

Reaching Energy Security in Europe through Renewables

Grzegorz Wiśniewski and Zbigniew M. Karaczun



REACHING ENERGY SECURITY IN EUROPE THROUGH RENEWABLES

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**HEINRICH BÖLL STIFTUNG
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Introduction

Meeting 100% of Europe's electricity needs through renewable energy by 2050 is possible – if we succeed in pooling the potential of Europe's renewable energy sources. This will require cooperation between EU member states, as well as coherent policies and regulation at the European level. Both currently exist only in fragmented form as energy policy in Europe is still shaped mainly at the national level. The Heinrich Böll Foundation therefore asked a number of experts to take stock of European policy in the sectors most important for the transition to renewable energy, to identify the areas in which European cooperation has been inadequate to date, and to propose possible solutions.

In this publication two Polish experts, Grzegorz Wiśniewski and Dr. Zbigniew Karaczun, consider how the collective use of renewable energies by European countries in electric power generation can improve energy security in Europe. Especially in the period leading up to the Polish presidency of the EU Council in the second half of 2011, in which questions related to energy security will supposedly play an important role, bringing attention to the importance of renewable energy sources in this context seems very significant and worth emphasizing.

Dr. Zbigniew Karaczun points to energy issues as the historical basis for the existence of the European community, which, in the face of new global challenges including those related to climate change, should increasingly move out of the sphere of purely national interests. Why do energy security and associated challenges demand an intensification of cooperation between EU members? What action should be taken on the EU level to promote the development of renewables? Could the construction by the Community of an economy independent of fossil fuels become the new European project?

Grzegorz Wiśniewski emphasizes the importance of local and regional initiatives, as well as the role of the individual consumer (and producer) of energy in strengthening European energy security. He considers the form which the concept of local and regional energy security based on renewable energy sources (combined with other forms of energy generation) could take, and at the same time how the European Union could promote energy security on local and regional levels. Wiśniewski presents different conceptions of and political strategies for energy security; he contrasts the EU vision of climate and energy policy contained in the EU energy-climate package with the American conception from the time of the George W. Bush presidency, elements of which seem to dominate Polish thinking on such issues so far. Why is the role of the actions undertaken on the regional, local, and individual levels crucial in the process of improving the energy security?

The two analyses included in this publication can therefore be said to present two sides of the same question – the role that renewable energy sources can and should play in the process of reinforcing Europe’s energy security: the issue of developing the European governance structure necessary to achieving this end, as well as presenting the tasks for the European Union in supporting and promoting local and regional initiatives fundamental for this process. Which mechanisms are essential on a European level, and which solutions must inevitably be introduced on the regional, local, and individual levels, so that these actions complement each other are the key questions for creating a coherent and effective framework for the advancement of energy efficiency based on the use of renewable energy sources.

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1. Energy Security: Individual, local and regional factors in European energy security based on the use of renewable energy sources

by Grzegorz Wiśniewski

The current discussion on European energy security is dominated by the questions of diversifying the supply of conventional carbon-based fuels to European Union (EU) member states and of the role to be played by traditional energy corporations. Meanwhile, both fossil fuels and traditional energy corporations belong to an age which is slowly coming to an end, and they cannot be expected to provide solutions to problems of energy security in the coming era of rapid technological change, stimulated in the EU by an active climate-energy policy and supporting research policies. Renewable energy sources will play a key role in this process. Thanks to their dispersed nature and that of the resources they use, their development must lead to intelligent energy management and to the decentralization of energy systems. Therefore to continue discussing energy security from an essentially national perspective, without considering local and regional factors and the individual energy consumer, who is no longer just a passive element in the energy supply system, becomes an outdated and unproductive approach. To improve energy security we must consider many aspects of the economy and many points of view, and engage with a much greater number of local and regional partners as well as energy consumers. This is confirmed by the findings of recent (more or less successful) experiments aimed at improving energy security, both in Europe and in the US, where this issue has a particular character, as well as in Poland, where the conception of energy security in use must be viewed in its specific historic and geopolitical circumstances.

This essay considers the wider global and European context, but it is written from a Polish perspective. As a member of the EU, Poland views energy security as one of its priority issues and is currently proposing it as a key theme for the Polish Presidency of the European Council in the second half of 2011.

In my opinion, the current Polish interpretation of energy security is not adequately integrated within the framework of EU policy and its trends, in particular when it comes to climate protection, innovation, and the common market. It also makes insufficient use of energy security improvement measures common in the EU such as the promotion of renewables and energy efficiency. The priority given to national energy security in Poland does not lead to seemingly natural processes such as integration with the EU and emphasis on the exploitation of the country's own renewable resources. In the domain of energy security action has been taken, however, to protect the role of national coal, to diversify the external supply of carbon-based fuels, and to construct nuclear power infrastructure in Poland. Diversification thus interpreted is not accom-

panied by the decentralization and de-monopolization of the energy production sector. Such an approach is more reminiscent of the somewhat outdated Bush era US energy policy than of the EU climate-energy policy model. The costs of implementing the established concept of energy security are analyzed superficially and without accompanying public debate. This essay aims to analyze the aforementioned problems and to outline the logic of a more active engagement in the EU energy-climate policy, in particular the need to decentralize energy production systems while relying on national, renewable energy sources. The causal relationships and evaluations set out in this work have been arrived at independently and represent solely the author's own current views.

1.1. The need for a sustainable approach to energy security in energy-climate policy

The balancing of traditionally conflicting interests in EU energy and climate policy can be graphically represented by a triangle. This “energy triangle” has three major components: improving energy **security**, ensuring environmentally **sustainable** development, and increasing **competitiveness**. The conflict inherent in this combination can be resolved using consistent, coordinated measures, which should result in the creation of a new model based on renewable energy sources and improved energy efficiency. In other words, the current model should be changed and a new equilibrium reached (also thanks to new technologies).

The 3 x 20% EU climate package is a good example of pursuing this equilibrium (within the new context of climate policy) in the time frame of the coming decade. The most significant element of this package is the goal of reaching a 20 percent share for renewable sources in EU energy use by 2020. Achieving this goal will determine the successful execution of the whole package, including emission reductions and a reduction in fossil fuel sourcing. And successfully implementing all of the three “twenties” will guarantee the security of our energy and fuel supplies.

Up until now the governments of individual EU member states have set the tone for the discussion on energy security and would sometimes readily sacrifice environmental sustainability and climate security on the “altar of energy security.” Some countries - those viewing the menace of energy insecurity with particular terror - were even ready to sacrifice the competitiveness of their economies, especially in the long-term.

The increasing engagement of governments on energy security issues, which strengthens as fossil fuels are being used up, is a global phenomenon. It is generally believed to be a valid concern for governments, justifying intervention, especially at a time of economic slow-down and with energy and climate crises looming. It is difficult not to agree with this view, particularly if the policies being implemented focus on introducing innovative solutions. Things get considerably worse, however, when, in the name of improving energy security, governments get involved in areas usually reserved for the private sector, thus limiting possibilities for individual enterprise, or when the government's aim is to support inefficient companies in traditional areas of the energy sector, such as mining, for example by artificially maintaining employment in such companies for prolonged periods of time.

Governments' anxiety about energy security can express itself in various ways. Mario Monti, the EU Commissioner for Competition between 1999 and 2004, argued that the EU needed a policy which "helps sectors awaiting a transition to a "green" economy and ... allows member states to focus on particularly promising areas, such as energy or green vehicles."¹ With such an approach the interests of science, environmental, and energy security policies can easily be reconciled, while at the same time lowering the costs of implementing each policy separately. Around the same time this problem was seen quite differently in the US. In 2004 Paul Roberts remarked in his well known book, *The End of Oil*, that, at a time of growing pressure and an increasing risk of conflict over resources, governments find it difficult to concentrate on long-term challenges, such as climate or renewables - i.e. those that are themselves key to energy security.² Describing US policy at the time, Roberts wrote in the foreword that, faced with the threat to energy supply manifesting itself in rising fuel prices, the Bush administration maintained the existing energy supply model and only took action to increase national fossil fuel extraction and imports. This attitude is reminiscent of the current approach to improving economic competitiveness and energy security in Poland. It must be noted, however, that while the US with its economic and military might could realistically try to win the coming battle over conventional energy resources, this would entail greater and greater costs. It would also be difficult to call such an approach sustainable, nor the solution to the problem - lasting. Analyzing this line of reasoning more closely can be worthwhile, especially that - as it would seem - it has impacted the way the problem is seen in countries such as Poland.

1.2. American experiments with energy security

President George W. Bush probably best described his energy security doctrine to international partners during the International Renewable Energy Conference (WIREC) in Washington in 2008.³ He proposed that energy security issues should determine practically all of US energy policy. The United States does not easily tolerate even a minimal level of insecurity (unlike Europe, with its differing experiences). Another of Bush's paradigms was the necessity of fast economic growth. One cannot but agree with this choice of priorities, but how are low fuel prices to be maintained if the aim is "absolute" security, and when, as Bush himself stated, "more and more countries don't like us"? There is a price to pay, and of course not everyone can afford to pay it. Environmental issues should be dealt with later, according to Bush; he was open to discussion, but - he added - this has to be "specific" discussion. It would seem that President Bush was reasoning logically, but that he lacked the imagination needed to foresee inevitable changes in the energy

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- 1 Andrzej Lubowski, "Ile państwa w gospodarce," ["How Much State in the Economy"] *Gazeta Wyborcza*, 15 August 2010.
 - 2 Paul Roberts, *The End of Oil: On the Edge of a Perilous World* (New York: Mariners Books, 2005).
 - 3 "Bush: America Must 'Get Off Oil'," Environment News Service, <http://www.ens-newswire.com/ens/mar2008/2008-03-05-01.html>.

sector. He tried to extrapolate based on past experience - a deluded approach in the midst of the current technological revolution and changes brought on by globalization and the decentralization of systems. Neither was he capable of seeking solutions by turning towards specific regions or states, nor did he have the ability to open up to wider international cooperation. Bush did not concern himself with issues as decentralized as heating or cooling, which are both important components of local energy security, but which, from a strategic viewpoint, did not constitute a priority for him. When discussing electric energy, he spoke almost solely of nuclear power (“nuclear power is limitless”). Describing legislative action already undertaken in the US, he stressed that it has two main objectives: facilitating siting procedures for new investments and enormous bank guarantees for nuclear power (10 billion USD), supported by means reserved for research in this area. Bush did not launch measures of this type for wind or solar power (here, effective support was provided by a series of US states, and even cities).

George W. Bush’s controversial approach to the problem of energy security and its effectiveness also met with criticism in some economic circles of the time. *The Age of Turbulence*, a book published in 2007 by former US Federal Reserve chief Alan Greenspan, contains criticism of the Bush administration’s approach to energy security, which is deemed “too unilateral.”⁴ Greenspan writes that the only reasonable definition of energy independence (an element of energy security - author’s note) is the possibility of dictating global prices by accessing still unexploited fuel reserves, while the period of fuel independence enjoyed by the US before the first energy crisis (up until 1971) finished long ago. Greenspan also adds that, if history is a sign of things to come, fossil fuels (oil, gas, nuclear power) can be expected to be pushed out by cheaper alternatives (ethanol, hydrogen, renewables) before traditional reserves run out. In other words, Greenspan argues that the observed growth in fossil fuel prices is a natural economic process, which will “lead to the mass production of intelligent, clean and effective energy technologies of its own accord” and it would be best if governments did not get in the way of this process with their outdated interventionism.

However, the US approach cannot be reduced to this past conservative energy security doctrine on a federal level as advanced by George Bush. The US is also characterized by the extensive autonomy enjoyed by individual states, and especially the wide margin of liberty left to individual consumers, themselves more and more often also energy producers. Despite unfavorable federal policy, a majority of states expressed the wish to source a minimum 10% of their electric energy from renewables. The possibility of independently producing electric power in the US no longer surprises anyone and is seen as normal. Connecting an American household to the grid is a two-sided process, with a two-way counter, which allows an insight into the consumption and production of energy from micro-sources such as small wind farms or photovoltaic installations. In a household micro-grid, the electric car is starting to play an important role, providing energy storage. So if local energy production exceeds the level of use,

4 Alan Greenspan, *The Age of Turbulence: Adventures in a New World* (New York: Penguin Press, 2007).

then at the end of the month the consumer receives a payment instead of a bill. The problem is that micro-grids, which include renewable energy sources, disturb the market order created by power corporations. Without decisive backing from the federal government their development has been relatively slow - until the Barack Obama presidency brought the 2009 stabilization plan (largely consistent with Commissioner Mario Monti's views and coinciding with EU policy). It must be noted, however, that when it comes to the development of the "prosumer" (consumer and producer of energy) concept and the ability to let the individual green energy producer pay directly for his net consumption, the US is far ahead of the EU.

As mentioned above, the American concept of energy security has changed with the Barack Obama presidency and with his plan of investing 140 billion USD of federal funding into green and generally innovative technologies. Thanks to this, the long-term energy dependency of the US is also expected to decrease. It is still too early for a fuller appraisal of the effects of President Obama's plan in terms of the durability of the improvement in energy security, but, despite various limitations in US home affairs and the need to compromise, it is a more modern, sustainable and forward-looking policy and one better suited to contemporary conditions. It is also decidedly more akin to the energy policy which has been promoted in the EU for the last twenty years.

1.3. The concept of energy security in Poland so far

In Poland the concept of energy security meets with greater obstacles from the practical implementation side than from the policy or legal aspects, although even the latter may sometimes cause doubts to arise. In the 3rd article of the 16th chapter of the Energy Law Act, the concept of energy security was defined as "a state of the economy enabling current and expected future demand for fuel and energy to be met, in a technically and economically justified way, while fulfilling the needs of environmental protection." This definition, largely transferred into Polish law from EU documents, is wide-ranging and not very specific, but it is apparent that what is meant here is the security of supplies interpreted as the physical availability of energy sources, taking into account raw material and energy prices within the "economy." This allows for a wider view of the problem, but in current policy this definition is unfortunately applied in a very narrow and traditional manner. In practice, it is difficult to find a role for renewables, energy efficiency or decentralization in this context.

Some EU countries, especially new member countries - and in particular Poland, which, in the second half of this decade, has become one of the most ardent allies of US policy in the EU - are mired in a fear of dependency on carbon-based fuel imports from Russia. The fact that Poland bases itself on the "Bush conception of energy security" is reflected in the importance accorded to the diversification of traditional fossil energy sources (both imported and national), even when this means disregarding the costs (as in the case of constructing LNG terminals). It can also be seen in the persistent promotion of national coal, together with the unconvincing argument that coal will remain a strategic

energy resource, in combination with renewables, even in the long-term.⁵ The promotion of nuclear power, to be introduced “from scratch,” is also growing more intense (since 2008), although in Poland, as opposed to the US, this power sector must depend wholly on imported technology and imported fuel. At the same time, the role of renewables, energy efficiency, decentralization and innovation in energy security, and climate security has so far been underestimated. Apart from the questionable logic of choosing a doctrine similar to one promoted in the US in the Bush era, the question remains of whether implementing measures resembling those used in the US a decade ago in a medium-sized EU country does not call for more serious, structured thought.

This does not seem to constitute a strategic vision of Poland’s development from the point of view of the energy sector or of energy-climate security, and it is obvious that this approach, largely divorced from the potential of renewable energy sources and climatic conditions, will not live up to the “challenges” of the contemporary world.

Even now, doubts are beginning to appear in circles where the view of energy security described above is largely held. Professor Jadwiga Staniszkis, the well-known Polish political scientist and sociologist, argues that energy should be seen from a much wider perspective than just in terms of pipelines, such as the Nabucco gas pipeline. She invokes US intelligence service reports in which Europe and Japan are presented as two areas likely to be affected by an energy crisis between now and 2025. Professor Staniszkis remarks that nothing is currently being done to prepare for the introduction of new technologies which will be key to providing enough energy, and writes with some regret: **“If only Poland, which has stressed the problem of energy security in the EU for some time, went further - not only in terms of geopolitics, but also technology.”**⁶ Staniszkis connects the need to diversify energy supplies with innovation: “Poland could add the problem of new technologies to this. During the crisis, with lowered public expectations, the US is using the government’s new, stronger position in the financial system to pump big money into technological development.” She postulates that “it is in the interest of Poland to convince Europe to say to itself: ‘We are locking ourselves in within our small club, because only we are capable of this technological leap.’ This leap forward can be achieved using the intellectual capital of new member countries.” Her voice is worth noting, also in the context of the vision for the Polish EU Presidency in 2011, in which energy security is to be given special importance. So far, discussion on this issue could cause alarm in some circles, due to Poland’s persistent pursuit of outdated technologies which, even in a mid-term perspective, turn out extremely expensive (uncompetitive compared to renewables). Traditional thinking about energy security displays an increasing lack of understanding of

5 “Determining a time horizon for the share of renewables in the power generation structure - at a level of 20%, and later poss. 30% (by 2030), taking into account the assumption that, in the case of Poland, coal is a valuable resource, it should be saved, although after the incubation period of ‘clean coal technologies’ (by 2020–2025) it may be worthwhile using less of it (by 2040–2050) making coal a strategic reserve for the second half of the XXI century.” Source: Assembly of Strategic Advisors to the Prime Minister, “Poland 2030 Report”, Warsaw 2009.

6 Jadwiga Staniszkis, „Jesienią rzucę się do walki,” [“In autumn I will fling myself into fight,”] *Rzeczpospolita*, 6 August 2009.

the wider and strategic consequences of the current economic slow-down and of the EU climate package, supported in the US, in the EU and in leading EU countries by a range of stimulation packages promoting renewables.

1.4. Difficulties with the centric approach to overcoming problems connected with improving energy security in Poland

Aided by innovation and decentralization, the technological and industrial revolution in the energy sector causes traditional concepts of energy security to run into insurmountable problems when put into practice within dynamic environments and political processes aimed at overcoming climate change. Alan Greenspan notes that, despite efforts and encouragements to this end from successive governments, since 1976 not one oil refinery has been built in the US. He writes: "Although several remain in the planning phase, the main problem stems from insecurity as to future environmental standards - because a typical new refinery means a financial engagement with a 30 year horizon. This insecurity renders investments into the construction of these installations particularly risky."

Equivalent problems affect investment in improving the security of electric power supply in Poland, currently based on coal and coal-fuelled power stations in as much as 94%. As Prof. Krzysztof Źmijewski argues, the basic problem of the Polish energy sector is the depreciation affecting the system, directly resulting from the ageing of the infrastructure. Over the last five years two new coal power stations were put into operation (Pałnów II and Łagisza II), and two others are nearing completion (Bełchatów II and Częstochowa). Two further generators for the Opole power station are being planned, but all this is insignificant relative to the level of unmet demand. Power transmission lines in Poland have not been more intensively developed for many years now. According to Źmijewski, to stop the process of technical depreciation, investments of at least 625 MWe a year are needed. The level of depreciation of sources has reached 79%. In the case of transmission networks, depreciation reaches 71%, and in the case of the heating sector - 63%. Stopping the process of depreciation of technical infrastructure requires investments at a rate of 16 billion EUR a year (of which 5 billion EUR a year for the electric power sector). This level of investment cannot be reached on credits, because the borrowing power of the Polish electric power sector is insufficient (9–12 billion EUR), while 25 billion EUR is the sum needed by 2015. The interest to be paid would cause enormous price increases. Other solutions must therefore be sought.

Gathering investment capital on such a scale is a problem, especially while other EU countries are also competing for it - countries which do not benefit from derogations for CO₂ emission allowances for their power stations and heating plants within the new ETS directive, and the recent directive on industrial emissions. EU countries without long-term derogations in this area create more favorable conditions for investment in new energy sources than Poland and Central European countries, which have managed to obtain derogation rights during negotiations for the EU climate package in 2008. Of the total financial means assigned to Poland for the years 2007-2012

(over 65 billion EUR - a significant sum on the EU scale), only a small part has been allocated to renewables by the central government (only around 0.6% of the total, together with the cohesion fund and the fund for regional development - although local governments adopted a different approach, as I will explain below). The greater part of the cohesion fund, being directly available to the government, was allocated to the development of needed but traditional infrastructure, including energy infrastructure. Significant levels of public funding are still being assigned to the protection of national mining industries (and coal power), and they are far from being spent on the development of clean coal technologies, but rather on the temporary protection of employment in mining and the energy sector. Such investment policies will not help build long-term energy security. As a result of its choice of priorities, in the name of protecting the current interests of its power sector, Poland is not fully benefiting from EU mechanisms accessible to it. These include, among others, the stabilization package focused on green technologies or the idea of common European grids, which could serve as a basis for a broader European conception of energy security, in particular when it comes to electric power.

One of the untapped solutions is the construction of international grid connections with Poland's neighbors. Connecting the systems would enable the balancing of peak demand, as well as making better use of renewables as the share of green energy from unstable sources in the electric power system inevitably increases. The lack of international connections forms a further barrier to the development of renewables. New grid connections would also minimize demand for national reserve power, and this would entail significant cost decreases in Poland, on a "climatic" time scale (2050) but also even on the time scale of the climate package (3 x 20% by 2020). According to analyses conducted by the European Climate Foundation, investment costs in the renewable sector will remain higher for a certain time, but will fall dramatically once the infrastructure is in place.⁷ Western Europe assumes that a common energy market will be in operation by 2015. By 2013 an energy market for so called "old" EU members should be in place, and other member states will enter this market gradually.

Another factor in the building of energy security championed in the EU, and insufficiently taken advantage of in Poland, is the development of renewables. As a result of liberalization and in the age of climate policy, **renewables will play a key role in Europe's supply of clean energy sources** as early as 2020-2030. Different European countries dispose of varying, but on a continental scale, complementary, renewable energy resources: in the north hydro-power, bio-energy, and wind dominate, while Southern Europe has greater solar and geothermal resources. Estimates suggest that the total economic potential of these sources exceeds their current exploitation twenty-fold. Research-backed initiatives such as ERENE, the European Community for Renewable Energy (a new community, akin to Euratom, for the optimal use of Europe's renewable

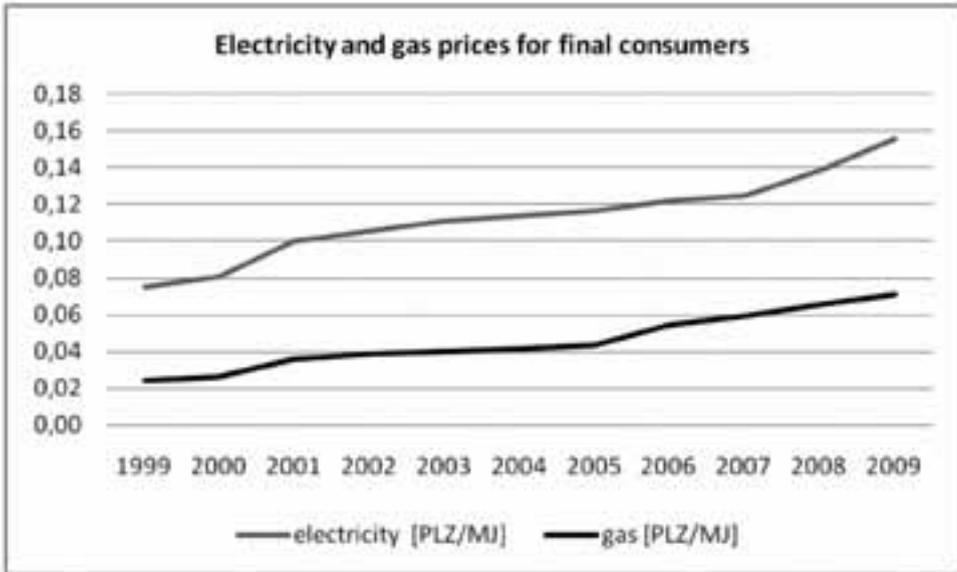
7 European Climate Foundation, "Road Map 2050: A Practical Guide to a Prosperous, Low Carbon Europe," Brussels 2009.

energy potential), focused on cooperation and the exploitation of renewable energy resources within a pan-European network, including marine networks, could allow us to meet all of our demand for energy from renewable sources by 2050, especially when it comes to electric power. The EU is in urgent need of a few flagship projects in this context, such as the installation of solar power plants in North Africa and the creation of wind farms in the North Sea. Assessing the situation realistically, Europe is not capable of achieving full energy independence by 2030, but it will continue getting closer to this goal, and the fact that the EU has initiated these processes sufficiently early must be seen as a very positive step.

The failure to take advantage of the possibilities offered by the EU in the area of energy and climate security does not entail low energy prices and better economic competitiveness, contrary to opinions current in Poland. It can also be argued that, with the current barrier to investment, the process of reforming the energy sector has slowed down. This is due to derogations and the difficulties of building a free electric power market in Poland because of the monopolization and partial nationalization of the power generation and distribution sector by means of four vertically integrated national power corporations (PGE, Tauron, Enion, Energa), dominated by government shares. The creation of vertically consolidated state enterprises was conducted with the explicit aim of increasing the value of the national power sector and improving national energy security, here understood to mean the direct influence exerted by the state on the policy conducted by key national corporations. Everything would indicate that, with a monopoly in place and without active efforts to advance energy efficiency and sustainable energy sources or to open up the market, renewables will find it more difficult to break through than in other EU countries. Insufficient consideration has been given to the view, dominant in the EU, that full liberalization of the electric energy market benefits national consumers most (unbundling, i.e. separating production and supply, and the removal of bottlenecks in this field by finally connecting “energy islands” to the European network). The four energy corporations acting as regional monopolies created as a result of consolidation were allowed to conduct actions such as increasing energy prices, without the possibility of the regulator successfully intervening in the commercial exchange processes of these groups, and in practice without an option for end consumers to take advantage of such means as changing their energy provider.

Structural conditions and the electric energy market model adopted by Poland inevitably - and completely independently of the EU climate package - lead to systematic increases in energy prices, increasingly hitting the budgets of small business, and especially those of individual households. The figure below represents trends in prices for electric energy and gas (a sector monopolized in Poland by one state company, PGNiG).

Fig. 1: Electricity and gas prices for final consumers



Over one decade (1999-2009), electric energy prices for consumers in Poland rose by 107%, and gas by 163% - despite a lack of investments to increase power - while the (relatively high) average income increase over this period was below 64%. This phenomenon cannot be explained otherwise but by the high level of monopolization in the sectors of energy and fuel production and distribution, and by the low efficiency which persists in the energy sector. Neither can the phenomenon be explained by the high costs of the EU climate package, as the energy sector has argued during its past lobbying efforts against the adoption of the package and in its current lobbying for increased public aid.

The result is that an average Polish family spends over 12% of its monthly income on fuel and energy (of which 5% on electric energy).⁸ It can therefore be said that a large portion of households are affected by energy poverty. It is also difficult not to postulate that in Poland these negative phenomena could grow in strength and that they have a certain causal connection with the established conception of energy security, based on the strengthening of state coal-energy monopolies, in particular with regard to electric power. Policy in this field, determined by the government's relations with energy corporations, is becoming increasingly inefficient in promoting the interests of the energy consumer and in the development of renewables. There is therefore a constant need to build organizational alternatives on a regional and local level, and to provide end consumers with technological alternatives to the extremely centralized Polish model of energy supply. This is why it is worthwhile looking more closely at the regional factor of energy security, largely ignored in Poland, and the (initially limited) freedom citizens have to improve their individual energy security.

⁸ In the United Kingdom energy poverty has been defined as a situation in which a household finds itself spending more than 10% of its income on an adequate level of heating.

1.5. The forgotten idea of local and regional energy security

It is assumed that ensuring energy security is one of the responsibilities of governments. This was certainly the case in the 19th, and partly also in the 20th century. Efforts to ensure security often led to very insecure situations, however - several recent wars were fought over oil. In the contemporary world, energy security is no longer determined by new multi-gigawatt turbo generators running on fossil fuels (nuclear fuel, coal, gas), increasingly expensive to acquire and operate, and a bigger number of pipelines (from places where fuel reserves are decreasing to places where demand for them is rising), but rather by actions to increase energy efficiency and use local renewable energy sources. Since this has been the case, governments, used to the established situation and procedures in the energy sector, seem incapable of finding a solution independently. Traditional “advice” given to governments by just as traditional energy enterprises will normally lead to over-investment in outdated technologies and to very high government guarantees and costs, tolerated (or rather camouflaged) as necessary for “state security.” It is perhaps for the best that in this respect governments will at least partly give up their monopoly on knowledge and power and will take advantage of cooperation within the EU in solving this problem. It would perhaps be even better if they paid more attention to the capabilities of regional assemblies in this field.

Coming back to my previous point, it would seem logical to argue that Poland’s approach to energy security lacks a regional, bottom-up, individual ingredient, and that energy security - as opposed to military security, for example - should be more of a combination of regional, local, and individual security than a division of national security into administrative units. Although currently things are somewhat different in practice, this type of thoroughly modern thinking appeared in Poland almost ten years ago. In a statement “on the state of national energy security and action taken by the government in this field,” prepared for the Council of Ministers in 2001 (at a time when Poland was in the midst of a battle over the adoption of the renewable energy development strategy), the following remarks appeared: “In the future the increasing importance of local energy security must be taken into account, as a result of the methodical execution of the country’s administrative reforms, with a series of powers being devolved from the central administration to a provincial, county or commune level.... Energy security can be expected to evolve on three levels:

- **local** (in one or several communes⁹), the most important element of which is the reliability and continuity of thermal energy supplies,
- **regional** (e.g. over the area of a province), the most significant element of which is the capability and readiness to provide power transmission services for communes (groups of communes) and exchanges of energy between regions,
- **national**.

If such a plan is implemented, responsibility for the level of energy security will be attributed as follows:

9 Commune – gmina – is the principal unit (lowest uniform level) of territorial division in Poland (editor’s note).

— **government administration** - creating conditions for the unhindered development of international, inter-regional and intra-regional infrastructural connections, allowing for reliable and unlimited transit, transmission and regional energy distribution services,

— **local government administration** - developing local potential for electric and thermal power generation, including renewable energy, local distribution services, and ensuring the supply of electric power and heat to consumers.”¹⁰

It is therefore a shame that currently the issue of energy security is discussed solely from a geopolitical and corporative perspective, focusing on centralized investments, Russian gas and national coal, with too little said about ways of improving energy security from the local and regional levels, which we can influence directly. The fact is that local government and politicians, who are elected locally, do usually notice this problem and the existing potential, but unfortunately the theory and practice aimed at combining these two ways of viewing the problem into one system are not sufficiently developed. The political, expert, and business base for the promotion of such an approach is also too weak.

Local governments could play a particular role in the development of renewable energy. According to former EU Commissioner for Regional Policy, Danuta Huebner, a growing number of projects in the EU are implemented on local and regional levels. Currently decisions regarding as many as 67% of all public investments are taken on a local or regional level. At the same time, local governments attach much importance to improving the environment in their area, decreasing pollution, improving the energy security of the region and the energy balance of individual communes. Facilitating cooperation between local government structures in creating a strategy for the development of renewable energy therefore seems logical. Such conclusions and measures for the promotion of renewable energy can be arrived at by different paths. Some local government structures experience the problem of environmental threats directly, and these can be felt even during attempts to build renewable energy infrastructure (which receive extensive publicity). A certain number of local governing bodies, motivated by a broadly understood responsibility for their citizens, for others and for future generations, engage in actions such as the EU Covenant of Mayors initiated by the European Commission, working in cooperation with the Committee of the Regions. The Covenant is to focus on implementing the 3 x 20% climate package, especially in urban areas, with the aim of reducing CO₂ emissions. However, the 3 x 20% package is nothing more than broadly understood energy security at every level and in the whole of the EU. Local governing bodies - as opposed to central government and traditional energy enterprises - see these activities as a source of benefits, rather than costs.

Probably the best known reaction of local government members to this type of problem could be observed in the spring of 2008, at the time of the “Szczecin black-out,” the most widely reported of such events in Poland over the last three years. The position held by the Covenant of Marshals of the Republic of Poland at the time in respect to improving the energy security of the country by developing

10 Government statement on the state of national energy security, adopted by the Chamber of Deputies on 25 January 2002.

renewable energy and electric power transmission networks gave rise to the creation of so-called provincial energy security councils in Poland.¹¹ Poland is not a federal country, neither is it sufficiently decentralized, and under our jurisdictional system provinces find it difficult to achieve rapid results in this respect. As for the current management structure in the field of energy security, the creation of specialized institutions to provide support for local government seems essential. This could be a joint task for regional and local energy agencies. A dozen or so of them already exist in Poland, several of them strongly connected with the provincial government and highly active. The action plans of agencies with financial backing from the European Commission (the IEE program - Intelligent Energy for Europe) include goals connected with the improvement of local energy security, such as compiling regional energy strategies, regional strategies for renewables, and commune-based energy plans, as well as action in the interests of end consumers of energy and the promotion of local exploitation of renewable resources.

In the capital of the region which experienced the black-out mentioned above - Szczecin - and in the surrounding area, the real (rather than political) losses were counted. This was a serious event, as losses to just one fertilizer plant in Police amounted to 10 million PLN, and the Szczecin shipyards lost 2 million PLN. Many suggestions were made as to how to solve the problem from a “technical” perspective, but the voices of experts and local government activists encouraged a broader view of the issue, and stressed that the “Szczecin events” would hurt the city’s image. This would be particularly worrying for (local) industry (even though bigger factories usually have back-up power), and especially if such events happened regularly.

In this situation we should be aware of the growing importance of the quality of spatial development plans (at regional and local levels), planning in the energy sector (on the regional level this will very quickly develop into the creation of not only provincial renewable energy development programs but also regional energy policy), with the possible use of such measures as e.g. air protection plans. It cannot be denied that, on its own, even the most diligent implementation of current law will not be enough, and that to face the challenges described above legal changes will be necessary. The responsibility for energy security (as well as means) will also have to be transferred to a regional level to a large degree, and even to a local level on subsidiary terms. Plans for the development of the network of distribution companies should always be correlated with plans for the development of renewable energy in regions and communes and agreed in detail with local government. Local governing bodies should in turn know where they plan to promote investments into renewables. With local governing bodies better prepared, the government will be able to achieve more through cooperation and coordinated action, and to look for solutions to the problem of energy security, among others, inside the country, and not only outside, where Poland does not dispose of sufficient leverage.

11 “Stanowisko Konwentu Marszałków Województw RP, Międzyzdroje,” [“Position of the Convent of the Marshals of Voivodships, Międzyzdroje”] Internetowy serwis informacyjny Związku Województw Rzeczypospolitej Polskiej, 13 March 2010, http://www.zwrp.pl/index2.php?option=com_content&do_pdf=1&id=671.

1.6. Individual energy security

Central and local government should create conditions for the improvement of the energy security of each individual company and citizen. However, they should also create conditions for the individual consumer to be able to independently contribute to a better, more reliable, and more environmentally friendly way of meeting his own energy needs. The goal is to release citizens' own creativity and initiative by removing legal barriers created in the current, centralized, and still highly monopolized energy supply system, but also by ensuring the availability of small-scale technologies on the marketplace, enabling the development of distributed generation (in small and medium enterprises, or SMEs) and micro-generation (in households). Use can be made here of the US experiences mentioned above, so far underestimated in the EU, as well as of the great potential of individual entrepreneurial spirit, also (and perhaps especially) in Poland.

Stanisław Lem, Poland's best known science fiction writer, was strongly attached to a personal feeling of safety following his experiences during the war and over the cold war period. This also concerned the electricity supply in his house in Kliny, where he lived and wrote in the seventies, also called the "years of shortages" in communist Poland. As his son Tomasz Lem writes in the book *Awantury na tle powszechnego ciężenia* (*Riot in a Gravitational Field* - not available in English), the regular (almost daily) blackouts motivated Stanisław Lem to acquire an enormous and noisy electric generator from a fishing boat to back up his own feeling of energy security, and to ensure he had the light needed for writing books at night for example.¹² This anecdote, colored with humor particular to Lem's extraordinary personality, demonstrates a particular type of entrepreneurial spirit and the individual potential of citizens who, in communist times, had to deal with many discomforts unheard of in Europe at the time, including the weaknesses of a centralized energy system.

Currently citizens have access to a much wider (although still too narrow) range of energy technologies, which they can easily make direct use of. These include, when it comes to heating (and cooling), solar thermal panels, biomass pellet boilers, and heat pumps, and when it comes to electricity - small-scale wind farms, photovoltaic systems, micro-biogas plants, fuel cells using biofuels, and even renewably produced hydrogen. It must be noted, however, that energy consumers find it difficult to access the grid, and that the development of technologies serving distributed generation is too slow. It seems that traditional energy corporations not only have too strong an influence on regulations relative to the access of independent energy producers to the grid, but also that in their choice of priorities for funding and the rules of co-funding scientific research into new technologies their main goal is maintaining the status quo (only slight changes to traditional multi-scale technologies are accepted). Not enough stress is put on small-scale technologies for independent, individual energy producers. This is the case with regard to scientific research funding on a national level (in Poland the majority of funding is still allocated to the development of traditional

12 Tomasz Lem, *Awantury na Tle Powszechnego Ciężenia* [*Riot in a Gravitational Field*] (Kraków: Wydawnictwo Literackie, 2009).

energy technologies, mainly coal power), as well as on an EU level (disproportionately high means for the development of nuclear power under Euratom and excessive importance accorded to the needs of traditional energy enterprises, attempting to defend themselves against the arrival of cutting edge technologies on the market). With the current, extremely stale range of technologies in use (dating back to the 19th century), cutting edge technologies should not be associated with enormous scales - previously something to be proud of in energy expert circles - but should rather be aimed at the great potential of replicating small-scale technologies. It is using such new technologies, serving to decentralize absurdly giant systems which we have constructed and which every day take us further away from consolidation and order and closer to uncertainty and chaos, that we can improve our energy security in a sustainable manner. The slow, but inevitable decline of energy supply systems which no longer have any significant development potential (apart from the unlimited potential of rising costs) can be seen as a positive phenomenon, as long as we are careful to make use of some of their achievements and if we are determined in the construction of sustainable technological alternatives.

This is a chance, but also an obvious challenge for Poland and in a sense for the whole European Union, which, **with its 40% market share, remains a world leader in the export of technologies using renewable energy sources, even if the attribution of resources and funding for research and development in this area is clearly growing faster in China and the US.** The EU must make sure that it can strengthen its leadership position by adequately increasing the distribution of resources and financial means, but at the same time it should distance itself from unjustified backing for certain technologies and outdated general conceptions of the energy sector.

We are entering an era where an energy consumer can go to one of the hypermarket chains selling building materials to choose a solar panel or wind turbine which he can himself install, and enjoy electric energy produced within his own household, which will meet all his energy needs. Networks of installers and producers of household appliances of this type will greatly gain in importance in this process. In the well-known publication *Small Is Profitable* (2002), the authors counted as many as 207 benefits which the development of distributed generation is expected to bring for the consumer and the citizen.¹³ A significant part of these is directly or indirectly connected with an improvement in local and individual energy security.

These processes are growing in strength, and they will shake the foundations of the current order governing the energy market created by the corporate energy sector, which will inevitably meet with resistance. The lack of faith in the executive power of states and international institutions stems from the fact that governments, while trying to change things, would have to influence changes in thinking within corporations, where the outdated paradigm of basing unchanging levels of productivity on increasingly limited resources dominates. The well known Polish sociologist and philosopher and key representative of the “post-

13 Amory B. Lovins et al., *Small Is Profitable: The Hidden Economic Benefits of Making Electrical Resources at Right Size* (Snowmass, CO: Rocky Mountain Institute, 2002).

modernist school,” professor Zygmunt Bauman, stresses the important role of local initiatives with truly global ambitions, such as e.g. environmental or consumer movements, in civil society. He warns, however, that “this is difficult, as the objectives are global, and the actors local and difficult to organize.”¹⁴ It will be made possible, however, by technological progress and legal limits on the role of monopolies in restricting access to the grid. No one can command our wishes and preferences. People incessantly seek variety, independence and security of their energy supply, and will find them in new, small-scale energy technologies.

1.7. Tasks for the EU

A significant and sustainable improvement in energy security cannot be achieved under a system dominated by relations between the government and traditional energy corporations. If cooperation only involves these two sides only the level of costs becomes obvious, and the effects are bound to be short-term. A European perspective and cooperation are essential here and will have a positive impact both on lowering energy supply costs as on general energy security and the quality of services. The EU should also act to de-monopolize and decentralize the industry and to unleash the potential of local initiatives and the development of small-scale technologies, without which small-scale energy consumers will find themselves with least protection on the liberal market.

Initiating EU support for the decentralization of energy systems and the development of small-scale technologies, particular to local communities, SMEs and individual energy consumers (transforming them into “pro-sumers”), is an essential element of the transformation process and of ensuring a smooth evolution of energy systems towards environmental sustainability and energy security at every level.

The Lisbon Treaty, in which the functioning of the EU on local and regional government levels was first included, should be effectively made use of in the improvement of energy security. This entails, among other things, that regions and local government structures participate in consultations when new EU rules are being drafted, and that their interests must be considered when assessing the effects of implementing the new regulations. The contents of the Treaty should also be reflected in the formulation of policy and law in the energy sector, and in the implementation of EU directives in EU member countries. Important tasks for the EU include the engagement of regional and local government structures (e.g. through the Covenant of Mayors mentioned above, or, earlier, the MERG Reflection Group representing regional energy agencies), pilot financial mechanisms such as ELENA (European Local Energy Assistance - a European Investment Bank program to encourage environmentally sustainable energy for local government) or CONCERTO (demonstration projects within the 7th EU Framework Research and Development Program), and these should be expanded and popularized. If activity is not stimulated on a local level, it will be difficult to promote energy efficiency and the development of renewable energy sources - this mainly requires local-level action, much closer to the individual

14 Interview by Iwona Kokoszka, *Forbes*, 26.07.2010. <http://www.forbes.pl/artykuly/sekcje/opinie/20-pytan-do---zygmunta-baumana,5586,1>.

than central government. The role of governments should be to create the right conditions for such initiatives and - together with the EU - to coordinate actions to promote modern energy infrastructure and technological development.

Work on the EU budget for 2014-2020, including the compilation of a list of priorities for the next EU research and development program, constitutes an excellent chance to undertake such action. EU recommendations to allocate a significant part of the total EU budget to renewables and energy efficiency have not so far been fully followed.¹⁵ Recommendations to allocate around 2% of the total budget from funding for cohesion policies / the Cohesion Fund and the European Regional Development Fund (ERDF) were also only partially respected. In line with the EU's new energy-climate challenges relative to the 3 x 20% package, over the 2014-2020 time period an increase in the share of means allocated to renewables should be sought, while ensuring that they can also be used to support strategic investments (such as e.g. marine wind farms), infrastructural investments (the development of distribution networks to benefit renewable sources), as well as investments into small-scale renewables, forming a part of distributed generation, and the creation of local intelligent micro-grids. The improvement of local and individual energy security would certainly benefit from increased efforts to implement the 2009/28/WE directive fully and on time. The directive, which deals with promoting the use of renewable energy sources, includes a series of annotations (e.g. in relation to the priority of connecting renewables to the grid or the role of installation companies). In particular, the EU should actively promote the full opening up of the grid to energy micro-sources (the possibility for an energy "prosumer" to pay his local distribution network for his net energy consumption) as in this respect it is lagging behind the US and failing to tap into the full potential of its citizens.

The 20-percent renewable energy share in the balance of gross final energy use by 2020 required by the directive, and the expected 30-35% share of green energy in meeting the demand for electric power (in places reaching 50%), constitute the best means not only of reducing emissions, but also of improving energy security.

In order to provide technological support for implementing the directive a critical assessment of the 7th EU Framework Research and Technological Development Program (binding until the year 2013) is also necessary, before the next program for up until 2020 is drawn up. Although of the whole 7th Framework Program budget (53.2 billion EUR) a significant amount has been allocated to energy (2.35 billion EUR), the Euratom budget (2.75 billion EUR) seems disproportionately high. Tenders organized under the "Energy" heading of the 7th Framework Program should also be revised, as they focus practically solely on large-scale projects involving big energy corporations, which are rarely sources of innovation or real inroads into the renewable energy sector.

Over the next decade, access to new, increasingly efficient and reliable technologies utilizing local renewable energy resources will be as important as access to fossil fuel resources was in this decade, and consequently technological rather than resource security will increasingly determine energy security.

15 Article 7 of Regulation (EC) No 397/2009 of the Parliament and of the Council of 6 May 2009 amending Regulation (EC) No 1080/2006 on the European Regional Development Fund as regards the eligibility of energy efficiency and renewable energy investments in housing.

2. The European Union on the road to energy independence

by Zbigniew M. Karaczun

How can European energy security be improved? Can the European Union become independent of external energy supplies and energy? How to support the growth of renewable energy sources in Europe so that they become the main source of energy produced by the EU? In this text the author tries to find answers to these questions.

2.1. Introduction

Two of the three European Communities brought to life by the Treaties of Rome of 25 March 1957 were directly or indirectly concerned with energy. One of the aims of Euratom (the European Atomic Energy Community) was, and remains, to promote nuclear power development in Community countries and to strengthen their cooperation in this area.¹ The April 1951 Treaty of Paris established the European Coal and Steel Community, creating a common European market whose goals included boosting the production of coal, seen as a fundamental energy resource at the time, and facilitating trade in coal between Community countries.² This allowed for the quick development of the energy sector in countries belonging to Economic Communities and provided them with a high level of energy security. As a result, no further action was taken in the 1950s and 1960s to coordinate energy policy across the whole Community, considering this one of the economic issues that member countries can and should resolve independently.

The situation changed in the seventies with the first oil crisis, caused by OPEC countries introducing an embargo on the sale of crude oil extracted in those countries. This made politicians realize that Europe was strongly reliant on the import of energy resources and that access to these resources and meeting ever-growing demand were becoming important problems from the point of view of economic development. European politicians also understood that access to energy resources was becoming a strategic issue, as these could be used by exporting countries as a political and economic weapon.

It also became apparent at the time that Europe needed stronger coordination of energy policy and that the creation of an institutional framework for actions aimed at avoiding future energy supply problems was imperative. The first of such actions was the involvement of the European Union (EU) in the

1 The decision to create Euratom was made in June 1955 during the Messina conference negotiations.
2 Initially 6 countries: Belgium, Holland, Luxembourg, Germany, France, and Italy.

International Energy Agency (IEA), created in 1974, which became the most important European tool for analyzing and monitoring the international energy market. The IEA started to analyze possibilities for raising energy independence and energy security in the European Communities. Another result of the first oil crisis was a closer cooperation between European countries and the Soviet Union (and later Russia), seen as an alternative supply source to Arab states. The search for new deposits in Europe also intensified, and the extraction of existing resources increased.

Almost two decades later, in 1991, the European Union announced the Energy Charter Declaration, which became the basis for the 1994 Energy Charter Treaty.³ These documents were created with the aim of strengthening cooperation between individual parties in the sphere of energy security and promoting the diversification of the supply of resources and energy to individual states and regions. Energy policy still remained the domain of individual member countries, however, and in most cases did not foresee a significant move away from fossil fuels.

This was soon to change. The 1990s was a period during which the European energy sector had to face another challenge: the need to reduce greenhouse gas emissions. Since the beginning of negotiations under the UN Framework Convention on Climate Change, the European Union has been one of the most active negotiators and a leader in international efforts in this area. A radical cut in emissions of the principal greenhouse gas, carbon dioxide, required a thorough overhaul of the means by which energy was generated and the replacement of carbon-based fuel burning processes with renewable sources as ways of obtaining energy. But while an aggressive climate policy and ambitious goals set for the European Union have not met with major protests from member countries, efforts to significantly change the approach to energy policy has. Several attempts to redefine it (in 1995, 2001, and 2003) did not bring the expected results. This was mainly due to the interests of individual member states dominating over the interests of the European Union. This became one of the reasons why the European Commission started to seek other ways of improving the energy security of the EU.

2.2. Community energy security

The European Union is dependent on fossil fuels. The EU consumes around 17% of the energy produced globally, and almost 80% of this comes from burning carbon-based fuels: coal, oil, and natural gas. Half of the energy resources consumed in the EU are imported. In the case of oil, the percentage imported reaches 80%, while for natural gas 57%.⁴ Some member countries are completely dependent on natural gas supplies; for others the reliability of imports is a key factor of energy security (table 1).

3 T. W. Walde, ed. *The Energy Charter Treaty* (London: Kluwer Law International, 1996).

4 The European Union imports around 70% of its oil and natural gas from Russia and the Middle East, countries with sketchy democratic standards and political instabilities. Russia is the supplier of 45% of all gas and 29% of all oil consumed in the EU.

Table 1: Level of dependence on natural gas imports for selected EU countries (data from 2005)

Country	1. Share of imports in natural gas supply (%)	Share of imports from Russia in gas supply (%)
Estonia	100	100
Finland	100	100
Czech Republic	98	70
France	98	26
Austria	88	74
Italy	85	30
Germany	81	39
Poland	70	50

Source: IEA 2009

Dependence on imports, concerns about disruption to supplies, and the lack of a common European energy policy result in some countries forcing through projects which improve their own energy security, even when this happens at the cost of decreasing the security of other EU members. One example is the project of constructing a pipeline under the Baltic Sea connecting Russia with Germany, against the protests of the Baltic countries and Poland, fearing for the security of their own supplies.⁵ This is understandable, however. Such actions are caused by a lack of coordination in EU energy and energy security policies. Politicians, fearing their voters' reactions, take decisions that are beneficial to the interest groups they represent and to their own national electorates, not paying attention to whether such decisions may be harmful to other countries. Especially as they rightly expect other countries to behave similarly. And so the vicious circle continues.

It became clear that these fears are justified and that such a high level of dependency on imported fossil fuels constitutes a major risk when Gazprom, the Russian natural gas monopoly, suddenly cut off gas supplies to Ukraine in 2005. Because the resource was transported to EU countries via a pipeline which transits Ukraine, the consequences of this decision were immediately felt by some European Union countries, among them Austria, Germany, Poland, and Italy, which began receiving up to 30% less gas. Although the crisis only lasted a few days, it caused significant losses for many companies which depended on gas for production purposes. It was also an unambiguous signal showing that the level of energy security of member states was insufficient. This belief intensified in January 2007 when Transneft, another Russian company, halted crude oil supplies delivered via the Friendship pipeline. Although this action was aimed at Belarus, its consequences – in the form of a 20% cut in oil supplies – were felt very strongly by countries like Germany and Poland.

5 The construction of a pipeline bypassing the Baltic countries and Poland and using it to supply gas to "old" EU countries will not result in gas shortages for the bypassed countries. It will, however, increase Russia's degree of freedom in its "game" with supplies. Russia will be able to close supplies to Central European countries without fearing that its interests in the West of the continent will be affected.

The Russia-Ukraine gas crisis, the Russia-Belarus oil crisis, and the cuts in deliveries to EU member countries should make the European community realize that EU policy as it stands does not ensure energy security in terms of the most basic criterion: reliability of supplies. Europe's heavy reliance on the import of resources and energy from countries that are unstable politically and not fully democratic means that the EU economy and community are at risk of being blackmailed by "rogue states" or countries not fully implementing democratic principles. The answer to this threat should be tighter cooperation on energy issues between member states, increased diversification of supply sources, and wider use of energy sourced in EU countries. For the latter, only renewable resources provide sufficient amounts of energy.

Although, it would seem, the need has been perceived, the EU is still unable to find a practical solution and reduce its dependence. As a consequence, forecasts point to a further rise in the EU's reliance on supplies of energy resources. By 2030 as much as 65% of energy sources utilized by the EU will come from imports. The majority of imports will be comprised of non-renewables – despite plans for the wide development of renewable energy sources.

2.3. Towards renewable energy sources

One of the reactions of highly developed countries to the energy crisis of the seventies was the development of the first plans for energy systems based on renewable resources. This process did not last long, however, and did not bring lasting changes. The rapid return of low prices for oil and other energy resources, followed by three decades of policies aimed at lowering resource and energy prices, conspired to limit interest in the development of renewable energy sources. The lack of confidence in renewables was encouraged by big energy corporations, which conducted more or less official lobbying activities, with no interest in changing the prevailing policy directions. Efforts made at the time did not, therefore, have durable effects and failed to bring about a fundamental change in energy policy in developed countries.

A much stronger signal for the development of renewable sources appeared twenty years later with the beginning of climate negotiations. Decisions to cut emissions taken by some countries at the time meant, in practice, that those countries chose to increase the role of renewables. This also concerned the European Union.

In 1996 the European Commission published the Green and then the White Paper dealing with the development of renewable energy sources.⁶ It specified an objective for the EU – reaching a 12% renewable energy share in the total EU energy mix by 2010. The European Commission stated the main reasons for introducing this priority as the necessity of increasing EU energy security and the need to improve the effectiveness of environmental protection measures. The authors of the White Paper pointed to the numer-

6 European Commission, "Communication from the Commission: Energy for the future: renewable sources of energy. White Paper for Community Strategy and Action Plan", COM (97) 599 final 26.11.1997.

ous benefits that the realization of the stated objective for the development of renewables would bring for the whole EU. These were, most of all:

- the creation of 500 - 900 thousand additional new jobs
- cutting the costs of buying carbon-based resources for use by the European energy sector by an annual 3 billion euro (after 2010)
- cutting energy resource imports by 17.4%
- cutting CO₂ emissions by 402 million tons/year after 2010

At the same time, according to the European Commission's calculations, the cost of implementing this objective across the entire EU was to come to 95 billion euro between 1997 and 2010.⁷

The imperatives contained in the White Paper served as the basis for the 2001/77/EC directive, adopted in 2001, regarding the promotion of electric power from renewable sources on the internal electric energy market, which reiterated the objective outlined in the White Paper (a 12% renewables share in energy generation). Unfortunately, the European Commission did not manage to force through a legally binding status for this objective. The main argument put forward was many member countries' fear that they would not be able to reach this level of development of renewables – not only because of the high investment costs, but also due to organizational and technical problems that could not be resolved in such a short time. These fears were, it would seem, justified. By 2005, half of the “old” member countries failed to reach a share of renewables that would ensure achieving a 12% share by 2010.⁸

This did not discourage the Commission's efforts, however. In January 2007 the Renewable Energy Roadmap was presented, and no more than three months later the European Council adopted a legally binding target to ensure a 20% share for renewable energy in the final energy mix of the whole EU.⁹ On this basis, on 23 January 2008, the Commission presented a new draft directive dealing with the development of renewable energy sources.¹⁰ It received political endorsement on 9 December and was adopted by the European Council on 12 December 2008. The most important change in relation to the earlier legal act was the establishment of a legally binding target – a 20% share of energy from renewable sources in final energy use by 2020. To reach this goal, it was agreed to set differentiated commitments for individual countries. Each country, based on its own evaluation of its capabilities and its political drive, set the share of renewables it is to reach in 2020 (figure 1). This solution, at least in theory, improves the chances of attaining the objective.

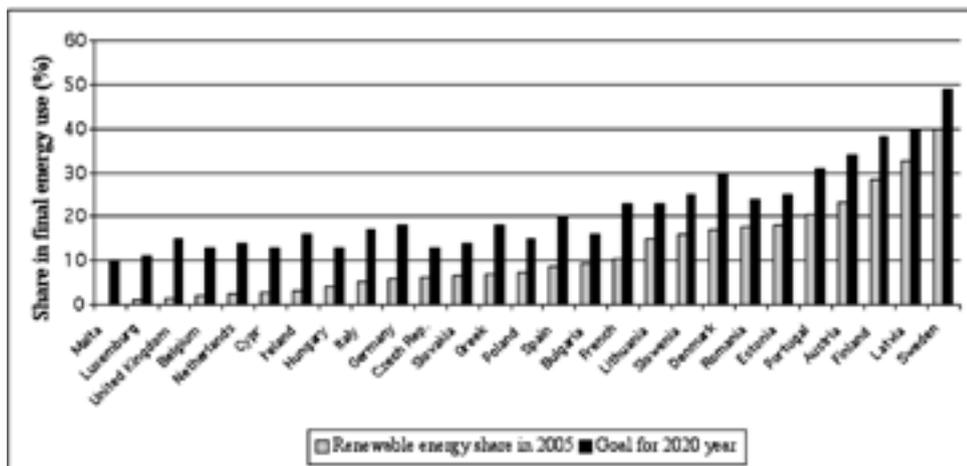
7 http://europa.eu/legislation_summaries/other/l27023_en.htm. Accessed 15.10.2010.

8 It must be noted, however, that the objective introduced by directive 2001/77/EC was not obligatory, but rather political, which meant that not all member countries used their resources fully to reach it. Had the objective been of an obligatory nature, the level of development of renewables would probably be more advanced at present.

9 Commission Of The European Communities, “Communication From The Commission to the Council and the European Parliament: Renewable Energy Road Map. Renewable energies in the 21st century: building a more sustainable future”, COM (2006) 848 final. Brussels, 10.1.2007.

10 Directive 2009/28/EC on the promotion of the use of energy from renewable sources.

Fig. 1: Development targets for renewables in individual member countries for 2020



Source: Directive 2009/28/EC

To further increase these chances, the European Commission made it compulsory for member states to compile national action plans for the development of renewables by 30 June 2010. By 15 October 2010 such plans had been prepared by 23 member states. Only Belgium, Estonia, Poland, and Hungary had failed to present them.

It can therefore be said that the European Union and its institutions have done a lot to ensure meeting the stated objective. But was it enough? Does shifting responsibility for the development of renewables onto national governments absolve EU institutions from all other efforts? And one more question, of foremost importance: is the objective introduced by directive 2009/28/EC sufficient to provide the EU with energy security, taken to mean both the reliability of energy supplies and the environmental safety of energy generation?

2.4. What does the EU need?

The foundation of building a Europe based on the use of renewable energy sources is the reconstruction of European solidarity. The principle of solidarity has been one of the European Union's funding paradigms for many years – the readiness of rich societies to share with the poorer. Thanks to this, countries such as Greece, Spain, and Ireland have experienced a great developmental leap forward. The practical implementation of this principle also benefited new member countries joining the EU after 2004. Thanks to cohesion funds, investments that stimulate their economic and societal growth are carried out.¹¹

The solidarity principle also had a deeper dimension. It meant the readiness of European society to renounce certain goods and benefits in order to ensure

¹¹ Cohesion policy also has a positive impact on the economies of donating countries. Almost half of the means spent in “new” member states is estimated to return – in the form of purchased goods and services – to “old” EU countries.

access to them for future generations. This is why the European Union adopted progressive environmental policies for many years, setting and implementing targets that were unprecedented on a global scale. This also contributed to the European economy maintaining its place at the forefront of global innovation, effectively competing in the international market with the other economic giants like the United States and Japan. It would seem that the belief that the solidarity principle still holds was fundamental to decisions aiming to increase the role of energy generation based on renewable sources in the EU. This is because the development of renewables, even at the cost of sacrifices made by the current generation, means that we retain valuable resources for future generations and that we do not develop at the cost of degrading the natural environment.

Unfortunately, changes in the distribution of power in the international economic market, the entry of China and other economic “tigers” into the market, and the economic crisis of recent years have changed the attitude of European societies. The rise in populist and nationalist tendencies is a threat to the openness and unity of Europe. As many of the CEE citizens believe, European solidarity weakens as France and Italy expel Romanian Roma people, Finland fights beggars, Ireland has seen killings of workers from Central and Eastern Europe accused of stealing jobs from the Irish, and the president of France reprimands politicians from new member countries for not keeping quiet while great EU countries make decisions and for demanding that their interests be respected.

All this is happening with minimal and selective protests from politicians from other countries, because in reality no one has a clear conscience. Although most politicians loudly expressed their outrage at Greece’s attempt to mislead the European Commission, no radical action was actually taken against the country. In fact most governments use various accounting tricks to boost their balance sheets. The defense of national interests dominates efforts to bolster European cooperation and increase EU policy coordination. The solidarity principle is dying.

This is a very gloomy perspective for the common energy policy of the European Union and for making renewable energy sources a basis on which to build its energy security. It is impossible to create a new system without greater solidarity on the part of member states. The acceptance of greater risk is necessary for the whole system to function in an efficient and effective manner: instead of taking actions at the national level (that is relatively “easy”) the member states must risk, believing that actions taken at the European level will be effective and that the problems of particular states will be treated equally.

Each EU country must assent to the heightened individual risk resulting from the transfer of the management of their own energy sector onto a higher, community level. The principle that energy security will be constructed on the level of the whole community rather than individual countries is an imperative that must be accepted, and any investments made should improve common security above all else. This is because the tightening of cooperation and integration among EU countries is a key, principal step in building a new European energy order. Without this, without greater trust that the Community can effectively solve Europe’s energy problems, an active development of renewables will not be possible.

Creating a new EU institution to support the renewable energy sector is the second essential step toward building a renewable-energy Europe. Community practice to date clearly demonstrates that, of all the objectives set by the EU, it is those managed on a Community level and coordinated by a specially appoint-

ed pan-European institution that are carried out most efficiently. The creation of Euratom contributed to the fast development of the nuclear sector in Europe. The Coal and Steel Community allowed for low coal prices to be maintained for many years and guaranteed steady supplies to power stations in all EU countries. A new institution responsible for the development of renewables and reducing our dependence on fossil fuels should not only monitor efforts undertaken by the governments of individual countries and the private sector in this area, but also broadly coordinate these efforts and promote those courses of action that will be considered essential from the point of view of an emerging new energy sector encompassing the whole bloc. Such an institution should cooperate closely with DG Research so as to ensure the rapid implementation of innovative solutions.

Widening research efforts, encouraging scientific cooperation, and implementing innovative solution form the next, third element in the construction of Europe's energy security. The development of renewable energy in Europe needs its own "Apollo Program" - combining a science program, which utilizes the knowledge of the best specialists, with an implementation program, which allows for their ideas, new solutions, and technologies to be put into practice. Wide-ranging scientific research on a pan-European level is essential, as is the implementation of innovative solutions when it comes to developing new, more effective renewable technologies, intelligent transmission networks, energy storage, creating energy reserves, and helping end consumers adapt to functioning in tandem with renewable energy sources, or rather changing the role of a passive energy consumer into its active "prosumer."¹² Crucially, a new concept of energy security from the point of view of the end consumer must be formulated; in most cases problems with power in the grid can be solved by cutting demand from the end consumer. This will require the creation of a new type of relationship: in the case of power shortages, instead of buying in power from producers (who will not always be able to react on time), distributors will pay those users who agree to cut their consumption for a given period of time. It will become necessary to differentiate energy prices for different producers depending on their readiness to react to grid problems. Those maintaining reserves capable of instantly supplying the grid with energy (in the case of an outage) must be paid more. This will make it possible to stabilize the functioning of the system and decrease the risk of outages.

The fourth essential element will be money. A program of remodeling the energy sector will require substantial, stable sources of financing, just as was the case with man's journey to the moon, the cost will be high. According to calculations carried out by the European Renewable Energy Council (EREC), fully switching to renewable energies by 2050 will cost 2,800 billion euro.¹³ This is a colossal sum. And although, as estimated by EREC, the savings resulting from not having to purchase coal, natural gas, and oil will more than compensate for the investments (estimated at 3,800 billion euro by 2050), it remains clear that access to funds could become a barrier to change.

On the other hand it is worth remembering that delivering the European economy from the effects of the last financial crisis and helping Greece has cost the

12 More on this can be found in J. Popczyk, *Distributed Energy in the Interest of the Consumer – Market – Energy Climate Pact* (Warsaw: Institute for Sustainable Development, 2010).

13 <http://www.ecoport1.com.pl/eko-energia/100-energii-ze-zrod-el-odnawialnych-do-roku-2050>. Accessed on 16.10.2010.

European Union a similar sum in recent years.¹⁴ So as not to allow for a repeat of the EU currency crisis such as that which hit Greece, the European summit of 9-10 May 2010 voted through the creation of a special mechanism to stabilize the common currency, with a 750 billion Euro fund at its disposition. Of this sum, the input of member countries to the European Stabilization Mechanism will total 440 billion Euro, 60 billion is to come from the EU budget, while the International Monetary Fund has offered 250 billion Euro. This clearly indicates that, if the political will is there, even very large financial means can be mobilized.

The money should stimulate investments, especially those that allow growing independence from carbon-based fuels and whose implementation raises the level of energy security on the scale of the whole Community. Without common projects and investments it will be difficult for Europe to cut its reliance on non-renewable resources. A further element should be provided by better coordination of EU policy being implemented in different domains. At present this is not so obvious. While adopting progressive climate policies and putting pressure on member countries to radically cut their greenhouse gas emissions, the European Commission simultaneously approves development programs, proposed by individual countries and to be paid for with EU funds, which will result in a rise in emissions!¹⁵ While calling for cuts in transport emissions, the EU supports the construction of motorways and infrastructure that promotes motorization. It encourages moving away from fossil fuels, but at the same time agrees to subsidies for the coal industry. If the European Union is to be efficient, this must change. It cannot simultaneously finance the development of renewables and conventional energies. Ensuring a rise in the share of renewable sources remains impossible as long as carbon-based fuels continue to receive subsidies – e.g. by not including external costs in the price of energy generated by burning non-renewable resources.¹⁶

2.5. Conclusion

The target of a 20% share for renewable energy sources adopted by the EU should be interpreted as the Community's first step to building an economy independent of fossil fuels. Achieving this target will not guarantee a leap forward in terms of improving Europe's energy security. Fifty to 60% of total energy will continue to be generated from imported non-renewable sources. Nevertheless, meeting this objective could usher in a breakthrough in the way we think about the European energy

14 The value of public money (government guarantees) allocated for bailing out national economies amounted to almost 2 trillion euro by the end of the first quarter of 2009 for only 3 EU countries! The United Kingdom allocated 656 billion Euro to this end, Germany – 643 billion Euro, and Ireland – 624 billion Euro. Source: J. Osiński, Introduction, *The European Union and the Economic Crisis: Understanding the Crisis*, no. 3 (Warsaw: SGH, 2009), p. 7–12. Of course giving out guarantees does not mean that these funds were actually spent (as it will be the case with investments into renewables), but this demonstrates the readiness of governments to allot such sums to chosen purposes.

15 Z. M. Karaczun, A. Kassenberg, M. Sobolewski, *European Union Funds for the years 2007-2013 and Environmental Protection* (Warsaw: InE, 2008), p. 96.

16 For example, according to the European Environment Agency, the external costs of producing electric energy in Poland are the highest in the EU and amount to 5-18 eurocents/kWh, compared to an EU average of 1.8-5.9 euro cents/kWh.

sector, and it should help remove market and technological barriers hindering the development of renewables. The mass use of renewable energy source technologies will contribute to lowering their cost. The ongoing modernization of power transmission infrastructure and its adaptation to the need of using renewables will make the connection of new power generating capacity based on renewable sources not only cheaper, but also less problematic. It can therefore be assumed that, although the 20% share for renewables is not a revolution in itself, it is the beginning of one, which will allow for a significant acceleration and facilitation of the development of renewables in the years to come. This is why achieving this target is so important.

Europe needs a new challenge, so as not to sink into complacency and not to lose its advance on quickly developing new economies. Achieving independence from energy resources could become such a challenge. As Ralf Fücks wrote in the preface to *ERENE: European Community for Renewable Energy: A Feasibility Study*, to retain the political dynamic and public support the European Union needs great goals.¹⁷ *ERENE* – which points to the possibility of meeting Europe’s energy needs solely using renewable sources – sets such a goal, similarly to the *DE-SERTEC* project (using the surface of the desert to produce solar energy and using wind power). That this project is not just the fantasy of a handful of enthusiasts is demonstrated by the fact that, alongside new technology companies (Schott Solar, MAN Solar Millenium), it has attracted the engagement of numerous European companies, also conservative firms from the financial sector, such as Munich Re, Deutsche Bank or HSH Nordbank as well as energy and industrial corporations such as ABB, E.ON, RWE or Siemens. A number of recent studies have also demonstrated that the European Union can generate all the electricity it needs from renewable energy sources – if Europe cooperates in using its renewable energy sources and takes a European approach instead of each member state developing its own policy and primarily using just the resources on its own territory.¹⁸

Responsibility for promoting the development of renewable energy therefore cannot be limited to member countries, but requires active efforts from Community institutions. Selecting and supporting investments that are important from the point of view of the whole European bloc is essential – such as, at present, system interconnectors, which reinforce the security of national systems by connecting them to the systems of other EU countries.¹⁹ The Commission also needs to take a principled approach towards attempts at illegally providing public assistance for conventional energy sources, as this creates a market barrier to the development of renewables. Over

17 Ralf Fücks, “Preface” in: Schreyer M. Metz L., “*ERENE: European Community for Renewable Energy. A feasibility study*” published by the H. Böll Foundation, Warsaw 2009.

18 See, for example, European Climate Foundation, *Roadmap 2050* (The Hague 2010); EREC & Greenpeace: *RE-thinking 2050 – A 100% Renewable Energy Vision for the European Union* (Brussels 2010) or: PricewaterhouseCoopers LLP (PwC), the Potsdam Institute for Climate Impact Research PIK, *100% renewable electricity A roadmap to 2050 for Europe and North Africa* Available at: http://download.pwc.com/ie/pubs/renewable_vision_europe_nov2010.pdf.

19 When during the winter of 2002-2003 the Norwegian electrical grid experienced a significant power deficit, the crisis was resolved also thanks to the import of energy from Poland (using a direct current cable running along the Baltic sea floor). A second factor was the rise in energy prices on the spot market (up to around 100 euro/MWh), which led many enterprising consumers to cut their use of grid energy and switch on their own generators (from: M. Duda, “Liberalizacja rynku a bezpieczeństwo dostaw energii elektrycznej,” [“Market liberalization and electric power supply security”] in *Biuletyn URE* 2004/1: 24 - 27).

the next two years the foundations for spending new European funds for the years 2014-2020 are to emerge. They should be based on the allocation of all available funds for renewable sources and related infrastructure. This will provide an unambiguous signal that the European Union is determined to build a low-carbon economy.

The European Commission seems to understand this increasingly well.²⁰ At the beginning of May 2010 it submitted for consultation a new document setting out the directions of energy policy development for the years 2011-2020. It listed the following priorities:²¹

- the creation of a modern integrated grid
- making progress towards a low-carbon economy
- support for innovative technologies and moving away from traditional solutions
- support for a coordinated energy policy in relation to suppliers from outside the European Union
- protecting EU citizens and guaranteeing them energy security

With adequate methods of implementing these targets and the use of appropriate instruments this could become a significant component of building a Community energy security based on the use of renewables.

As it promotes the development of renewables, the European Union must not forget that renewable energy is not always secure. Every technology – renewables included – comes with a risk factor which must be addressed, best of all at the decision stage. Building a new energy system for the European Union, based on the use of renewable sources, must be carried out with the results of a wide-ranging analysis of their impact on the natural, social, and economic environment in mind. Only then, when this impact turns out less significant than that of conventional sources, should the transformation be implemented on a European scale. Meanwhile, individual decisions – where and what type of installation to build – must always be considered one by one, so as to prevent negative effects on the environment and/or minimize them.

The above review does not discuss all the actions which should be taken in the European Union to increase the use of renewables. It does, however, point to the most important such actions. Although the change in current thinking about the EU energy sector seems difficult to bring about, it is worth noting that, if the European Union wants to build its position as a leader in the most competitive market in the world, it is essential. In a world of shrinking energy reserves and rising needs, with those reserves controlled mostly by countries with low democratic standards, in a world threatened by the degradation of natural resources, there is no other way.

2.6. Acknowledgements

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20 Andrzej Kassenberg, *Energy and Climate Policy of the EU and Poland: Educational Materials of the Institute for Sustainable Development*. Published by ISD, Warsaw 2010.

21 “Towards a new Energy Strategy for Europe 2011-2020”, http://ec.europa.eu/energy/strategies/consultations/2010_07_02_energy_strategy_en.htm.



Meeting 100% of Europe's electricity needs through renewable energy by 2050 is possible – if we succeed in pooling the potential of Europe's renewable energy sources. This will require cooperation between EU member states, as well as coherent policies and regulation at the European level. Both currently exist only in fragmented form as energy policy in Europe is still shaped mainly at the national level. The two analyses included in this publication, prepared by two Polish experts, Grzegorz Wiśniewski and Dr. Zbigniew Karaczun, can be said to present two sides of the same question – the role that renewable energy sources can and should

play in the process of reinforcing Europe's energy security: the issue of developing the European governance structure necessary to achieving this end, as well as presenting the tasks for the European Union in supporting and promoting local and regional initiatives fundamental for this process. Which mechanisms are essential on a European level, and which solutions must inevitably be introduced on the regional, local, and individual levels, so that these actions complement each other are the key questions for creating a coherent and effective framework for the advancement of energy security based on the use of renewable energy sources.