.

Another important initiative involves the "*Accelerated Capital Allowance for Energy Efficiency Equipment (ACA)*" Program, which was introduced in 2008 for the purpose of improving the EE of Irish companies including industrial operators) by encouraging them to purchase energy saving technologies and equipment. This program, which was introduced under the 2008 Finance Act[111], provides a tax incentive for companies who invest in highly efficient equipment to avail of tax breaks by allowing such businesses to deduct the full cost of any such equipment from taxable profits in the year of purchase rather than over the usual wear-and-tear eight-year period. The scheme has expanded from 3 categories and 5 technologies in 2008 to 52 technologies with over 17,400 products currently listed. ACA eligible products are listed on SEAI's Triple E (Energy Efficient Equipment) Register which provides a benchmark register of best in class energy efficient products[112]. Both the ACA and Triple E are managed by SEAI.

Ireland has also established the Large Industry Energy Network (LIEN), which is a voluntary grouping of large industrial operators that collaborate - with the assistance of SEAI - to develop and maintain robust energy management practices. The members of LIEN provide annual data reports to SEAI on their energy use and on the actions taken to reduce their energy consumption. The network now comprises 192 of Ireland's largest energy users that account for 19% of the national total primary energy requirement (TPER) and 55% of the domestic industrial TPER. LIEN's work focuses, *inter alia*, on the sharing of best practice and case studies and the organization of information seminars in order to build capacity and exchange new learning and approaches for reducing energy consumption.

A related initiative is the "*Energy Agreements' Program*" that is managed by SEAI and which is a sub-set of 80 LIEN companies, who have agreed to work towards implementing ISO 50001. In exchange for their participation in this program, these companies receive tailored-made support from SEAI in the form of assigning an Agreements' Support Manager who

- provides both general and technical advice;
- assesses any gaps in order to achieve EN 16001;
- identifies special investigations to reveal opportunities for energy savings;
- organizes targeted workshops, training and networking events; and
- provides EN 16001 implementation support.

As regards industrial SMEs, SEAI has engaged with over 3,000 SMEs to provide them with strategic support, training funding, and advice for energy projects; in this connection, particular

[111]The scheme was at first implemented for a trial period of three years and in 2011 it was extended to 31 December 2014; it was then again reviewed in 2014 and was successfully extended up to the end of 2017.
[112]In addition to the ACA, this register is used to meet the requirements of the EU Energy Efficient Public Procurement) Regulations (S.I. No. 151 of 2011), which oblige public bodies, when purchasing or leasing categories of products that are listed on the Triple E Register, to procure only products that meet SEAI's EE criteria.

attention is given to training and best practice support[113]. In addition, SEAI has prepared an interactive SME guide in the form of a toolkit for the smaller companies that intend to follow the EE and energy management path. Also, small commercial energy users can avail of SEAIs best practice material. There is further a series of practical guides and case studies available on the SEAI website and SEAI provides a range of applied training courses for a diverse array of business needs relating to EE topics.

Lastly, the Department of Communications, Climate Action and Environment has developed - with the co-operation of SEAI - a *National Energy Services Framework* to help stimulate the energy-efficiency market in the non-residential sector. This initiative sets out the roadmap for EE investments to follow and specifically how energy performance contracting can be incorporated into a company's operations. More specifically, this Framework provides for public sector and commercial operators a standard and structured approach, which is supplemented with a suite of tools, including comprehensive guidance documents, templates, model contracts, monitoring and verification requirements to support the efficient procurement and delivery of EE projects on the ground. For this purpose, SEAI has further set up a Project Assistance Grant support scheme to assist with the preparation of all aspects of a business case for EPC-based contracting by providing any requisite legal, financial and technical advice.

Funding

Financial assistance for EE investments in the industrial sector is funded by Ireland's EU Structural Funds Program that is co-funded by the Irish Government and the European Union.

[113]More specifically, three days training over a three-month period with some mentoring support, is available free of charge to SMEs. For companies at the smaller end which energy bills less than €100,000 the time requirement is reduced further to three half days.

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