

NEW HORIZON-S FOR THE EUROPEAN ENERGY UNION

Ivan Tsvetanov*, Ivaylo Toskov**

I. Foundations of the European Energy Union

In the not so distant year of 2010 the European Union (EU or the Union) adopted the Strategy for smart, sustainable and inclusive growth – Europe 2020 [1], which presented the vision for its development in the decade to come. This ten-year strategic programme laid out the basis and objectives for the upcoming long-term policies in various areas such as employment, research and development, education, social inclusion, energy and climate, which have to be achieved by 2020.

Taking into consideration the completion of the set objectives in the areas of climate and energy, on February 25th 2012 the European Commission (EC or the Commission) presented a Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy [2], as a part of the Energy Union Package [3] that presented as a main goal the provision of secure, sustainable, competitive and affordable energy for the European consumers- households and businesses. This shows that the European energy union is based on the three long-term objectives of the EU's energy policy- sustainable development, security of deliveries and competitiveness which were laid down with the Europe 2020 Strategy and the Strategy for Competitive, sustainable and secure energy – Energy 2020 [4]. In order to meet these long-term goals, the Framework Strategy visualises five mutually complementing and closely linked areas, which will be addressed in the following pages.

II. Main areas of the Energy Union [5]

1. Energy security, solidarity and trust

One of the fundamental objectives of the Framework Strategy is to minimise the vulnerability of the EU to external energy shocks. That is why measures that

* Ivan Tsvetanov, Assoc. Prof. PhD, Private Legal Studies Department, UNWE, email: ivan6ivanov@abv.bg

** Ivaylo Toskov, PhD Student, Private Legal Studies Department, UNWE, email: ivaylo.toskov@gmail.com

reduce the dependency on specific fuels, energy suppliers and routes should be adopted.

The two driving forces to achieve energy security are visualised in the Framework Strategy. They are ***the completion of the internal energy market*** and ***the more effective use of energy*** in the following years and decades. Not to be overlooked is also the circumstance that the energy security of the Union is closely linked to its neighbours, which leads to the necessity for all energy-related matters to be discussed and decided in the spirit of solidarity by all EU members.

The desired energy security, solidarity and trust can be achieved by the following of ***four main priorities***, namely:

1.1. Diversity of deliveries (energy sources, suppliers and routes)

Nowadays it is more than clear that the diversification of the energy sources, suppliers and routes is of key importance to guaranteeing secure and sustainable energy deliveries that are available to European producers and consumers at any given time. That is why in the Framework Strategy the EC has identified several actions whose performance would contribute to the desired diversification:

1. Intensification of the work on the Southern Gas Corridor (which would allow Central Asian countries such as Azerbaijan, Turkmenistan and other to export their gas to Europe);
2. Creation of gas hubs for liquefied natural gas with several suppliers in Northern, Central and Eastern Europe;
3. Completion of the Mediterranean gas hub which is currently in the making;
4. Construction of infrastructure for the provision of new suppliers of gas to the EU, as well as an internal one inside EU borders;
5. Exploration of the potential of the use of liquefied natural gas (LNG) as a backup option in crisis situations;
6. Development of the infrastructure to transfer and store LNG, as well as removal of obstacles for its import from the USA and other producers;
7. Undertaking of measures to reduce oil consumption;
8. Diversification of the deliveries of nuclear fuel and related services;
9. Encouragement of EU domestically produced energy from renewable and conventional or unconventional sources.

1.2. Security of deliveries

Energy security requires close cooperation and interaction between the Member States, between the operators of transmission systems, the energy industry and all other interested. In the Framework Strategy it is ascertained that:

- in regards to oil deliveries measures have already been taken, that ensure that the Member States maintain minimum stocks of crude oil and petroleum products [6];
- it is necessary to strengthen the cooperation and to introduce a common crisis management on EU and regional level, which would guarantee the Member States that in cases of insufficient gas deliveries they can rely on their neighbours;
- it is necessary to improve the mechanisms for collective purchasing of gas during times of crisis and where Member States are dependent on only one supplier, which should be fully compliant with WTO rules as well as EU's competition provisions;
- it is necessary to update the frameworks for the security of electricity deliveries and to establish a range of acceptable risk levels for supply interruptions.

1.3. Stronger European role on the global energy markets

In the Framework Strategy it is taken into consideration that the energy policy is often used as a tool of foreign policy. Accordingly, the necessity for the EU to improve its ability to project its weight on the global energy markets, in order to achieve better competition and transparency on them.

When the negotiations for agreements with countries that are important from energy supply perspective, it is a priority to include "energy" provisions in these agreements that would contribute to the energy security (in particular- for the access to resources) and the objectives for sustainable energy of the energy union.

The necessity for the establishment of foreign policy strategical partnerships with producers and transit countries such as Algeria, Turkey, Azerbaijan, Turkmenistan and other, as well as with regions of increasing importance such as the Middle East, Africa and other potential suppliers.

It is also important to develop the partnership with Norway- the second largest supplier of crude oil and natural gas in Europe. With the right political conditions, it is also crucial to reframe the energy relationships between the EU and Russia, which should develop on the basis of equality in regards to market access, loyal competition, environmental safety and other that would prove to be mutually beneficial for both parties.

Last but not least the EU recognises that particular attention should be given to the partnership in the field of energy with Ukraine as a transit country for gas supplies, which partnership should address the issues of the reforming of Ukraine's energy market, the modernisation of its gas transit network, the increasing of Ukraine's energy efficiency, etc.

1.4. Better transparency for gas supplies

In the Framework Strategy it is noted that the full compliance of the agreements for the purchasing of energy from third parties with EU law is an important element of guaranteeing the energy security, especially in the field of gas. It is also ascertained that the renegotiation of agreements concluded between Member States and third parties is extremely difficult because of many obstacles, including political pressure not to alter any part of the agreement. Taking that into consideration, it is stated that in future the EC must be informed about the negotiations of intergovernmental agreements from an early stage so that it can ensure a better preliminary assessment of the compatibility of the future agreement with the rules of the internal market and the requirements for security of supplies.

It is also considered for the Commission to participate in the negotiations with third parties, as well as the creation of standardised contract provisions that would more effectively prevent any unfair pressure and guarantee the compliance with the European rules.

2. Fully-integrated internal energy market

The European Commission takes into consideration the fact that the current organisation and design of the internal energy market does not lead to the creation of adequate conditions for investments, as at the same time market concentration and the weak competition remain an issue. This is why one of the leading objectives in this direction is considered to be the giving of a new political boost to the ***final completion of the internal energy market***.

For the achievement of this strategic objective the following ***priorities*** have been outlined:

2.1. Material provisioning of the internal energy market

For the material provisioning of the internal market, and more particularly- the linking of the markets via interconnections, the Strategy provides the following:

1. Continuation of the work on the energy infrastructural projects of common interest and on the 33 key infrastructure projects, as well as regular reporting on the progress;
2. Reaching by 2020 of the set minimum interconnectivity target for electricity of 10% of the installed electricity production capacity of the Member States and the setting of a new target of 15% by 2030;
3. Exploration and approval of proposals for energy investment schemes that combine resources for financing of economically viable investments [7],

and the creation of an investment portal that is being set as a part of the European Fund for Strategic Investments.

2.2. Creation and actualisation of the organisation of the internal energy market

For the achievement of this strategic objective the following are required:

1. Full implementation and strict enforcement of the existing energy and related legislation, and especially- the 3rd Internal Energy Package in regards to the internal market; in particular, the efforts should be directed towards the unbundling and the independence of regulators;
2. Strict compliance with the competition rules established in the Treaty on the European Union and the Treaty on the Functioning of the European Union with the purpose of preventing of distortion of the internal energy market;
3. Improved cooperation between the operators of transmission systems for electricity and gas within the European Networks of Transmission System Operators for Electricity and Gas (ENTSO-E/G);
4. Strengthening of the regulation on the EU internal market which should be achieved through a significant reinforcement of the powers and independence of the Agency for Cooperation of Energy Regulators (ACER);
5. Adoption of network codebooks with the purpose of the assistance of the harmonisation of the flow of electricity and gas across the different transmission systems;
6. Expansion of the possibilities for distributed generation and management of electricity consumption, as well as the development of new high-voltage long distance connections (“supergrids”) and new technologies for storage;
7. Preparation and realisation of a legislative proposal by the EC for restructuring of the electricity market and the linking of wholesale commerce with retail, which should lead to closer integration and increase of cross-border trade, and hence to the origination of the right investment signals;
8. Ensuring that the capacity mechanisms and support for renewable electricity are fully in line with existing rules and do not distort the internal energy market. As a part of this measure it is provided that the environmentally harmful subsidies need to be phased out altogether and the Emissions Trading System should be reformed;
9. Ensuring by the EC of better transparency in the composition of energy costs and prices.

2.3. Improved regional cooperation within the common EU framework

The cooperation within the Energy Union presupposes improved coordination between neighbours while making the policies in the energy field. The successes of already achieved arrangements such as the Pentalateral Energy Forum or the Baltic Energy Market Interconnection Plan (BEMIP) should act as a catalyst in this direction. It is necessary, however, to improve cooperation, solidarity and trust in the Central and South-Eastern parts of Europe. It is provided that the Commission must work with the Member States and industry to deliver cost reduction for the Northern and Baltic Sea based energy systems.

2.4. New commercial mechanism for the consumers

The consumers of one Member State in the Energy Union should be able ***to make an informed choice and purchase their energy freely and simply from a company in another Member State***. For the achievement of this leading objective it is provided:

1. Adaptation of the current regulatory frameworks in this regard;
2. Full implementation and enforcement of the existing European rules for consumer protection;
3. Taking of control of the energy consumption by the consumers, respectively by companies providing energy services working on their behalf, which can be accomplished by including smart technologies;
4. Standartisation and introduction of smart measuring devices on national level;
5. Phasing-out of cost regulated prices and tariffs through competition and economic governance frameworks.

2.5. Protection of the vulnerable consumers (overcoming “energy poverty”)

“Energy poverty” is a phenomenon which can be now freely addressed and which has a negative effect on living conditions and health. It can be overcome by a combination of measures, mainly in the social field and within the competence of the competence of authorities on national, regional or local level. When phasing-out the cost regulated prices the Member States should propose a mechanism to protect the vulnerable consumers which should preferably be provided through the general system of social welfare. If it is provided through the energy market, then it can be realised through different schemes such as a “solidarity tariff” or as a discount on the energy bills, and the cost of such schemes should be collectively covered by non-eligible consumers.

3. Energy efficiency as a contribution to the moderation of energy demand

The EU has to work actively towards rethinking its energy efficiency policy [8]. The European Council has set an indicative target of at least 27% of improving energy efficiency by 2030 at EU level, with a review of the possibilities for a 30% target scheduled for 2020.

In the Strategy it is ascertained that the EU has already put in place the world's leading set of measures for better efficiency in energy consumption, amongst which are energy labelling and ecodesign legislation. Nevertheless, special attention should be given to the sectors with bigger potential for energy efficiency- transport and buildings.

3.1. Increasing energy efficiency in the buildings sector implies:

- a) improvement of the heating and cooling systems of building, including through central heating and cooling;
- b) taking of actions on local and regional level within a Member State in order to realise the potential of energy efficiency of buildings;
- c) support by the EC for the work of the Smart Cities and Communities-initiatives as well as to the Covenant of Mayors;
- d) development of an initiative for the “global excellence for energy efficiency policy-making” as a contribution to the G20 Energy Efficiency Action Plan;
- e) encouragement of financing for energy renovation of buildings from the EU funds and the EIB.

3.2. Energy-efficient low-carbon transport

Since the transport sector represents more than 30% of the final energy consumption in Europe, realising its energy efficiency potential requires and presupposes ***a continued focus on tightening of CO2 emission standards*** for passenger vehicles and vans after the year 2020, as well as measures for improving fuel efficiency and CO2 emissions reduction for heavy-duty vehicles and buses.

This strategic objective must be accompanied by the following measures:

- promotion of the use of different road charging schemes, based on the principles “the polluter pays” and “the user pays”;
- realisation of significant fuel economies by removing the barriers to less greenhouse gas intensive types of transport, like the rail and maritime transport and inland waterways;

- increased development and deployment of alternative fuels as well as promotion of the quick installation of the necessary supporting infrastructure (refueling and recharging stations) [9];
- speeding-up of the electrification of the automobile fleet and other means of transport;
- better traffic management and urban mobility policies as an instrument for carbon dioxide emissions reduction.

4. Decarbonisation of the economy

The policy of the EU in the field of climate relies on the necessity for greenhouse gases reduction, as well as on the idea of making the Union a world leader in the renewable energy field.

4.1. Ambitious policy in the field of climate

The agreement on the 2030 climate and energy framework defines EU's commitment to ***reduce its greenhouse gases emissions*** with at least 40% as compared to 1990. For the completion of this objective it is provisioned for the Commission, together with the Member States, to ***establish dialogue*** with other large economies, in order to convince them to join Europe's ambitious approach.

A well-functioning emissions trading system is the cornerstone of Europe's climate policy, and it has to perform its function to stimulate the investments in low-carbon technologies. For this objective ***the EU Emissions Trading System will deliver a reasonable price*** for carbon emissions and will stimulate cost-effective reductions of greenhouse gases emissions.

For the sectors that are not included in the EU Emissions Trading System, national targets must be set, and ***the land and forestry sectors will be incorporated in the "EU 2030" framework strategy***, in order to ensure that these sectors have the right incentives to reduce greenhouse emissions and contribute to the fight against climate changes.

4.2. Becoming the world leader in the field of renewable energy sources

The European Union has committed itself to becoming the world leader in the production and use of energy from renewable sources. Part of the toolkit for the reaching of this objective is the setting of a target of at least 27% for the share of renewable energy consumed in the EU in 2030. In order to meet the set target of 27%, several challenges must be overcome, and more specifically:

1. Integration of renewable sources production- this requires adaptation of the energy markets and grids to the renewable energy sources;

2. Support and encouragement of the production from renewable energy sources by market-based schemes and in line with the Environmental and Energy Aid Guidelines;
3. Attracting investments from international funds, entrepreneurs and cooperatives for the realisation of large-scale projects on the exploitation of renewable energy sources;
4. Development of new infrastructure and more precisely- of interconnections with the purpose of lowering the costs for integration of electrical energy from renewable sources on the internal energy market;
5. Investments in modern, sustainable alternative fuels, including in the processes for biofuels production, and bio-economy in general.

5. Energy Union for research, innovation and competitiveness

In order to ensure the EU's role as a world energy leader, it must have a leading role in next generation technologies for renewable energy sources, as well as storage solutions. Also, with the purpose of putting the EU in the lead in smart grids and smart home technologies, ecologically clean transport, as well as clean fossil fuels and the world's safest nuclear energy, it is of utmost importance that the energy union be turned into a motor of growth, employment and competitiveness.

Europe is aware that in order to achieve these ambitious objectives, there must be serious changes [10] in the energy system of the EU. This could hardly happen if a powerful impetus is not given to the development of new technologies necessary for decreasing energy consumption, diversification of the options for production of energy and optimisation of energy infrastructure. It is obvious that today and in the near future scientific research and innovation activities play and will play an extremely important role in developing cheaper, more effective and more reliable energy technologies. In turn, these technologies would ensure efficient and profitable solutions for improving energy efficiency of buildings and local heating systems, as well as to provide new solutions for energy storage. In order to achieve all of the above, the new European approach for research and innovation in the field of energy should accelerate the transformation of the energy system [11], which should be done on the basis of the Horizon 2020 Programme for Research and Innovation (Horizon 2020 Programme, of simply Horizon 2020).

III. Foundations of horizon 2020

Horizon 2020 is an EU framework programme for scientific research and innovation with a budget of around 80 billion euro. Even though it finds its foundation in the Europe 2020 Strategy, the Horizon 2020 Programme was

established with Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC.

The purpose of the Horizon 2020 Programme is to support the achievement and functioning of the European Research Area, in which researchers, scientific knowledge and technologies can move freely, by strengthening the cooperation between the Union and the individual Member States, as well as between the Member States. The Programme is focused on *three main priorities*, namely:

- to create conditions for excellent science with the purpose of strengthening and promotion of the scientific achievements of the Union on world level (*priority “Excellent science”*);

- to help promote the leadership positions of the industry in innovation and to support the businesses, including the small and medium enterprises (SMEs) (*priority “Industrial leadership”*);

- to tackle societal challenges in the context of the priorities of the Europe 2020 Strategy, by supporting activities covering the entire process from scientific research to the market (*priority “Societal challenges”*).

The Horizon 2020 Programme is directed towards attracting wide participation by universities, research centres, the industry and SMEs in order to achieve the objectives of the European Innovation Partnership, in accordance with the Innovation Union flagship initiative of the Europe 2020 Strategy, by bringing together all relevant actors across the whole research and innovation chain. With the aim of deepening the relationship between science and society, as well as to reinforce the public’s confidence in science, Horizon 2020 has set the objective of fostering the citizens and society to take an informed engagement on the matters of scientific research and innovation, by improving accessibility to science data, by developing responsible research and innovation agendas that meet the citizens’ and society’s expectations, and by making the activities on the programme more accessible.

IV. The European Energy Union and Horizon 2020 – new horizons for the Energy Union

Taking into account EU’s ambitious goals regarding energy and climate, *the “Secure, clean and efficient energy” specific objective of the “Societal challenges” priority* aims to support the transition towards a sustainable and competitive energy system. EU financing through the programme has to play a major role in the achieving of this goal. Through the specific objective support will be provided to scientific research and innovation related to energy consumption, with the aim of providing secure, competitive and affordable energy to all energy

consumers. The main challenges are pointed out to be the Union's increasing energy needs, the scarce resources and the fight against climate change.

The funding under the Horizon 2020 Programme is set in multiannual periods (work programmes). Currently active is the 2016-2017 Work Programme [12], which focuses on *two main calls: Energy Efficiency Call* and *Competitive Low-Carbon Economy Call*. As a response to the challenges marked by the Framework Strategy for the Energy Union, as well as in line with the priorities set by the Strategic Energy Technology Plan (SET-Plan) [13], the current work programme focuses on providing more opportunities for the consumers, as well as on improving the efficiency of the energy system, especially in regards to building stock, making and development of next generation renewable energy technologies [14] and their integration in the energy system. In order to maximise the effect of this work programme, the strengthening of the cooperation with the national funding programmes should be supported.

1. Energy efficiency call

The reaching of *high levels of energy efficiency* is a main objective of the policies of the EU in the field of energy and the fight against climate change, as was stated in the Framework Strategy for Energy Security and the Strategy for a Resilient Energy Union. This objective is also set in the Energy Efficiency Directive [15]. The achievement of the 2030 goals for energy efficiency requires a focus on the investments in scientific research and innovations necessary for the removal of existing technological and market uptake obstacles. In order to accomplish these objectives, the challenges before research and innovation must be identified, which was done with the Strategic SET-Plan. In the priorities for the improvement of energy efficiency in buildings were set, as well as for addressing existing issues in heating and cooling, and of the necessity to activate consumers at the centre of the energy system. That is why the Energy Efficiency Call is organised in several sub-areas, to which attention will be given below.

1.1. Sub-area "Engaging consumers towards energy efficiency" aims to achieve broader consumer awareness in the field of sustainable energy solutions, improved understanding and activity, as well as strengthening of the participation of the individual consumer in the solutions, including by producing energy for their own consumption. The sub-area should address challenges of non-technological nature and to achieve change in the behaviour and attitude of the consumer towards sustainable solutions and the decisions for energy sources. At the same time it should support the research on decision making processes by the consumers, as well as the quantification of the positive impact of the different solutions on energy efficiency.

1.2. Sub-area “Buildings” “enjoys” particular attention within the present work programme not only because of the fact that buildings are one of the biggest “consumers” of energy in the EU [16]. By placing emphasis on this sub-area, Horizon 2020 aims to approach in full two separate and distinct issues: on one hand is *the consumer issue* regarding the high energy costs because of energy ineffective buildings, and, on the other hand, is *the issue of EU’s energy independence and security*.

This sub-area is focused on reducing costs of renovations targeting improved energy efficiency. Its goal is to achieve Nearly Zero-Energy Buildings performance, which, however, should not be at the expense of the internal convenience and quality in life in the buildings. In accordance with that, it accentuates on different projects, including in the public-private partnership areas, with the purpose of:

- removing different obstacles that hinder the energy efficiency of buildings;
- stimulating the market for energy efficiency driven renovations;
- enabling further harmonisation in calculation of energy performance and certification of buildings;
- training of the building workforce in order to develop knowledge and skills in the field of energy efficiency.

1.3. The main challenges before *sub-area “Heating and Cooling”* is to support policies for the reduction of the demand for heating and cooling, for the increase in the use of RES and, of course, to address the main consumer issue- to reduce the costs of heating and cooling. All of this is in line with the European Strategy on Heating and Cooling [17] brought by the Commission. Scientific research and innovation in this sub-area should be focused on the optimisation and matching of efficient and sustainable heating and cooling supply, on developing different and improved models and systems for heating and cooling, as well as on stimulating of appropriate measures for the market of retrofitting of inefficient district heating networks. Particular attention is given to the support of solutions for the creation of district heating/cooling networks with cost-effective and efficient management as well as the reuse of waste heat and waste cold from different sources. Within the boundaries of this sub-area support will be given to: projects for the recovery of waste heat from buildings and its reuse with the aim of increasing energy efficiency of district or individual heating systems; improving the performance of inefficient district heating networks; systems for heating and cooling that use geothermal energy; creation of models for effective heating mapping, and other.

1.4. The financing on *sub-area “Industry, services and products”* is aimed towards projects for improving the energy efficiency of production processes and technologies and towards supporting the competitiveness of the industry and services in the Union, which are focused on the objectives of the EU in the areas of energy and climate. Research shows that investments in industrial energy efficiency can lead to serious increase in productivity, as well as to drastic decrease

in production costs. For that reason in the centre of the sub-area are the project aimed at achieving efficient production processes, energy audits and energy management systems, reuse of industrial waste, development of innovative and highly effective products and systems, related to energy consumption, and other.

1.5. Through *sub-area “Innovative financing for energy efficiency”* support will be given to different innovative mechanisms for financing, investment instruments and schemes for energy efficiency. Emphasis is given to increasing investor confidence and to effectiveness of the existing solutions, as well as to the implementation of energy services, which, in its entirety, should considerably improve market development. Within the boundaries of this sub-area support will be provided to different projects in the field of innovative and flexible financing schemes (such as crowd-funding, factoring, forfaiting, financial models for the deep renovation of buildings, addressing both property and rental markets, and other).

2. Competitive low-carbon energy call

The envisioned in EU energy and climate strategies transition to low-carbon competitive energetics requires enormous and constant investment in energy facilities and grids, in transition technologies, in infrastructure and energy efficiency. Estimates show that the increased investments should represent 1,5 % of EU’s GDP per annum until 2050. Until 2020 it is necessary for the EU to invest amounts of around one trillion euro, in order to guarantee security of supply, diversification of energy sources, ecologically clean energy and competitive prices within the integrated European energy market framework.

2.1. Sub-area “Towards an integrated EU energy system”

When the ambitious goals of the EU regarding energetics and climate are examined, one cannot neglect the role of electricity network in the energy mix of the Union. In 2014, 26 % of the EU’s power was generated from renewable energy sources. Nearly 10% of the total EU electrical energy is sourced from variable renewable sources (such as wind and solar). Due to the growing number of appliances used in everyday life and industry, and with the expected penetration of heat pumps and electrical vehicles, the share of electricity in overall energy consumption is expected to increase considerably, and at the same time it is assumed that the share of electricity from renewable sources might be higher than 50 % until 2030.

Currently, EU’s energy network still does not have the sufficient interconnectivity level in order to ensure a secure and affordable supply of electricity, gas or heating. Due to the undeveloped energy infrastructure in some regions increasing amounts of energy from variable renewable sources cannot

reach the consumers. Accordingly, the Energy Union Strategy envisions the creation of interconnections between the different energy grids, which should ensure flexibility, security and resilience in times of crises.

For the reasons set above in the centre of this sub-area are placed projects in the field of electricity distribution networks, transnational cooperation and the creation of links between the energy grids, investments in smart transmission systems, electricity distribution and management, storage technologies, and other. All financing proposals should be in compliance with EU policies in regards to the energy union and energy and climate as a whole, and should benefit the development of the internal and international electricity markets [18].

2.2. Sub-area “Renewable energy technologies”

EU’s policies in the field of energy and climate are based on the need of sustainable, secure, affordable and competitive energy with reducing greenhouse gases emissions. That requires of the Union to transform [19] its energy network in such a way that it would allow the access to safe and efficient energy, and at the same time ensuring its position as a global leader in the production of energy from renewables. The 2016- 2017 Horizon 2020 Work Programme is focused on the support of different technologies for energy output from renewable sources, as strong attention shall be given to the potential of the technology, as well as its efficacy and price. The priorities in this sub-area in the 2016- 2017 period are visualised as follows:

- highest priority will be given to technologies that ***should be readied for cost-competitiveness*** and introduced in the market as soon as possible (like for example- offshore wind generators in the sea, including floating ones, certain areas of photovoltaic, concentrated solar power, tidal and wave energy, and geothermal energy);
- the next level of priority is for projects for technologies that are ***beginning to reach cost- competitiveness*** but still need additional efforts for their development and their inclusion in the European industry (like for example- on-shore wind turbines, areas of photovoltaic, biofuels [20, 21], solar heating and cooling);
- continuation of the support for new technologies for energy output (like for example- ocean thermal energy conversion, saliently gradient energy, etc.), as well as for existing technologies that require more research (like RES) and replacement of critically pollutant and expensive materials with ecological and sustainable materials.

2.3. Sub-area “Enabling the decarbonisation of the use of fossil fuels during the transition to a low-carbon economy”

Decarbonisation is one of the three main objectives of European energy policy [22]. It can be of real value to Europe’s competitiveness in midterm. However, its implementation requires profound changes in the Member States’ energy production mix, as well as gradual abandonment of energy from fossil fuels (oil, gas, coal), which still account for 80% [23] of the share in the European energy mix. The sub-area will be supporting different projects in the area of decarbonisation, like for example:

- new technologies for carbon dioxide (CO₂) capture;
- utilisation of the captured CO₂ as a feedstock in different industry sectors;
- measuring, monitoring and controlling of the potential risks of CO₂ capture, as well as shale gas extraction;
- sustainable and efficient energy from fossil fuels.

2.4. Sub-area “Social, economic and human aspects of the energy system”

The EU’s ambitious policies in the field of energy and climate will undoubtedly have an enormous impact on the life of the consumers. However, not always changes are met with confidence by the citizens, even though the development of the new technologies cannot be done without them. Through this sub-area support will be given to projects in different areas of communal, social and human studies with the aim of systemising and analysing the consumers’ setting, prejudices and values, as well as project aimed at improving the dialogue with the citizens.

2.5. Sub-area “Supporting the development of a European research area in the field of energy”

In the Framework Strategy for the Energy Union the Commission stated that scientific research and innovation are of key importance to the increase of market offering of sustainable, clean, low-carbon and energy efficient sources to a level that will allow for a swifter transition of the energy system. The EC’s estimations show that the industry provides around 70 % of the innovation funding in Europe, while the national public funds amount to 25 %, and the financing through the EU funds accounts for 5 %. In accordance with that, the said sub-area will provide support for projects for joint actions that have a direct connection to the work on the SET-Plan and transnational cooperation. The supported projects will have to complement the activities of other “players” in Europe, and have to be focused on activities of significant benefit to the Union, as well as projects that have a high potential for attracting financing from other sources like national funding from

the respective Member States or leveraging financing from different European funds and third parties- states or other entities.

3. Other initiatives

Besides the abovementioned calls, through the “Secure, clean and efficient energy” specific objective are also laid out different other initiatives that aim to support innovation in clean and sustainable energy. As more substantial and leading among them the following can be pointed out:

- ***the European Innovation Partnership on Smart Cities and Communities*** – the concept of the “smart city and community” presupposes the usage of modern integrated technological services and infrastructure in the field of energy, transport and information- communications technologies with the aim of achieving a substantial improvement in the quality of life of the citizens, enhancement of the competitiveness of the different sectors in the industry and innovations, as well as a contribution to sustainability and the 20/20/20 objectives in the field of energy;
- ***the Horizon 2020 prize for CO2 reuse*** will reward around 1,5 million euro for the development of an innovative project for the utilisation of greenhouse gases;
- ***the Horizon prize for a Combined Heat and Power (CHP) Installation in a hospital using 100% Renewable Energy Sources*** with an indicative budget of 1 million euro, will reward solutions for the usage of 100% of energy from renewable sources for the production on heating and electricity in hospital buildings;
- ***the Horizon prize for Integrated Photovoltaic System in European Protected Historic Urban districts*** with indicative budget of 750 thousand euro is intended for a project that enables the integration of solar panels in urban districts with historical architecture that has to take into account the distinctive appearance of the district;
- ***assessment of the costs and benefits and of the macro-economic impacts of the energy efficiency policies;***
- ***assistance with the verification of compliance of national legislative measures implementing Directive 2012/27/EU.***

V. Several conclusions

In order to complete the study we would like to formulate several important conclusions that come as a result of the above analysis. Briefly summarised, they can be laid down as follows.

With its vision for the creation of an European Energy Union, the EU acknowledges the three fundamental objectives of its energy policies set in the Europe 2020 Strategy- sustainable development, security of supplies and competitiveness.

Once again the ambitions for achieving the 20/20/20 objectives regarding the decreasing of greenhouse gases emissions, increase of the usage of energy from renewables and the improvement of energy efficiency are reaffirmed.

As was stated in the Framework Strategy for the European Union, the EU's role as a global leader on the energy market and at the same time as a guarantor for energy security cannot be realised without significant progress in the field of scientific research, technologies and innovation.

The Horizon 2020 Programme for Research and Innovation is one of the most important and efficient tools for the acceleration of the transformation of the EU's energy system. Through the 2016-2017 period the programme is focused on two main prerogatives- energy efficiency and competitive low-carbon energy. This is why the funding under Horizon 2020 should support projects that are aligned with the EU's energy policy, like for example: projects of technological nature; projects seeking for different solutions for energy efficiency and for the reducing of energy consumption; projects aimed at the introduction of new sustainable and competitive energy sources; projects aimed at the development of the market and the implementation of new technologies in it.

An important aspect of the energy policies is the attention towards the individual citizen and consumer that has to take into consideration the latter's distinct interests. Considering that, the Horizon 2020 Programme will foster projects aimed towards decreasing of the consumers' costs for energy and heating bills, as well as towards educating the public of the Union's policies in the field of energy and climate.

It is also important to welcome and encourage the attraction of joint funding that should be done through the Horizon 2020 Programme, as well as through national funding, through European funds and financing from third parties. This is a kind of a guarantee for the securing of the creation of quality and efficient projects that would provide solutions for the resolving for specific issues and for the achievement of the abovementioned objectives in the field of energy and climate.

Notes:

[1] Document COM (2010) 2020 final, available at <http://eur-lex.europa.eu> (accessed on December 20th 2016)

[2] Communication COM (2015) 080 final, available at: <http://eur-lex.europa.eu> (accessed on December 20th 2016), hereinafter referred to as the Framework Strategy or the Strategy.

[3] The Energy Union Package consists of three communications by the EC:

1) The already mentioned **Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy**, in which the goals of the EEU are laid out, as well as the actual steps that are to be undertaken in order for the union to be completed;

2) **Communication from the Commission to the European Parliament and the Council – The Paris Protocol – A blueprint for tackling global climate change beyond 2020** (document COM (2015) 81 final, available at <http://eur-lex.europa.eu> (accessed on December 20th 2016). This communication is a direct response to the decisions taken at the climate conference in Lima, Peru. It is noted as a key element of the implementation of the EC's priority goal to establish a resilient energy union with a forward-looking climate change policy. In the same time, the communication precludes EU's position for the last round of negotiations on climate issues that predate the Paris Conference of 2015. According to the Commission, in order to foster the taking of collective action in the field of preventing climate change, the Paris Protocol must ensure the achievement of the following objectives:

- *to guarantee the ambitious emissions reduction* by outlining a long-term goal to reduce by 2050 the harmful emissions with at least 60% compared to the levels of 2010 (which is in compliance with the long-term goal of the EU to halve by 2050 the harmful emissions compared to the levels of 1990), as well as by defining clear, straightforward and legally binding obligations to reduce the impact on the climate, which are to lead the world towards reaching the goal of holding the increase in global average temperature to well below 2 °C;
- *to ensure the dynamics in process development* by providing the possibilities of global overview and renewal every five years, as well as ensuring ambitiousness of the obligations for the mitigation of the impact on the climate, which have to match the scientific data in this direction;
- *to strengthen transparency and reporting* considering the need of process assessment, and in particular- whether the goals for emissions reduction and the specific obligations in this manner are being met;
- *to ensure the encouragement of sustainable development*, which shall be resistant to climate change. This requires improved international cooperation and the conduction of policies that reduce the vulnerability and improve the capacity of each country to adapt to the impact of climate change;
- *to provide support for the effective and efficient application and cooperation* with policies that mobilise public and private investments in low-emission and climate change sustainable development.

According to the EU, in order for a party to the United Nations Framework Convention on Climate Change (UNFCCC) to join the Paris Protocol, it has to commit to mitigate climate impact. This is extremely important for the G-20 states since they generate around 75% of global emissions worldwide. In this process the EU, China and USA have to send an important signal of political leadership and to set the necessary pace, by joining the protocol as soon as possible.

3) Communication from the Commission to the European Parliament and the Council- Achieving the 10% electricity interconnection target. Making Europe's electricity grid fit for 2020. (Document COM (2015) 82 final, available at <http://eur-lex.europa.eu> (accessed on December 20th 2016). The ascertainment in this communication is that the interconnection of the European electricity networks is of key importance to Europe's energy security, as well as to achieving better competition for the internal European energy market. Furthermore, the communication states that an well-connected energy grid will help deliver the will help deliver the ultimate goal of the Energy Union, that is- *to ensure affordable, secure and sustainable energy*, and with it- to encourage the growth and employment in the EU. The fact that a well-connected energy grid is of key importance *for the decarbonisation of the energy mix* is emphasised on, as it allows the grid to accommodate increasing levels of energy from variable renewable sources. These main considerations are the basis of the conclusion that the *interconnection of the electricity markets must be a political priority for the EU* at all levels in the years to come.

According to the European Council the target for interconnectivity has to be realised mainly through the implementation of Projects of Common Interest (PCI). The first EU list of PCIs was adopted in 2013 and contains 248 projects, of which 137 are in the field of electric energy. Of these 137 projects, 52 concern electricity interconnections, and one project with anticipatory investments enabling future interconnections. The projects are in different stages of development- while some are in a construction phase, other are still being set up. Nevertheless, the plan is for 75% of the projects of the first EU list to be finished by 2020.

EC's communication also mentions several key projects under the European Energy Programme for Recovery (EERP) and PCIs which, after realised, should help Member States reach the 10% interconnectivity target. These projects are:

- 1. The project linking Baixas, France to Santa-Llogaia, Spain.** This project was initiated in February 2015 and has received support from the EERP;
- 2. The PCI between Aquitaine, France and the Basque country, Spain,** which should double the interconnection capacity of the two states. All efforts for its completion in 2020 will be mobilised, which will move the interconnection level closer to the target of 10%;
- 3. The project for interconnection between Portugal (Vila Fria – Vila do Conde – Recarei) and Spain (Beariz – Fontefría,** which was present in the

- first PCI list, will increase by 2016 the interconnection capacity between Portugal and Spain of currently 7%, and with it Portugal will exceed the 10% interconnectivity target;
4. Estonia, Latvia and Lithuania reached 10% interconnectivity with the EU electricity market via Finland in 2015 thanks to *the EERP project Estlink2*, and the further improvement of the integration between the Baltic Member States and the Nord Pool Spot will be realised through *the interconnection between Sweden (Nybro) and Lithuania (Klaipeda), known as the project Nordbalt 1*, funded under the EERP;
 5. After the completion of the of the construction of *the PCI interconnection between Lithuania and Poland, known as the LitPol Link*, Poland's interconnection capacity will double to 4% by the end of 2015, and thanks to another *PCI- the interconnection between Vierraden, Germany and Krajnik, Poland*, would exceed Poland's interconnectivity above 10% by 2020;
 6. Several Italian PCIs in the field of electricity, mainly *interconnectors between Italy and France, Switzerland and Austria*, would increase the electricity interconnection capacity with neighbouring states to around 12% after the completion of the projects by 2020;
 7. Ireland can also considerably increase its interconnection capacity with several PCIs included in the first list of projects. Ireland's interconnection level was 3% in 2011, with an increase to 7% in 2013 thanks to a *project funded by the EERP* that connected Ireland to the United Kingdom;
 8. It is expected that Romania's interconnection level would increase from 7% to 9% after the *interconnection link* with Serbia is realised in 2017;
 9. Even though Cyprus is considered to be an "energy island" that is heavily dependent on oil and where electricity prices are high, it is expected for its interconnection level to reach over 100% in 2023, thanks to a *PCI for future interconnection called the Euroasia Interconnector* with a capacity of 2000 MW;
 10. With the EERP's support Malta's interconnection level will reach approximately 35% with the commissioning of *the high-voltage interconnection with Italy (Sicily)* in 2015.

The construction of the necessary infrastructure for the provision of the required interconnection of all Member States of the EU until 2020 will require investments of around 200 billion euro. The projects in the field of electrical energy will require around 105 billion euro, of which nearly 35 billion euro will be for interconnections.

[4] Communication COM 2020 (639) final, available at: <http://eur-lex.europa.eu> (accessed on December 20th 2016).

[5] For the energy policies of the EU Member States, as well as the development of the processes of energy European integration, see more detailed (in Bulgarian) – Boneva, S. (2015). The European Energy Union as a stage in the development of European energy policy, in- Collection of research reports- The Bulgarian Membership in the EU: Seven Years Later, UNWE Publishing Complex, Sofia, pp. 57- 69; Boneva, S. 2015, National Energy Policies of the Member States of the EU: State and Perspectives, in Collection of research reports- Innovative Strategies for Competitive Business, International Business School Publishing, 2015, pp 67-74; Boneva, S., The European Integration in the Context of Energy Integration, in Collection of research reports- Innovative Strategies for Competitive Business, International Business School Publishing, pp 61-66.

[6] Council Directive 2009/119/EC of 14 September 2009 imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products, available at available at: <http://eur-lex.europa.eu> (accessed on December 20th, 2016).

[7] In the Strategy it is provided that the creation of a secure and sustainable energy system will require investments of around EUR 200 billion through the following decade – see more detailed An Investment Plan for Europe, Communication COM(2014) 903 final, available at: <http://eur-lex.europa.eu> (accessed on December 20th 2016).

[8] For energy efficiency see more detailed (in Bulgarian) – Boneva, S. 2013, Energy Efficiency- the biggest European energy resource, in Collection of research reports- Bulgaria's European Future- Legal Aspects, UNWE Publishing Complex, Sofia, pp, 62-67; Boneva, S. 2013, Financing of Energy Efficiency Projects and RES under the Energy Efficiency and Green Energy Scheme, in Collection of research reports- Crisis and Economic Growth, UNWE Publishing Complex, Sofia, Volume 2, pp 555- 563; Boneva, S., Energy Efficiency in Bulgaria and the EU: State and Perspectives, Energetika Journal, vol. 1, 2016, pp 55-68.

[9] See more detailed – Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure, available at: <http://eur-lex.europa.eu> (accessed on December 20th, 2016).

[10] See (in Bulgarian) Boneva, S. 2016. The European Energy Union: A Premise For Preserving Unity in the European Union, in Collection of research reports- Is There Enough Europe and Unity in the European Union, SU “ St Kliment Ohridski”, Sofia, pp. 89-108.

[11] See (in English) – Boneva S. 2013. Bulgaria and the European union: renewable energy sources, Conference „Strategic developments and establishment of Serbia's position in contemporary international relations“, Belgrade, pp. 259-269.

- [12] Adopted with European Commission Decision C (2016)4614 of 25 July 2016, available at: <http://eur-lex.europa.eu> (accessed on December 20th, 2016). The funding provided for the present period is of the amount of around 194 million euro.
- [13] Document COM (2009) 0519, available at: <http://eur-lex.europa.eu> (accessed on December 20th 2016).
- [14] See (in English) – Boneva S. 2012, Green Energy: Pros and Cons, Academic journal “Management and Education”, Vol. VIII (I) 2012, pp 198-204; (in Bulgarian)- Boneva, S. 2007, Renewable Energy Sources- A Means for Decreasing the EU’s Energy Dependency”, Academic journal “Management and Education”, Prof. Dr. Assen Zlatarov Publishing House- Burgas, vol. III (2), pp 328- 334; Boneva, S. 2009. Individual Measures by the Member States of the EU for the Transition Towards the Use of RES in the context of the European Emissions Trading Scheme, Management and Sustainable Development Journal, Sofia, vol. 19 (3- 4), 2009, pp 122- 128.
- [15] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, available at: <http://eur-lex.europa.eu> (accessed on December 20th 2016). The Directive was transposed into the Bulgarian legislation with the regulation of its requirements in the Energy Efficiency Act (promulgated in State Gazette, vol. 35 of 15th May 2015, entered into force on 15th May 2015).
- [16] The share of the buildings’ energy demand represents around 40% of the final energy demand in the EU.
- [17] Document COM (2016) 51, available at: <http://eur-lex.europa.eu> (accessed on December 20th 2016).
- [18] See (in Bulgarian) – Boneva, S., Markets and Prices of Electricity in Bulgaria and the EU, Economic Research Journal, XXV, book 2, pp 90- 128.
- [19] See (In Bulgarian) – Boneva, S. 2016, Legislation in Bulgaria and the EU in cases of realisation of electric power plants working with renewable energy sources, in Collection of research reports – Rule of law- Prerequisite for Business Development and Economic Growth, UNWE Publishing Complex, pp. 302- 314.
- [20, 21] See (in Bulgarian) – Boneva, S. 2008. The implementation of the EU environmental action programmes- support for the present ideology of the global community, Assen Zlatarov University Yearbook, Burgas, 2008, XXXVII, book 2, pp 66- 71. See (in Bulgarian) Boneva, S. 2007, National strategies and programmes for the implementation of the policies for environmental protection, Management and Sustainable Development Journal, Sofia, vol. 18, 2007, pp 227- 231.
- [22] See (in Bulgarian) Boneva, S. 2008, The Emissions Trading Scheme- the European Union’s main tool for the performance of the obligation of the

Community to the Kioto Protocol, in Collection of research reports “Bulgaria in the European Economy”, Stopanstvo University Publishing, UNWE, Sofia, 2008, pp. 266- 269.

[23] See Opinion of the European Economic and Social Committee on the ‘Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Energy Roadmap 2050’ COM (2011) 885 final, available at <http://eurodocs.org/042383>.

NEW HORIZON-S FOR THE EUROPEAN ENERGY UNION

Abstract

The presented study is dedicated to the interdependencies between the European Energy Union (the EEU) and the European Union Framework Programme for Research and Innovation “Horizon 2020”, which is one of the key tools for achieving the EEU objectives. The main EU legislative acts, which together form the Energy Union Package, are pointed out and briefly analysed. Significant attention is given to the five fundamental dimensions of the European Energy Union, and in their context are visualised the different instruments necessary for and serving the achievement of the Union’s objectives. The foundations and the legal framework of the Horizon 2020 Programme are established. By using the methods of analysis and synthesis the relation between the objectives of the EEU and the Horizon 2020 Programme is visualised, with particular attention to the 2016-2017 Horizon 2020 Work Programme. Finally, several main conclusions that come as a result from the research are formulated.

Key words: European Energy Union, energy policy, energy system

JEL: F21, K32, K33, O13, Q4