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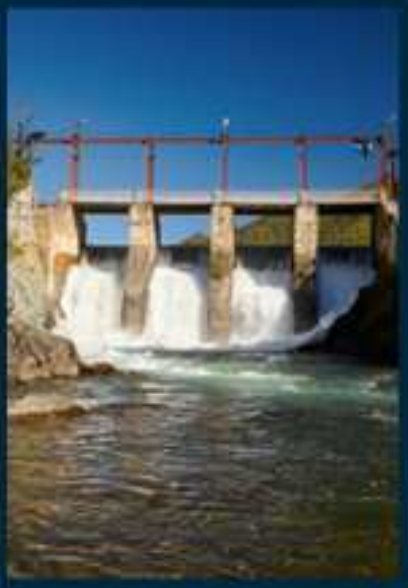



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Introduction

Welcome to the 39th edition of the EUCERS Newsletter.

This month's general article section includes a piece by Androulla Kaminara, Principal Adviser in the Directorate General for Development and Cooperation – EuropeAid - of the European Commission, who writes on the EU's initiatives for developing countries regarding energy projects. In our second article, Philipp Offenberg, Research Associate at EUCERS and at Jacques Delors Institut – Berlin (Notre Europe), deals with the difficulties of the German Energiewende in light of the need for greater regional coherence across Europe. Finally, Kalina Damianova, current Research Fellow at EUCERS, outlines Bulgaria's energy potentials in the Black Sea in the wake of the Ukrainian Crisis.

In our Activities section, we provide you with some background information for our upcoming Energy Talks workshop on China's "energy hunger".

We are most happy to announce the upcoming fifth roundtable discussion as part of our EUCERS/ISD/KAS - Energy Talks Series. The event will take place on November 6, at King's College London on the topic of China's "energy hunger" and its global implications.

In EUCERS on the Road we continue to inform you about conference participation and presentations of our members, as well as latest publications.

I hope you enjoy the newsletter!

Justus Andreas
Research Associate and Newsletter Editor at EUCERS, King's College London

In this Month's Edition:

ARTICLES

Which are the European Union initiatives for developing countries that focus on energy?

Androulla Kaminara

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As the new year is quickly approaching it is good to look at the challenges that it has in store for us. For the European Union, 2015 has been dedicated to the European Year of Development (EYD2015)[1] - a unique opportunity to engage with EU citizens and to show case the work that is being done by the European Commission, Member States and other European actors towards eradicating poverty worldwide[2]. The importance of this decision can be understood if one considers that for the last 30 years that the EU has been dedicating a year to the promotion of a policy area it is the first time that it has been dedicated to an external policy area.

The EU is the biggest donor of the official development assistance (ODA) in the world. However, in this article, I will focus on just one sector of the work that is being done by the EU to eradicate poverty worldwide - that of the energy sector - as this is crucial for development. Energy is the golden thread that connects economic growth, increased social equity, and an environment that allows the world to thrive. Addressing the lack of access to clean, reliable and affordable energy services for billions of people has become one of the most critical development challenges in the fight against poverty.

Lets first of all look at the magnitude of the challenge. Worldwide, about 1.2 billion people have no access to electricity and an additional billion only have access to unreliable electricity networks. More than 2.6 billion people rely on solid fuels, such as traditional biomass and coal, for cooking and heating. A well-performing energy system that improves efficient access to modern forms of energy would strengthen the opportunities for the poorest people on the planet to escape the worst impacts of poverty. Sustainable energy is central to providing opportunities for inclusive, equitable and environmentally friendly economic growth, creating new job opportunities and contributing to poverty eradication while moving towards low-carbon and resource-efficient energy models.

The magnitude of the challenges means that actions and initiatives at all levels are needed: international, regional, national, local.

At a global level, the United Nations General Assembly unanimously declared the decade 2014-2024 as the Decade of Sustainable Energy for All (SE4ALL) [3], underscoring the importance of energy issues for sustainable development and for the elaboration of the post-2015 development agenda.

Sustainable energy provides new opportunities for growth. It enables businesses to grow, generates jobs, and creates new markets. Children can study after dark. Clinics can store life-saving vaccines. Countries can grow more resilient, with competitive economies. With sustainable energy, countries can build the clean energy economies of the future. Transforming the world's energy systems will also lead to new multi-trillion-dollar investment opportunities.

Sustainable energy for all is an investment in our collective future. Universal energy access, increasing the use of renewable energy, improved energy efficiency and addressing the nexus between energy and health, women, food, water and other development issues are at the heart of all countries' core interest, which must be deeply integrated in the development agenda.

At the European Union level, for already a decade, the fight against energy poverty has been a driver of the EU development agenda. In 2004, the EU Energy Initiative was created as a collaborative platform between the European Commission and its Member States in order to join forces in the fight against energy poverty. In 2007, it was made one of the cornerstones of the Joint EU-Africa Partnership and integrated energy issues in the programming of aid. In the last programming cycle (2007-2013)[4], the European Commission contributed more than €2 billion to energy, of which a large part was dedicated to the African continent because of its massive needs in this area.

In April 2012, European Commission President Barroso committed to providing access to sustainable energy services for 500 million people by 2030 in developing countries. As a step towards this objective, for the period 2014-2020 around

[1] http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P7-TA-2014-0269+0+DOC+XML+V0//EN

[2] http://ec.europa.eu/europeaid/european-year-development-2015_en

[3] http://www.se4all.org/decade/

[4] the European Commission development cooperation financial instruments are decided on a 7 year basis

€3.3 billion will be dedicated to supporting sustainable energy in the EU's partner countries around the globe, through bilateral and regional cooperation. This is expected to leverage between €15 and €30 billion in loans and equity investment to fill gaps in energy infrastructure and power businesses, schools, homes and hospitals.

Following the adoption of the policy document 'Agenda for Change' [5] and the strong commitment to support the goals of the Sustainable Energy for All initiative, the EU developed a comprehensive set of actions and rolled out more than €600 million - over the last two years alone to end energy poverty. Now efforts will be further reinforced together with about 30 countries that have chosen energy as a focal sector for their bilateral cooperation with the EU.

As a strong legacy of commissioner Piebalgs and his role in the advisory Board of se4all the access to electricity is and will be a fundamental poverty focussed aspect on which the Commission is studying innovative approach (ElectriFI) close to market functioning involving massively the private sector and Development financial institution in a large scale.

Particularly with Africa, the EU has signed an Energy Partnership (AEEP)[6] which provides a long-term framework for a more structured political dialogue and cooperation on energy issues of strategic importance to Africa and Europe, in particular energy security and energy access. Through the Partnership, Africa and Europe are developing a shared vision and a common approach to address today's rapidly changing geopolitical, economic and ecological reality. Together, the EU and Africa will address the energy challenges of the 21century. As part of this Energy Partnership, a high level meeting took place on 11-13 February 2014 in Addis Ababa, Ethiopia, on the theme "Taking the Next Step: Africa and the EU are tackling energy challenges together." The meeting which was jointly hosted by the Ethiopian Government, the AEEP Co-Chairs at that time the Governments of Austria, Germany, Mauritius and the African Union,: over 450 key stakeholders were present.

The challenges are numerous. Developing energy markets still face many barriers to sustainable energy services. Lack of technical qualification of the workforce undermines the effectiveness of public authorities and power companies. Poor payment recovery performance and non-cost-reflective tariffs can jeopardise the financial stability of utility companies, and a small customer base makes it difficult to assemble the necessary funds for rapid expansion of the electricity grid.

This is why the EU is considering to adopt a comprehensive and long term approach that will be discussed with all stakeholders. The aim is creating an enabling environment to allow for transparency, policy and regulatory reforms, cost-recovery and reinvestment. At the same time it is necessary to catalyse investments through innovative financing schemes that use EU grants and loans in a strategic way to make large energy infrastructure projects bankable, through our blending instruments. Change will happen only through combined efforts, thought bilateral and multilateral dialogue and a strong regional cooperation with partner countries.

More recently, in September 2014, at the margins of the UNGA in New York, the EU built further on energy commitments by signing Joint Declarations with five partner countries a set of new initiatives has been taken[7]:

- *EU* Commissioner Piebalgs and President Barroso, signed joint declarations to reinforce energy cooperation with five African countries: Cabo Verde, Côte d'Ivoire, Liberia, Togo and Rwanda. These agreements will increase access to sustainable energy sources, even in rural areas, where the needs are the greatest. The agreements will also aim to strengthen the political ties between energy policy commitments of signatory countries and the financial support by the EU and other co-signing donors. The following European countries will equally co-sign the joint declarations:
  - Cabo Verde: Austria, Luxembourg, Spain and Portugal
  - Ivory Coast: France
  - Liberia: Norway

- A new declaration to boost cooperation in renewable energy and energy efficiency in the Caribbean was also signed between the European Union, the Inter-American Development Bank (IDB) and the Kingdom of Spain.

  The declaration, includes a commitment to improve the coordination of policies and activities in renewable energy and energy efficiency with Caribbean states in order to promote best practices on energy throughout the region. It will also focus joint efforts in the area of energy efficiency,

[5] http://europa.eu/rapid/press-release_IP-11-1184_en.htm?locale=en

[6] http://ec.europa.eu/development/icenter/repository/africa_ue_energy_partnership_fiche03_en.pdf

[7] http://europa.eu/rapid/press-release_IP-14-1026_en.htm

renewable energy and the green economy in order to promote 'climate compatible' development (i.e. one which takes climate change into account.)
It's clear that sustainable energy is crucial for the continued development of the Caribbean; enabling businesses to grow, health facilities to function smoothly, and transport and infrastructure to be put in place to allow people to get their goods to markets. The Commissioner stated that the ' declaration is a good example of how we're working with our partners to make sure that our work on sustainable energy is as efficient and well-coordinated as possible i*n order to achieve our goal of helping developing countries to provide access to sustainable energy services to 500 million people by 2030.*[8]

The Joint Declaration approach has proven to be a formidable policy traction for climate change commitment being a WIN-WIN and it be replicated upon requests already coming in with other interested partner countries.
It is estimated that in order to meet the SE4ALL goals investments of the order of **48 billion dollars per year will be needed**. These are massive investments. Only the cooperation of public and private sectors can possibly mobilise such funds. The European Commission is well aware of this and therefore is not working on this alone. Together with the Member states as well as with UN relevant bodies, on the 29-30 September 2014, a workshop was organised in Brussels on 'Empowering Rural Electrification' where apart from EU Commissioner Piebalgs, my colleague Roberto Ridolfi DEVCO Director for Sustainable Growth and Development and the coordinator of this action in the Commission, Kandeh Yumkella, UN Under Secretary General , Adnan Amin, Director General of IRENA (international Renewable Energy Agency) but also a packed conference room of representatives from both energy sector, policy makers, industry, rural electrification associations, private sector, utility companies, think tanks, universities, development banks, investors, European Investment Bank, World Bank and also representatives from developing countries. The objective was to exchange views on a potential new initiative being considered that is aiming at leveraging more private investments in addition to the funds set aside by the EU to accelerate rural electrification (ElectriFi). The challenges are many: rural electrification requires mini-grids but how to make these mini-grids viable long term ?; how to tackle the barriers to investment such are the lack of capacity and training, lack of legal frameworks, lack of transparency as well as financing and payment risks; how to ensure sustainable economic and social development; how to make sure that the electrification projects will benefit all the population; how to integrate a gender perspective; how to ensure that local civil society is a partner in the effort; and many others. The valuable contributions of the participants are currently being analysed and the European Commission is currently assessing the conclusions of the workshop and discussing with the Member States on the next steps.

You can find more information on the work of EUROPEAID at: https://ec.europa.eu/europeaid/home_en

"Taking stock of German energy policy in a European context"

Philipp Offenberg

Germany's energy transition is organized as a national project, but due to this fact it is neither effective in reducing CO2 emissions nor cost-efficient. There are several European answers to these problems, for instance the creation of Europe-wide support scheme for renewable energies which would have to be achieved incrementally through regional cooperation. Without a more European approach, including network expansion and the integration of electricity markets, new market distorting interventions at national level like capacity markets will be the consequence.

In spite of the energy transition, CO2 emissions in Germany are rising. This is a result of a surplus of emission certificates within the Emissions Trading System (ETS), which is mainly caused by the falling production after the economic crisis in 2009. Thus the CO2 price has declined, and electricity generation from black coal and lignite has been rising. This again had the effect that new highly-efficient and climate-friendly gas power plants throughout Germany have been pushed out of the market because they cannot compete with the prices for electricity generation from coal. As less coal is used in the United due to the shale gas boom, the world market price for coal is significantly lower than the gas price. Furthermore, coal-fired power plants in Germany have been fully depreciated as opposed to gas power plants. The latter have generated less and less electricity or have even been completely decommissioned. In many cases, gas power plants were only built in the past few years and are now considered as failed investments; many public utility companies and major energy providers are suffering as a result.

Carbon leakage through conflicting regulation on national and EU level

The member states of the EU avail themselves of different national promotion programmes for the development of renewable energies, whose benefit for climate protection is

considered controversial due to the simultaneous existence of the European Emissions Trading System. The Intergovernmental Panel on Climate Change (IPCC) points out in its report "Climate Change 2014: Mitigation of Climate Change"[9] that emissions trading systems on a higher legal level do not work with other CO2 reduction systems on a national legal level. The "carbon tax" in Great Britain is explicitly stated, however, also the German feed-in scheme as part of the Renewable Energies Act (EEG) may be understood as addressee of the raised criticism. As CO2 emissions are capped by the Emissions Trading System, systems such as CO2 taxes and feed-in compensation for electricity from renewable energies do not lead to CO2 reductions. The quantities of CO2 reduced in one place are emitted in other places outside the jurisdiction of the tax or feed- in compensation. This leads to a displacement effect referred to as "carbon leakage".

As the problem of increasing coal-based power generation is due to a surplus of ETS certificates, the reduction of CO2 certificates could solve the problem. There are several proposals for this: (1) the cancellation of surplus certificates. (2) The so-called "back loading", in which the number of CO2 certificates is not reduced but instead the certificates are auctioned at a later point in time, probably in the years 2019 and 2020. This applies to 900 million credits (for a tonne of CO2 each), while the excess supply of CO2 certificates is estimated at two billion. This means that "back loading" would not have noticeable impact on CO2 prices. (3) The establishment of a "market stability reserve": For the next trading period until 2030 a "market stability reserve" – a kind of central bank for the climate – will be established. If the surplus of emission rights is too high, which is the case in the current situation, the auctions for new certificates are held back. If the surplus declines too much, the reserves are released[10]. However, the current carbon price of around 6 euros per ton would have to rise enormously in order to have an effect on emissions. The French consultancy, Sia Partners, anticipates that gas power plants will only become competitive at a certificate price of almost 36 USD per ton of CO2[11]. As this price level is unlikely to be achieved in the near future, environmental politicians in Germany favour the idea of phasing out coal by regulatory means or even establishing national minimum prices for CO2 which would further undermine the ETS.

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Removing the German renewable energy support scheme in favour of a reformed ETS?

As national support schemes for renewable energies conflict with the ETS, there are critics advocating for the abolition of the EEG. For instance the Expert Commission on Research and Innovation of the Federal Government raised fierce criticism with regard to the EEG[12]: due to the displacement effect the EEG did not contribute to climate protection and due to the feed-in compensation there was no incentive to develop innovative technologies. Overall there was no justification for a continuation of the EEG, which is a minority opinion with very low chances of implementation though. The Federal Ministry for Economic Affairs and Energy argues in favour of the EEG that it had formed a basis for the development of renewable energies and "made them a supporting pillar of the German electricity supply with a share of 25% out of its niche existence"[13]. The latest EEG reform is planned to help expand renewable energies in order to take up a share of 40 to 45% in 2025 and a share of 55 to 60% in 2035. In fact, the German Energiewende has made a great contribution to industrial learning on the field of renewable energy; however, for the German consumer the costs have been immense.

Large costs of the Energiewende

The EEG apportionment was increased from 5.3 cents per kilowatt hour to 6.24 cents in the period from 2013 to 2014. Thus, the electricity costs of an average household rose by around 35 EUR in 2014. According to the Agora Energiewende and the Öko-Institut this increase is comprised as follows: The addition of renewable energies made up 0.44 cents (46%). The lower exchange prices for electricity made up 0.36 cents of the increase (37%),

[9] IPCC, Climate Change 2014: Mitigation of Climate Change, Chapter 15, p. 55, http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter15.pdf [11/06/2014].

[10] Centre for European Policy, "Marktstabilitätsreserve für den Emissionshandel, cep Analyse Nr. 21/2014", http://www.cep.eu/fileadmin/user_upload/CEP-Analysen/Marktstabilitaetsreserve/cepAnalyse_COM_2014_20_ETS-Marktstablitaetsreserve.pdf [24/07/2014].

[11] Green Wiwo, „Energiewende: Wie der Kohleboom zu stoppen ist", 13/01/2014, http://green.wiwo.de/energiewende-wie-der-kohleboom-zu-stoppen-ist/ [17/06/2014].

[12] Expert Commission on Research and Innovation, "Gutachten zu Forschung, Innovation und technologischer Leistungsfähigkeit Deutschlands", http://www.e-fi.de/fileadmin/Gutachten_2014/EFI_Gutachten_2014.pdf, p. 51-52.

[13] Federal Ministry for Economic Affairs and Energy, "EEG-Reform", http://www.bmwi.de/DE/Themen/Energie/Erneuerbare-Energien/eeg-reform.html [08/07/2014].

because when the electricity exchange price drops, the EEG apportionment rises[14]. Exemptions from the EEG apportionment for the industry have an effect of 0.14 cents (15%).

While energy-intensive industries, such as the steel industry, complain that the burden of the EEG apportionment is too high, "Friends of the Earth Germany" (BUND) states that energy-intensive industries are beneficiaries of renewable energies[15]: The electricity exchange price drops due to the regenerative electricity being fed in. Industrial companies benefit from this, but additionally are exempted from paying the EEG apportionment. Private households have to ease the burden for the industry in this way. However it is the relative costs of energy compared to other production sites – especially the United States - that determine where industrial reinvestments are taken. Thus, despite the exemptions from the EEG apportionment, energy intensive industries see themselves under pressure. The EEG apportionment only amounts to one-fifth of the electricity price, taxes and duties devise around 45% of the electricity price in total. One-third of the electricity price is attributed to energy procurement and marketing. Another 20% is incurred due to the use of the electricity networks.

European solutions: common tendering schemes for renewable energies?

The German Council of Economic Experts argues in its working paper from June 2012[16] that additional promotion of electricity generation from renewable energies could only be achieved in a cost-efficient way by European harmonisation of promotion to be pursued in the medium term. Ideally, emissions should only be limited by the trading of emissions rights. Today, there are more than 20 different feed-in compensations for renewable energies in the EU. According to the Federal Government[17] feed-in compensation totalling 120 billion EUR was paid to the operators of renewable energy plants in Germany from the introduction of the EEG in the year 2002 until the end of 2013. The remunerated electricity quantity amounted to around 837 terawatt hours. Thus, operators received 14.3 cents per kilowatt hour on average.

While a Europe-wide harmonisation of renewable support schemes is currently not on the agenda, partly because it would create temporary investment uncertainty[18], Germany is now obliged to open its renewable support scheme to foreign suppliers. In the debate about the EEG reform in July 2014, EU Competition Commissioner Joaquín Almunia demanded that imported green electricity should also be supported by the German green electricity scheme. On 1 July 2014 the European Court of Justice (file number: C-573/312) ruled that the green electricity regulation in Sweden restricted the free movement of goods within the EU, as it was not open to foreign renewable energy suppliers[19]. The German Federal Government agreed to provide access to German green electricity promotion to foreign producers from 2017 according to the July 2014 EEG reform, which is, however, limited to 20 megawatts of new electricity output. This corresponds to a good three per cent of the development of renewable energies determined by the Federal Government totalling 6000 megawatts per year and shall correspond to the size of current green electricity imports in terms of percentage. Foreign suppliers will only receive access to a small part of photovoltaic promotion within the scope of a pilot project to test the tendering process until 2017.

With the start of the tendering scheme for photovoltaic coming closer, the German debate now embraces regional solutions more strongly. For instance, in the debate about future tendering schemes for off shore wind power, the idea of common tendering schemes with Denmark and Sweden are on the agenda. Similarly, the Pentalateral Forum, consisting of the Benelux countries, France and Germany, as a first step to market integration has developed common definitions of energy security and forecasts of capabilities.

More market interventions underway: capacity markets

Utilities from countries of the Pentalateral Forum are also spearheading the discussion on capacity markets for fossil fuel power plants. Their argument is based on the peak load problematic: In an energy system increasingly dominated by renewable energies, gas power plants are needed to produce

[14] The difference between the exchange price for electricity and the fixed feed-in compensation is balanced by the EEG apportionment.

[15] BUND, „Energiewende Kosten fair teilen", http://www.bund.net/fileadmin/bundnet/publikationen/energie/121023_energie_fair_teilen_broschuere.pdf [18/08/2014].

[16] German Council of Economic Experts „Energiepolitik: Erfolgreiche Energiewende nur im europäischen Kontext", Arbeitspapier 03/2012, June 2012, http://www.sachverstaendigenrat-wirtschaft.de/fileadmin/dateiablage/download/publikationen/arbeitspapier_03_2012.pdf [17/06/2014].

[17] Federal Government, „Antwort der Bundesregierung auf die Kleine Anfrage der Abgeordneten Bärbel Höhn, Oliver Krischer, Julia Verlinden, Peter Meiwald und der Fraktion BÜNDNIS 90/DIE GRÜNEN – Drucksache 18/165", 27/12/2013, http://dip21.bundestag.de/dip21/btd/18/002/1800242.pdf [18/08/2014].

[18] The Federal Chancellor, Angela Merkel, criticised that the EU could not "question long-standing pro- motion systems without considering the creation of transitions" in the context of the debate about the Renewable Energies Act, FAZ.NET, „Merkel warnt vor Zerschießung des EEG", 25/06/2014, http://www.faz.net/aktuell/wirtschaft/wirtschaftspolitik/energiewende-merkel-warnt-vor-zerschiessung-des-eeg-13010362.html [07/07/2014].

[19] However, the court ruled that this restriction was justified by the interest of the general public to promote the use of renewable energy sources in order to protect the environment and tackle climate change.

the peak load for times when the sun and wind cannot generate enough energy. Utility providers thus call for the creation of a supply capacity market in which the state pays power plant operators for the provision of electricity generation capacities even if they are not used. France and the UK have already created similar mechanisms; German utilities are now campaigning for a national capacity market, however with the option of integrating it within the Pentalateral Forum.

In the energy market, European solutions are preferable over national solutions as they tend to be more cost-efficient. That means that European capacity markets are preferable over national ones. But there are more efficient means to ensure the stability of the electricity system, for instance the integration of electricity markets that would lead to higher electricity imports from other European countries. For this, an increased network expansion is required. So far, deadlines for the finalisation of the internal market for energy could not be held. This issue should be tackled soon, because a functioning EU internal market for electricity has the potential to prevent further costly market interventions at national level, be they beneficial to renewable or fossil power generation.

For the full study on "Taking stock of German energy policy in a European context", please refer to: http://www.eng.notre-europe.eu/011-20195-Taking-stock-of-German-energy-policy-in-a-European-context.html

The Black Sea energy potential and Bulgaria: a brief overview

Kalina Damianova

Kalina Damianova is one of the KAS Fellows at EUCERS. She is conducting her research on Iran in the context of (re)emerging energy superpowers.

The EU and, more precisely, a substantial number of its member states rely significantly on Russian energy imports.[20] Due to historical and geo-political reasons, the energy dependency mostly concerns the Central-Eastern EU states. Additionally, the direction of the gas flows is primarily orientated westwards and the Central-Eastern EU states' lack of a well-developed network of interconnections further restricts these states to fully avail themselves of the solidarity and crisis response mechanisms. The latest European Commission (EC) Energy Security Stress Test shows that in energy terms Bulgaria is one of the most vulnerable EU members.[21]

The European Energy Security Strategy from 2014 suggests a variety of external and internal measures, most significant of which are the diversification of gas suppliers and the development of an internal energy market.[22] While improving energy efficiency, increasing the share of renewables, and promoting greater coherence and integration within the EU are measures that apply to all of the states, the exploration of the member states' indigenous resources is a field in which all of them require individual strategy.

Bulgaria, as an EU member state with a strategic geographic position, has to be able to produce independent foreign policy, which is now troubled not only by the internal lack of stable democracy, but also by the state's almost fully dependent energy sector. An overall improvement of the Bulgarian political and social status requires a certain level of economic stability, which is to a high extent dependent on the development of the domestic energy sector. Therefore, by positioning the Bulgarian case in the context of the general insecurity in Europe, the article reviews the possibilities of exploring indigenous energy resources in the Black Sea, through the perceptive of its littoral state – Bulgaria.

Bulgaria: A Brief Overview

The energy mix in Bulgaria is as follows: 34.1% crude oil; 35.5% coal; 21.3% nuclear; 0.1% renewable energy sources; 5.5% natural gas; 2.2% hard fuels; and 1.3% oil products.[23] According to the Bulgarian 2020 Energy Strategy Bulgaria imports more than 70% of its gross energy demand, as the natural gas, crude oil and nuclear fuel imports originate from Russia.[24] With no feasible projects for diversification of gas suppliers, Bulgaria relies on gas flows transiting through Ukraine. Additionally, Bulgaria is not well connected within the EU internal energy market, making it highly vulnerable to gas supply cuts and highly dependent on Russia as major

[20] In 2009 34% of EU's gas imports and 33% of its oil imports are from Russia. (EC, European Commission (2011b), 'Key Figures', Market Observatory for Energy)

[21] EC, (2014a), Communication from the Commission to the European Parliament and Council: on the short term resilience of the European gas system, COM 654 final

[22] EC, (2014), Communication from the Commission to the European Parliament and Council: European Energy Strategy, COM 330 final

[23] Sirleshtov & Stoyanoff, (2013), 'The Current Status Of The Bulgarian Energy & Natural Resources Sector', Link:http://www.corporatelivewire.com/top-story.html?id=the-current-status-of-the-bulgarian-energy-natural-resources-sector

[24] Ministry of Economy and Energy of Republic of Bulgaria, (2011), 'Energy Strategy of the Republic of Bulgaria till 2020

energy provider. As listed in the Bulgarian Energy Strategy 2020 'with a view to guaranteeing the state's energy independence with strict adherence to the environmental requirements, the development of new natural gas fields, including, without being limited to, shale gas and deep water wells in the Black Sea, will be actively supported'.[25]

Although Bulgaria holds unproven technically recoverable shale gas resources amounting to 17 trillion cubic feet and 200 million barrels (proven 15 million barrels) shale oil,[26] in 2012 the government imposed a moratorium on hydraulic fracturing and drilling for shale gas exploration, due to national protests, concerning the environmental risks that shale gas exploration hides.[27] With shale gas out of the question, the attention has been turned to the non-investigated areas of the Bulgarian Black Sea waters. The reserves in the Northern Black Sea economic shelf hold more promises, yet the exact quantities are still unknown. The Ministry of Environment and Water estimates that there are over 30 million tons of oil and over 50 billion cubic meters of gas.[28] Further information is expected to be disclosed in 2015, when the French company Total is to start drilling for gas and oil in the Black Sea shores.

Black Sea: Hydrocarbons and Bulgaria

In the peak of the Ukrainian crisis, with the Russian annexation of Crimea, the energy potential (between 4-13 trillion cm of natural gas)[29] of Crimea's Black Sea shores became widely discussed. But it is not only Crimea that has energy potential in the Black Sea. In 2012 ExxonMobil and Romania's OMV Petrom executed the first deep-water exploration of Domino-1 and Neptun East block of Romanian Black Sea shores. 'At the time OMV chief executive Gerhard Roiss declared the discovery had established an in-place resource of around 3 Tcf, making it the biggest gas find in the company's history.'[30] Additionally, similar explorations, searching for deep-water gas fields are executed in Ukraine (Prykerchenska Block), Russia (Zapadno - Chernomoskaya block) and Turkey (Turkish Black sea shores).[31]

Interests in the Bulgarian Black Sea shores, have increased because the Romanian Black Sea gas fields border the Bulgarian Black Sea territorial waters (Fig.1). In 2012 a consortium of international companies (the French Total (40%); the Austrian OMV (30%) and the Spanish Repsol (30%)) started a deep-water, off-shore exploration session with a duration of 5 years of the Bulgarian Black Sea, 1-21 Khan Asparush Block.[32] 1-21 Khan Asparuh block covers 14,220 sq. km with water depths of up to 2,200 metres. OMV called the exploration 'the largest 3D seismic acquisition campaign in the entire Black Sea'.[33] Jaap Huijskes, OMV board member responsible for E&P said: 'Interpretation of the data will help us and our partners determine the location for the two exploration wells that are planned during 2015 and 2016 in order to assess potential hydrocarbon resources in this part of the Black Sea.'[34] The increased international interest in the Black Sea as an energy resource is proven by the wide participation of international energy companies such as OMV Petrom, Shell, Repsol, Total and others, in the Second Black Sea Offshore Conference in Constanta, on 15 and 16 October 2014.[35]

In this regard, it should be further taken into consideration that the delimitation of the maritime border between Bulgaria and Romania is subject to a legal dispute. The problem came forward in 2012, when rumours of possible gas and oil reserves in the continental shelf and the EEZ (Exclusive Economic Zone) of the two countries were spread.[36] The issue was temporarily resolved by returning to the status quo, but the understanding between Bulgaria and Romania may as well depend on the future of natural gas and oil findings in the area.

Black Sea: Methane Hydrates and Bulgaria

The 21st century is often regarded as an age of technological innovation. In the energy area, the shale gas revolution was a landmark event, while now progress is expected to come from methane hydrates or the so called 'flammable ice', considered to become an energy source of the future.

[25] Ibid.
[26] The Corporate Wire, (2013), 'U.S. EIA estimates Romania's shale gas resources at 51 tln cu ft, Bulgaria's at 17 tln cu ft', Link:http://wire.seenews.com/news/u-s-eia-estimates-romanias-shale-gas-resources-at-51-tln-cu-ft-bulgarias-at-17-tln-cu-ft-358711
[27] The Guardian, (2012), 'Bulgaria bans shale gas exploration', Link:http://www.theguardian.com/world/2012/feb/14/bulgaria-bans-shale-gas-exploration
[28] Ministry of Foreign affairs of Denmark, (2013), 'Bulgarian oil and Gas sector'
[29] Umbach, F. (2014), 'The energy dimensions of Russia's annexation of Crimea', NATO review Magazine, Link:http://www.nato.int/docu/review/2014/NATO-Energy-security-running-on-empty/Ukraine-energy-independence-gas-dependence-on-Russia/EN/index.htm
[30] GeoExPro (2013), 'Black Sea hots up', Link:http://www.geoexpro.com/articles/2013/06/the-black-sea-hots-up
[31] Ibid.
[32] EuroPetrole (2014), 'OMV and partners complete 3D seismic survey in the Black Sea offshore Bulgaria'. Link:http://www.euro-petrole.com/omv-and-partners-complete-3d-seismic-survey-in-the-black-sea-offshore-bulgaria-n-i-8968
[33] Ibid.
[34] Ibid.
[35] Black Sea Offshore Conference 2014, Link:http://globuc.com/events/black_sea_offshore_2014/0/0/5101
[36] Socor (2012), 'Romanian-Bulgarian Maritime Dispute Can Affect Exxon's, South Stream, Nabucco Projects', The Jamestown Foundation, Link:http://www.jamestown.org/regions/europe/single/?tx_ttnews%5Btt_news%5D=39185&tx_ttnews%5BbackPid%5D=673&cHash=aef56a91f8b922fb073956dde22e20a6#.VD-SavmSxVI

Location of Khan Asparuh Block[1]

Methane hydrates formed in low temperatures and under high pressure, ice-like crystals with natural methane gas locked inside, are mostly found in sea and ocean beds.[37] If methane hydrates are exposed to pressure and temperature, different from the ones that they are stable, gas can be extracted. Given that methane hydrates are said to be widespread internationally, they offer a potentially significant source of natural gas.

States such as the US (for reference: the U.S. Department of Energy methane hydrate program),[38] South Korea, China, Japan and India are investing into exploration of methane hydrates as a source of natural gas. However, the technology for extraction and production of energy from methane hydrates is still not well developed. Japan, in 2013, became the first to succeed in flowing gas from methane hydrate deposits under the Pacific Ocean.[39] In Europe, methane hydrates are found in the Mediterranean, the North Sea and the Black Sea.

In 2013, the Bulgarian government authorised the research ship 'Maria S. Marian' under German flag to conduct a one-year research in the Bulgarian Northern EEZ the Black Sea. The initiative is part of the German SUGAR (Submarine Gas Hydrate Reservoirs) project, financed by the Ministry of Education and Research (BmBF) and the Ministry of Economics (BmWi). According to SUGAR '[within] European waters only the Norwegian margin and the Danube deep-sea fan show clear geophysical evidence for large gas hydrate accumulations, but only the Danube deep-sea fan most likely contains gas hydrates within sandy deposits.'[40] The main objective of cruise Maria S. Marian 34 (MSM34) 'is locating and characterizing suitable gas hydrate deposits on the Danube deep-sea fan'.[41] Ukraine, Georgia and Turkey have been showing increasing interest in the methane hydrates exploration, too. However, it remains to be seen whether producing energy from methane hydrates will be commercially viable.

Black Sea: Hydrogen Sulfide - a source of endless energy?

The International Centre for Hydrogen Energy Technologies (ICHET) of the United Nations Industrial Development Organisation (UNIDO) defines hydrogen as 'the lightest, the most efficient, the most cost effective, and the cleanest fuel available,' concluding that 'each country will be able to produce hydrogen using its own available primary energy sources, and therefore obtain direct control over its economy.'[42] The Black Sea has abundant reserves of hydrogen sulfide and the scientists from the littoral states have been attempting to produce hydrogen from it. The hydrogen-sulfide (H2S) is a colourless toxic gas, with odour of rotten eggs that comes from the bacterial breakdown of organic matter in the absence of oxygen. The most common way of producing hydrogen is by electrolysis. The process, however, consumes nearly as much energy as it produces. Therefore, the scientists have been searching for a more efficient way to produce hydrogen.

Bulgarian scientists also have their say on the matter of hydrogen extraction. For several years the Institute of Chemical Engineering of the Bulgarian Academy of Sciences, led by Prof. Venko Beshkov, ex-deputy minister of the Environment and outstanding scientist, member of the European Federation of Chemical Engineering (EFCE) has been searching a more efficient way to utilise the hydrogen-sulfide from the Black Sea. At the Black Sea Hydrogen Sulfide Workshop, organised by ICHET and the Turkish Ministry of Energy and Natural Resources in 2011, the Bulgarian research group presented the conception of a multistage process, which involves extraction of seawater, adsorption of H2S and electrochemical production of hydrogen.[43] The method uses the hydrogen sulfide as a fuel in a fuel cell to convert chemical energy into electricity, analogically to the accumulators and batteries. The

[37] For more information: Anderson, R., (2014), 'Methane hydrate: Dirty fuel or energy saviour?', BBC, Link:http://www.bbc.co.uk/news/business-27021610

[38] The U.S, Department of Energy, Methane Hydrates Program, Link:http://energy.gov/fe/science-innovation/oil-gas-research/methane-hydrate

[39] BBC, (2013), 'Japan extracts gas from methane hydrate in world first', Link:http://www.bbc.co.uk/news/business-21752441

[40] Bialas (2014), 'Short Cruise Report, R/V MARIA S. MERIAN – MSM34/2', GEOMAR, Link:http://www.ldf.uni-hamburg.de/de/merian/wochenberichte/wochenberichte-merian/msm32-msm35/msm34-2scr.pdf

[41] Ibid.

[42] UNIDO, ICHET website, Link: http://www.promotionplus.info/ICHET-vision.php.html

[43] Black Sea Hydrogen Sulfide Workshop, 2011, Link: http://www.bsun.org/userfiles/file/unai-s_events/7e63b3.pdf

produced energy can be used for electrolytic extraction of hydrogen from the hydrogen sulfide.

The project is now entering an exploration stage of 2.5 years in the Black sea, with the partnership of Georgia and Romania. Prof. Beshkov claims that the amount of hydrogen sulfide in the Bulgarian Black Sea waters may be used for manufacturing of 9 billion of hours of electric energy, which will satisfy the Bulgarian consumption for 200 years ahead.[44] The Bulgarian research group aims at proving that the invention is suitable for commercial usage.

Conclusion

In the foreseeable future, emphasis is most probably going to remain on the exploration of hydrocarbons in the Bulgarian Black Sea shelf. The use of methane hydrates and hydrogen sulfide, as sources of energy, depends on numerous variables such as technological advancement, interest in investment and the need of new sources of energy. However, as the IEA (International Energy Agency) Executive Director Maria van der Hoeven, said about the future of the methane hydrates, '[i]t may seem far off and uncertain, but keep in mind that shale gas was in the same position 10 to 15 years ago'.[45] Therefore, it is important for the Bulgarian government to prioritise its objectives and actively support explorations in the field of energy. Nevertheless, since revolutions can be hidden deep in the rocks, why would we rule out the deep waters?

ACTIVITIES

5th EUCERS/ISD/KAS Energy Talk - Background

Jan-Justus Andreas

Currently the largest producer, consumer and importer of coal, China is one of the most important factors in world energy-related carbon emissions, in fact being the world's leading energy-related CO_2 emitter (8,715 million metric tons of CO_2 in 2011). While China's energy mix today remains largely focused on coal, the Chinese government is promoting the diversification of its energy supplies. However, hydroelectric sources (6%), natural gas (4%), nuclear power (nearly 1%) and other renewables (solar and wind, <1%) remain comparatively insignificant to coal

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(69%) and oil (18%).[46] Nonetheless, particularly gas has experienced an extreme rise over the past years, its domestic demand more than quintupling since 2000.[47] Recent policy plans strive to boost the share of natural gas in the energy mix to around 8% by the end of 2015 and 10% by 2020; consumption in 2012 rose to nearly 5.2 Tcf, 11% greater than the 4.6 Tcf in 2011.[48]

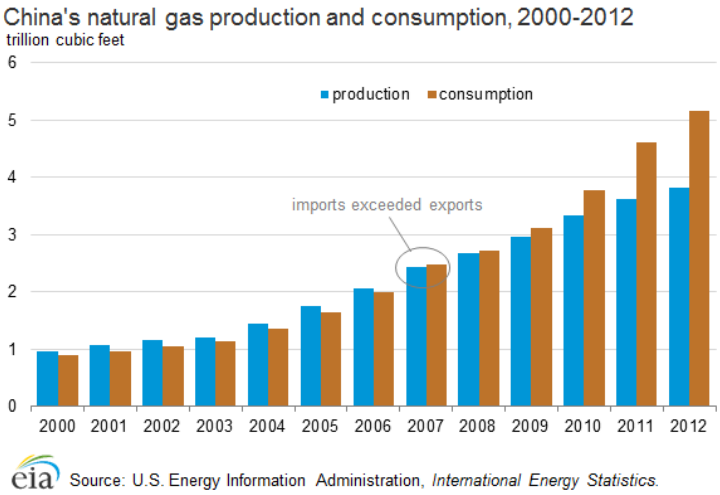
The development is one of the consequences of the Chinese government's aim to reduce carbon intensity (carbon emissions per unit of GDP) by 17% between 2010 and 2015 and energy intensity (energy use per unit of GDP) by 16% during the same period, according to the country's 12th Five-Year Plan.[49] This plan comes primarily from a domestic inducement: Beijing air pollution levels have been the highest in its history and recorded continuous health warnings.[50] While energy demand so far has been driven first and foremost by the industry sector, growing urbanisation will result in an increasing share in demand for fuel in the residential, commercial, and transportation sectors. At the same time, especially in these urban hubs where air pollutions is severest, clean air demands are becoming more vocal.[51] Consequently, moving away from coal and decreasing carbon emissions has a very practical domestic goal of maintaining social support.

Nonetheless natural gas production and distribution are facing several issues, as upstream competition in China is very limited due to strict regulation and exploration licenses, resulting in only a couple of state-owned enterprises actively engaged in drilling. Furthermore, midstream pipelines and storage infrastructures remain inadequate, with many regions not having access to gas; China only has a around 40,000km of gas transmission pipelines, compared to 100,000km in Germany and 500,000km in the US. Finally, in peak times, the market is usually extremely tight due to the lack of storage facilities; Chinese storage is about 1.7%

[44] Ibid.
[45] Staffor (2014), 'The Golden Age of Gas, Possibly: Interview with the IEA', Oil price, Link:http://oilprice.com/Interviews/The-Golden-Age-of-Gas-Possibly-Interview-with-the-IEA.html

[46] EIA, *China,* 2014, http://www.eia.gov/countries/cab.cfm?fips=ch
[47] CIEP, *Development Strategies of the Chinese Natural Gas Market*, 2014, p.9, http://www.clingendaelenergy.com/inc/upload/files/Ciep_Paper_2013-07.pdf
[48] EIA, *China,* 2014, http://www.eia.gov/countries/cab.cfm?fips=ch
[49] ibid.
[50] Air Quality Index, *Beijing*, 2014, http://aqicn.org/city/beijing/
[51] Houser, *Charting China's Natural Gas Future,* 2013, p.6, http://belfercenter.hks.harvard.edu/files/CES-pub-GeoGasChina2-103113.pdf

of total consumption compared to the global average of 12%.[52]



Although China had traditionally been a net-exporter of natural gas, increased domestic consumption caused the country to become an importer in 2007 (compare Figure). While between 2002 and 2012 China more than tripled its natural gas output to 3.78 Tcf (107.7 bcm), the country consumed around 5.19 tcf (147 bcm) of natural gas. Hence, China imported nearly 1.5 Tcf (42 bcm) of LNG and pipeline gas to fill the gap [53]

Current forecasts for natural gas demand range from 220 bcm to 500bcm by 2020. In either case, while China only accounted for 4.3% of global gas demand in 2012, these increases would comprise between 15% and 50% of projected global demand growth until 2020.[54] In the government's *12th Five Year Plan for the Natural Gas Industry* of 2012, the Chinese National Energy Administration (NEA) targeted gas consumption to be at 230 bcm and production at 176 bcm for 2015. Private sector estimates even see the demand rise as high as 260bcm, almost twice the 2011 levels.[55]

Gas imports reach the Chinese markets via pipelines and LNG. The Central Asian Pipeline supplies around 20bcm from Turkmenistan (2012 amount) since 2010, and since 2013, China also operates a 12-bcm pipeline with Myanmar, which however is only expected to supply 2-4bcm a year. China's newest pipeline project is with Russia, which from 2018 onwards may supply 38bcm a year. At the same time, the Central Asian pipeline with Turkmenistan is planned to be expanded to supply a total of 65bcm by 2015.[56] From an LNG side, since the construction of the first regasification terminal, Dapeng LNG, in 2006, LNG imports have risen dramatically, rendering China one of the largest LNG consumers in the world. In 2012, LNG imports reached 706bcf, a rise of 20% from 2011 levels (581 bcf). Overall LNG capacity currently stands at 1.5 tcf/year (4.1 bcf/day), with an expected increase of 2 bcf/day by 2016. [57]

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ANNOUNCEMENT

EUCERS/ISD/KAS Energy Talks:

How will China's "energy hunger" affect the world?

6 November 2014, 10.00 - 12.00, with a breakfast buffet from 9.30 ♦ War Studies Meeting Room, K6.07, sixth floor ♦ King's College London ♦ Strand Campus ♦ London WC2R 2LS

Welcome Address and Introduction

Professor Dr Friedbert Pflüger, Director, EUCERS

Sasha Havlicek, CEO, ISD

Hans-Hartwig Blomeier, Director London Office, KAS

We are delighted to welcome the following speakers:

Tim Yeo MP, Chairman of the Energy and Climate Change Committee, UK Parliament

Professor Dr Keun-Wook Paik, associate fellow of the Energy, Environment and Resources department at Chatham House and senior research fellow at the Oxford Institute for Energy Studies

Dr Frank Umbach, Research Director EUCERS, King's College London

[52] CIEP, *Development Strategies of the Chinese Natural Gas Market*, 2014, p.13, http://www.clingendaelenergy.com/inc/upload/files/Ciep_Paper_2013-07.pdf
[53] ibid., p.12,
[54] Houser, *Charting China's Natural Gas Future,* 2013, pp.7,10, http://belfercenter.hks.harvard.edu/files/CES-pub-GeoGasChina2-103113.pdf
[55] ibid., p.13,
[56] CIEP, *Development Strategies of the Chinese Natural Gas Market*, 2014, p.29, http://www.clingendaelenergy.com/inc/upload/files/Ciep_Paper_2013-07.pdf
[57] EIA, *China*, 2014, http://www.eia.gov/countries/cab.cfm?fips=ch

This workshop seeks to explore the global implications of China's growing energy demand. Once an exporter of oil and coal, China has now become a net energy importer and recently surpassed the US to become the world's largest energy consumer. Primarily fuelled by energy-intense heavy industry and infrastructure building, its energy demand will continue to increase rapidly in the decades ahead. This development will not only be an issue in supply terms, but will inevitably also have global repercussions that leaves a number of open questions: To what extent will China's energy drive impact global energy prices? Will China's intensified efforts to secure energy supplies worldwide raise the risk of inter-state conflict? What impact will it have on international efforts to curb greenhouse gas emissions?

Please RSVP to carola.gegenbauer@kcl.ac.uk

EUCERS ON THE ROAD

Our team represents EUCERS at various conferences and events all over the world. This section gives a regular update and overview of conferences and interview contributions by EUCERS Director Professor Dr Friedbert Pflüger, Associate Director Dr Adnan Vantansever and Research Director Dr Frank Umbach.

15.10.2014 Washington D.C., USA	The Atlantic Brücke organized a roundtable discussion on "Russia's New Ambitions and the Consequences for the Transatlantic Alliance" and Friedbert gave a presentation to the roundtable on "Are there realistic alternatives to Russian gas?"
11.10.2014 Meisenheim, Germany	The 20. Energy Industry Grape Harvest featured a presentation by Friedbert on "'Energiewende' and the industrial location of Germany".
10.10.2014 London, UK	Friedbert spoke at the London Oil and Gas Forum in a panel on "Natural Gas Diversification of European gas supplies: Commercial and Geopolitical Dynamics of the Southern Corridor".
09.10.2014 Berlin, Germany	Friedbert moderated the panel "Security of supply and sustainability: The German 'Energiewende' in global context and the role of natural gas in combating climate change".
07.10.2014 Warsaw, Poland	Frank gave a presentation on "Baltic and EU Energy Security at the Wake of the Russian-Ukrainian Conflict" at the College of Europe, Natolin Campus.
05.10.2014 Vaduz, Liechtenstein	Frank presented on "Economic Foundations of Russia's Future Power: Energy Policies and External Conditions" at the Vaduz Roundtable: "Russia's Future and Europe in the Wake of the Ukrainian Crisis", GIS/CESS
29.09.2014 Istanbul, Turkey	Frank spoke on "The Role of Turkey for the EU Energy Security" at the Expert Roundtable "Turkish Energy Leadership and Its Implications for European Energy Security" by the Policy Center of Sabanci University, Stiftung Mercator Initiative and Stiftung Neue Verantwortung, Berlin.

PUBLICATIONS

Dr Frank Umbach shares with us his most recent publications and interviews:

Frank published on "Tusks Energieunion - Ein Plan zur Befreiung der EU aus der Abhängigkeit von Russland" ("Tusks energy union – a plan to free the EU from its dependency on Russia"), World Review (http://www.worldreview.info/de/content/tusks-energieunion-ein-plan-zur-befreiung-der-eu-aus-der-abhaengigkeit-von-russland) and Open Europe Berlin (http://blog.openeuropeberlin.de/2014/10/tusks-energieunion-ein-plan-zur.html), on 15 October 2014.

Frank wrote on "Europe's Challenge to Build an Energy Union Dealing with Supplies and Prices", in the Geopolitical Information Service (GIS - www.geopolitical-info.com), 10 October 2014, 4 pp.

Frank published an article titled "EU's Credibility at Stake over South Stream Pipeline", with the Geopolitical Information Service (GIS - www.geopolitical-info.com), on 26 August 2014, 4 pp.

Frank gave an interview published in Stuttgarter Zeitung (Newspaper) on "Wir sind besser vorbereitet als bei der letzten Krise - Interview" („We Are Better Prepared Than During the Last (Gas) Crisis"), on 27 September 2014, p. 14.

Frank wrote on "Gasversorgungssicherheit in Deutschland und in der EU. Bedeutung, Herausforderungen und strategische Perspektiven" („Gas Supply Security in Germany and in the EU. Importance, Challenges and Strategic Perspectives"), in Politische Studien (Political Studies, ed. by the Hanns-Seidel-Foundation), September-Oktober 2014, pp. 28-40.

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