ENERGY COMMUNITY STRATEGY AND PROJECTS OF ENERGY COMMUNITY INTEREST

ENERGY COMMUNITY SECRETARIAT
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Introduction
Preface

The Treaty establishing the Energy Community (the “Treaty”) was signed in October 2005 and entered into force in July 2006. When in 2011, the Energy Community celebrated its fifth anniversary, it was acknowledged as a “success story” by the European Commission in its Report to the European Parliament and the Council:

“The Energy Community is about investments, economic development, security of energy supply and social stability; but – more than this – the Energy Community is also about solidarity, mutual trust and peace. The very existence of the Energy Community, only ten years after the end of the Balkan conflict, is a success in itself, as it stands as the first common institutional project undertaken by the non-European Union countries of South East Europe.”

However, Contracting Parties, as well as the EU Member States and all other countries in the world, currently face immense challenges in the energy sector. The need to reduce our carbon footprint, and at the same time, to meet the increasing level of energy that we use, requires new technological solutions, the modernization of the energy sector and more dialogue with neighbours. New market mechanisms need to be introduced that will be appropriate to accommodate new energy sources. This complex and costly transition will have to take place in time of an economic crisis when the available public and private capital is limited and difficult to obtain. There is also an intensive competition among different sectors – including energy – to attract capital and countries compete with each other for the available financial resources within the energy sector.

It is on this background and acknowledging need for a strengthened regional cooperation, that the Energy Community Ministerial Council decided in 2011, to prepare its 1st Energy Strategy (Strategy), in a joint effort of all its stakeholders. In effect, the Ministerial Council established a Task Force which was mandated to develop the 1st Strategy. The Task Force members include a large base of stakeholders, from the Contracting Parties, the European Commission, the Donors’ Community, and the Energy Community Investors’ Advisory Panel; besides, experts and observers were associated with its work. The Task Force was assisted by USAID sponsored consultant, Tetra Tech Inc. USA.

The Strategy aimed to provide a brief, synthesized collection of the existing policy goals and plans within the Energy Community and match it with the main elements of national energy strategies. An overview of national objectives in the regional context helped to highlight any possible inconsistencies with political commitments and to identify points where joint actions can lead to cost-efficient solutions. A demand...
scenario analysis showed how the future energy consumption of Contracting Parties may develop and what are the estimated costs of covering (or not covering) this demand.

The vast investment needs in energy infrastructure was one of the underlying reasons for the preparation of the Strategy. The identification of projects that benefit more than one Contracting Party is necessary to achieve maximum infrastructure capacity at the lowest costs. The Strategy represents a first step to identify these projects, by defining the required operational framework and methodology.

Parallel to adoption of the Strategy in 2012, the Ministers approved the extension of the mandate of the Energy Strategy Task Force, with the task to prepare a list of Projects of Energy Community Interest (PECIs). The Strategy determined the eligible project categories, including the main criteria along which the projects are to be evaluated. For the purpose of identifying and assessing the potential list of PECIs, the Task Force was assisted by a consortium of DNV KEMA, REKK and BHP (Consultant). As proposed by the Task Force, the list of PECIs was approved by the Ministerial Council on 24 October 2013, in Belgrade.

Upon finalization of the process, the Secretariat incorporated the two strategically important documents: “Energy Community Strategy” and “Report on the Projects of Energy Community Interest Assessment” under one cover. In effect, this publication does not reproduce the documents in full length, but presents a condensed version. It was compiled and edited by Violeta Kogalniceanu and Heli Annika Lesjak.

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Director
2. Energy Strategy of the Energy Community
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I. INTRODUCTION

The Energy Strategy of the Energy Community follows the same principles as that of the European Union’s “Energy 2020”, defining the energy priorities for the next years and setting the actions to be taken in order to tackle the challenges of achieving a market with competitive prices and secure supplies, saving energy, using less polluting energy sources and reducing the carbon footprint from the energy sector.

The Strategy paper represents a programmatic document. It highlights the objectives of the Energy Community, the actions required to meet these, possible scenarios to meet the forecasted energy demand, targets for energy savings, as well as those for renewable energy in the final energy consumption.

The transition into an energy efficient and low-carbon economy will require significant investments in energy production, transport and storage in the Energy Community. It is therefore essential that the projects, which are of regional importance, are identified based on objective criteria and their planning, financing and regulatory procedures (e.g. permitting, licensing) take place in a coordinated manner. The limited availability of both private and public financing also underpins the need for a coordinated approach. The Strategy outlines the main elements of the methodology and the criteria to identify these projects.

The Strategy was developed against a background constrained by the financial and economic crisis, the full implications of which are not yet fully apparent. Also, the end of the Kyoto era is leading to greater uncertainty concerning future carbon costs.

II. OBJECTIVES OF THE ENERGY COMMUNITY STRATEGY

The objectives defined in the Strategy are in line with Article 2 of the Treaty establishing the Energy Community, as follows:

Objective 1: Creating a Competitive Integrated Energy Market

The Energy Community Treaty aims at organising the relations between the Parties, in a manner that would create a common legal and regulatory framework for the energy markets and would allow trading energy across their borders. Its objective is the creation of a competitive integrated energy market between the Contracting Parties and their EU neighbours, and ultimately, its integration with the single EU energy market.

Objective 2: Attracting investments in energy

In order to meet the increasing demand and to replace old generation plants (which will be required also due to implementation of the Energy Community environmental acquis), to improve security of supply, energy efficiency and the use of renewable energy sources, new investments in the entire energy sector are needed in the Contracting Parties.

Objective 3: Providing secure and sustainable energy supply to customers

Delivering uninterrupted energy, at affordable prices while taking into account environmental concerns is one of the core principles of the Energy Community Treaty.

Improving energy security implies, among others, to promote diversity, efficiency and flexibility within the energy sectors of the Contracting Parties, to be prepared to respond to energy related emergencies, and not least to promote regional cooperation with all players in the energy markets.

Energy security is closely associated with timely investments in energy supply in line with economic development and environmental needs.

III. ACTIONS REQUIRED TO MEET THE STRATEGY OBJECTIVES

Besides the implementation of the EU acquis on energy, the Contracting Parties shall take other actions in order to achieve the first objective that shall comprise, but not be limited to, the following issues:

Objective 1: Creating a Competitive Integrated Energy Market

1. Actions related to market reforms

1. Facilitate the creation of the Pan-European Energy Market by removing the identified barriers in the interfaces between the Contracting Parties and the EU Member States, as soon as they all fully implement the provisions of the internal energy market legislation (i.e. Third Energy Package).

2. Introduce common capacity allocation mechanism (coordinated auctions), establish one or more power exchanges that cover all Energy Community Contracting Parties and implement price based market coupling, in line with the milestones defined in the “Regional Action Plan for Market Integration in South East Europe” with a view to join the single European Price Coupling mechanism no later than 2015, without prejudice to the ongoing discussions about the amendment of the SEE RAP for Wholesale Market Opening related to Moldova and Ukraine.

Sub-activities:
• Setting up of the coordinated auction office project company and establishing a working coordinated auction office during 2013.
• Establish one or more power exchanges that cover all Contracting Parties, especially in South Eastern Europe.
• Develop a plan for the implementation of the Pan-European Energy Market, with the aim of joining the single European Price Coupling mechanism no later than the beginning of 2015.

3. Adopt regulatory balancing rules and balancing responsibilities for market participants by the dates agreed in the Action Plan for Market Integration in South East Europe2.

Sub-activities:
• The responsible bodies (as determined by national regulatory authorities or legislation) in each Contracting Party shall develop adequate balancing rules and should specify the balancing responsibilities for market participants, in 2013.

1. Actions related to price regulation and network tariffs

The existing price levels (non fully cost reflective) in the Contracting Parties cannot support new generation investments, either by attracting private investors or by providing domestic utilities with the means to invest on their own. The network infrastructure is largely outdated and needs upgrading in order to be able to offer increased security of supply; this will require both a more efficient use of the existing system, but also new investments in both generation and network infrastructure. When price levels are below the cost of new investments, it will not be possible to attract new commercially driven investments, which may even worsen the supply-demand balance. If the investment in the long-term remains inadequate, there is a serious risk for the security of supply, for which low regulated prices would be a key reason. Therefore, Contracting Parties to the Energy Community will need to take urgent actions to remove these barriers to investments:

1. Phase out price regulation for large customers in line with the Treaty and measures taken by the Ministerial Council.

• Contracting Parties’ authorities shall ensure that the electricity prices

2 This is without prejudice to the ongoing discussions about the amendment of the SEE Regional Action Plan for Wholesale Market Opening related to Moldova and Ukraine.
Ministerial Council.

1. Introduce harmonized licensing regimes in line with the EU licensing/registration regime by January 2015.

A harmonized Pan-European licensing/registration regime (in line with that envisaged by REMIT) should be established.

3. Actions related to regulatory barriers

In order to reduce barriers of a regulatory nature, one of the actions envisaged is to:

Objective 3: Providing secure and sustainable energy supplies to customers

1. Actions related to Security of Supply

The following actions shall be taken, but not limiting others, that may also contribute to achieving the objective:

- Establish the internal framework for security of supply (nomination of Competent Authority, definition of protected customers, interruptible consumers).
- Enhance preparedness to secure gas supply (establishing Risk Assessments, Preventive Action Plans, and Emergency Plans).
- Diversify sources of gas imports where appropriate.
- Enhance the role for, and coordination within, the Security of Supply Coordination Group.

2. Action(s) related to renewable energy

One of the key actions is to incorporate Directive 2009/28/EC in the acquis of the Energy Community and to establish a target for renewable energy at the national level.

Increase renewable energy share of gross final energy consumption of the Contracting Parties in line with that envisaged by REMIT should be established.

Sub-activities:

- Allow priority access or guaranteed access to the grid for renewable energy (RE).
- Simplify and accelerate the authorization procedures for RE plants and grid connections.
- Introduce and/or revise (if necessary) existing support schemes for RE in order to assure continuity and stability for investors.

4. Actions related to environmental protection

Prepare national road maps for the implementation of the large Combustion Plants Directive by 31 July 2013, in a coordinated and consulted approach of all stakeholders.

Prepare national road maps for GHG emissions reduction/limitation, including setting indicative targets and concrete measures, by the end of 2013.

for large/industrial consumers are not subject to price regulation.

2. Adopt cost reflective energy network tariffs in line with the Treaty and measures taken by the Ministerial Council.

- Regulators shall ensure that network tariffs are non-discriminatory and cost-reflective.

3. Adopt prices that reflect fully the cost of supply for all tariff customers, in line with the Treaty and measures taken by the Ministerial Council.

Sub-activities:

- National Regulators (and generators) shall ensure that they are able to calculate the real costs of generation (reflecting among others: the costs of full generation portfolio, necessary investments/depreciation and market based rate of return, the costs of imports, the costs of supply services and appropriate treatment of bad debts).

- All Contracting Parties shall ensure that electricity prices for all small and medium customers subject to price regulation are covering the full costs of supply.

2. Actions related to energy infrastructure

These actions shall ensure that there is less chance of a ‘supply gap’ between energy demand and supply, based on forecasts of demand and supply for 2015, 2020 and 2030, both at the national and regional levels. To this end, development of new generation capacity should be a priority.

Electricity and gas interconnection capacity shall be increased, based on the recommendations derived from the ENTSO Ten Year Network Development Plan (TYNDP) and ENTSO Regional Investment Plan, and respectively, the ENTSOG TYNDP.

The actions will include, among others:

1. A set of policy measures will be proposed to the Permanent High Level Group, by the Energy Strategy Task Force by mid 2013; these may involve accelerated and coordinated permit granting and licensing procedures, coordinated regulatory authorizations and coordinated tariff methodologies adoption, support from relevant European Union funds, degree of fulfilment of criteria for IFI’s financing, and increased visibility for investors.

2. Infrastructure projects of Energy Community interest will be defined, with the aim of stimulating those investments that contribute to enhancing security, reliability and quality of energy supply, increasing energy efficiency, and promote environmental sustainability, as well as increasing the use of renewable energy sources.

3. Diversify sources of gas imports where appropriate.

4. Enhance the role for, and coordination within, the Security of Supply Coordination Group.

2. Action(s) related to energy efficiency

The most important action is to set and achieve a energy savings target, as follows:

1. Increase efficient use of energy by achieving a minimum 9% energy saving target by 2018.

Under their current obligations, most Contracting Parties committed to an energy saving indicative target of 9% of the final energy consumption between 2009 and 2018, through their National Energy Efficiency Action Plans. Contracting Parties shall ensure that the institutional and legal framework, as well as financial resources to implement National Energy Efficiency Action Plans is in place (e.g. Energy Efficiency Agencies and other relevant institutions, public and private funding is available) and that the implementation is monitored and corrective actions are taken to reach the target.

5. Action related to protection of customers

It is important to ensure that vulnerable customers are protected. In this regard, all Contracting Parties shall define clearly (and by law or regulation as appropriate) the definition of vulnerable energy customers subject to special protection and support. Moreover, targeted national programmes to support vulnerable customers should be implemented, as well as programmes to increase energy efficiency and greater use of renewable energy in households. Create a clear and transparent regulatory framework, set standards for quality of services, handling consumer complaints, and provide clear guidelines for changing energy supplier.
1. Methodology

The Strategy covers all nine Contracting Parties of the Energy Community: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Kosovo*, Moldova, Montenegro, Serbia, and Ukraine.

The Strategy was prepared by the Energy Strategy Task Force members and the associated experts, with the contribution of the Energy Community Secretariat. The Task Force took a “bottom up” approach using a template to collect specific energy data for each Contracting Party, preparing the basis for energy demand forecast scenarios, proposing regional objectives and the associated activities to achieve such objectives.

A public consultation was conducted in April 2012 and its results were also taken into consideration in the Strategy paper.

The significant diversity among national strategies – in terms of the date of establishment, examined time-frame, units, scenarios, methodologies – made it difficult to obtain fully compatible data for the whole region, and therefore, developing a coherent regional overview is not simple. A more harmonized approach in developing national strategies in the future would make regional analysis and comparison among Contracting Parties more feasible.

2. Brief overview of the energy sectors in the Contracting Parties of the Energy Community

The economic and energy landscapes in the Energy Community are diverse, but at the same time have many features in common. The Western Balkans and Moldova have small and fragmented energy markets, mainly dependent on fossil fuels, which are predominantly imported from the East. Apart from coal, no significant fossil fuel reserves have been explored in the Western Balkans and Moldova. On the contrary, the Ukrainian energy market alone is larger than the remainder of the Energy Community considered together.

Currently, hydropower is the most commonly used type of renewable energy, which has further growth potential across the entire region. The structure of the energy mix is, however, completely diverse with some Contracting Parties having a balanced portfolio of energy sources and others being dependent only on a few types of energy. A common feature is that the main elements of the energy infrastructure (e.g. power plants) were built in the 1960s and 1970s, using standard Eastern European technology. Their age, the type of technology, and their inadequate maintenance raise serious policy challenges at present. There is an urgent need for large scale rehabilitation and replacement of infrastructure, to avoid a situation in which considerable generation and transmission capacities are unavailable.

In 2009, the total primary energy supplied in the Energy Community Contracting Parties was 155,878,68 ktoe, of which 74% was supplied in Ukraine and the rest in the Western Balkans and Moldova (Figure 1).

Figure 1. Regional primary energy supply 2009

The Western Balkans and Moldova had a total installed generation capacity in 2009 of approximately 20.5 GW, of which Serbia accounts for approximately 35%, followed by Croatia with 19%, and Bosnia and Herzegovina with 17%. When adding Ukraine, the total capacity raises to 73.5 GW. The distribution by fuel sources is presented in figure 2.

Figure 2. Electricity generation in the Energy Community Contracting Party’s fuel in year – overview

3 Throughout the entire document, this designation is without prejudice to positions on status, and is in line with UNSCR 1244 and ICJ Opinion on the Kosovo declaration of independence.

4 This figure was calculated based on installed power generation in Ukraine of 53.0 GW (as reported by Ukraine).

5 These figures are taken from the results of the “minimal investment cost” scenarios, which reflect the expected impact of energy efficiency on electricity demand and do not include Ukraine.

6 Some Contracting Parties provided information for 2021, not 2020.

7 Much of the data for the period 2012 through 2030 was incomplete.
Only between 2012 and 2020 (or 2021), the installed generation capacity in the Western Balkans and Moldova is forecasted to grow by 13.23 GW, which represents an increase of approximately 64% from 2009 capacity. To this, Serbia contributes with 25%, and each of the others with approximately 10%, with the exception of Moldova (4%). In Ukraine, the additional installed capacity is forecasted at 8,100 GW.\(^8\)

The additional generation capacity mix, without Ukraine included, continues to be dominated by lignite (at 45%) followed by hydropower (39%), natural gas (9%), and other renewable energy (7%). New gas power plants are foreseen mainly in countries with a current gas market (Croatia, Bosnia and Herzegovina, former Yugoslav Republic of Macedonia, Moldova and Serbia); Albania, where there is no gas supply at present, is the only notable exception for significant new gas fired capacity.

With Ukraine included, hydropower generation will be predominant (42%) in the new generation, followed by coal fired plants (32%), nuclear (10%), gas (6%) and other renewable energy (10%) in the planned additional generation mix.

The total investment cost for this much additional capacity is EUR 44.6 billion over the period of 2012 through 2020, for those new projects targeted for development and commissioning within this time period. The figure for the Western Balkans and Moldova (not considering Ukraine) is estimated at a daunting EUR 28.8 billion and could be even higher.\(^9\)

These figures do not include the capital expenditures required in the latter part of the decade for new planned facilities proposed after 2021. Realistically, a new large thermal plant, for instance, may take four years from the time of groundbreaking to commissioning. A plant planned for 2023 commissioning will see about 30 - 35% of its capital expenditure in 2019 and 2020.

More concerning is the simple fact that since 1990, this region has only seen about 0.940 GW of new utility scale plant put in place (compared to the current plans of 13.23 GW). Thus, to ensure adequate power supply, the region will need to develop its generation plant fleet at a rate more than 10 times that seen over the past two decades.

With respect to grid development, the years 2012 through 2020 are particularly significant as the region has only seen about 0.940 GW of new utility scale plant put in place (compared to the current plans of 13.23 GW). Thus, to ensure adequate power supply, the region will need to develop its generation plant fleet at a rate more than 10 times that seen over the past two decades.

Figure 3. Planned new capacity 2009 - 2012 (MW), by fuel

Figure 4. Planned new capacity 2013 - 2021 (MW), by fuel

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5. New electricity interconnectors

Energy Community interconnection plans (as proposed by the Contracting Parties) are driven by the same needs as seen with the ENTSOE members that includes connecting new generation, integrating energy markets and new renewable energy in the grid, enhancing the security of supply, and improving the reliability and quality of energy services provided.

A number of cross border interconnections in the Western Balkans have been identified already as priorities by the incumbent TSOs and have been the subject of a significant amount of grants for preparation of feasibility studies, as well as environmental and social impact assessments, through the Western Balkans Investment Framework. These include among others:

- Electricity 400KV interconnection between Serbia - Romania that has reached the investment decision phase, and
- 1000 MW undersea DC cable between Montenegro and Italy.

Moldova and Ukraine, together with Romania are identifying investment needs related to the possible synchronization with the continental synchronous system, through a study funded under the Eastern Partnership, and started in 2012. Both these Contracting Parties are interested in joining the ENTSOE.

6. Natural gas and crude oil infrastructure

The different sizes and levels of establishment in the gas markets of the Contracting Parties make it important to have a complex approach and recognize the various needs in order to achieve the objectives. Some Contracting Parties have no natural gas infrastructure and consequently gas market at all, some others have an established gas system in need of renovation, while others have a well-operating system with the desire to have access to multiple export markets. In addition, the level of interconnections between Contracting Parties should be increased to ensure real market integration.

Therefore the aim of developing natural gas infrastructure in Contracting Parties is threefold:

- to help currently isolated regions to have access to natural gas supplies;
- to ensure continuous and secure supplies to Contracting Parties by having their network renovated and modernized;
One of the most important pipes of the “gas ring” will be the Ionian Adriatic Pipeline (IAP), with its flexible supply from any of the main pipelines of the Southern Gas Corridor. The Ionian-Adriatic Pipeline Project (IAP) will interconnect the existing and planned gas transmission system of Croatia with Bosnia and Herzegovina, Montenegro and Albania. The project aims to establish a new supply route for natural gas from the Middle East and Caspian region, along the Adriatic coast. The feasibility study as well as environmental and social impact assessments, funded by the WBIF, will be completed by early 2014. Additional gas interconnectors are also planned between Serbia and Romania, Croatia and Bosnia and Herzegovina, Moldova and Romania, Poland – Ukraine, Slovak Republic – Ukraine, Hungary – Ukraine, Romania – Ukraine.

In crude oil, a number of projects of regional significance have been discussed for some time already. Here, the objective is to ensure stable on diversified oil supplies to the Contracting Parties serving both market and security of supply interests.

7. SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of the Energy Community Contracting Parties, as a region

A short analysis of the strong and weak points, as well as the opportunities and threats of the region, as a whole, leads to some interesting common features, as presented below.

1. Strengths

The region's greatest strength is the large and diverse renewable energy potential, as well as other natural resources, even if on smaller scale (gas, oil, lignite, black coal and uranium).

The current, relatively low energy consumption per capita, gives an indication that the region has a good growth potential. Similarly, although markets are small, in the Western Balkans and Moldova, they are rapidly growing. When considering the region's labour costs, the price of land or raw materials, the region has a comparative advantage in energy production.

A strong political will to become members of the European Union unites most of the Contracting Parties. Under the Energy Community Treaty, the nine Contracting Parties committed to binding reform obligations and deadlines, as well as, regional integration. The region can also build on the experience gained from the past forms of regional cooperation.

2. Weaknesses

With the exception of Ukraine, the region consists of small and fragmented markets. It is largely dependent on energy imports. Natural gas, in particular, is mainly imported from a single source (Russia), via a main transit route (Ukraine). The prevailing gas networks are positioned at the end of import routes and lack interconnectors with the neighbouring countries.

The fact that power generation is dominated by a few incumbent companies limits competition. The region's market reforms are incomplete, for now, and at different levels among the Contracting Parties. As a result, the markets are not fully functioning and are not liquid enough to be attractive. Also, the capacity allocation for cross border interconnections tends to lack transparency. Prices and tariffs are not reflecting the real costs of generation, network operation and supply. High energy intensity is also characteristic for the whole region. As regards generation and transmission, in a large number of cases, the use of available capacity is insufficient, leading to inefficient operation and higher costs. At the same time, a large share of the coal and lignite fired power plants are either close to, or have already passed their expected life spans. In general, the power station equipment, high voltage power lines and distribution networks are subject to a rather advanced level of degradation. And finally, there is a large gap between the need for and the actual investments inflow in the energy sector, at approximately EUR 44.6 billion. Despite the region's potential, the use of renewable energy sources remains insufficient.

3. Opportunities

Being at the cross roads between Central Europe, Southern Europe and the Middle East, the region's position also grants it an important geopolitical significance. With Ukraine joining the Energy Community, the most significant route for transport of Russian natural gas to Europe has been integrated into the internal market.

A recent World Bank study listed the numerous opportunities to be gained from the wholesale market opening in the region. Above all, higher electricity and gas prices are expected to attract new investments, thus boosting the overall security of supply. The wholesale market opening would help pave the way for competition, enabling an easier market entry for new suppliers. A common, well interconnected market could better attract new gas suppliers to the region. Thanks to competition, consumers would benefit from broader product and service assortment.

New investments should be directed predominantly towards new renewable energy generation and natural gas fired power plants, whose potential both in term of enhanced security of supply and contribution to reduced emission remains untapped as of today in the region. The latter is particularly important also in light of the role of natural gas can play as back up fuel in a market with high penetration of intermittent energy source as the ambitions on renewables seem to imply.

In general investment should be directed towards any project that would help meeting the requirements of the Large Combustion Plant (LCP) Directive.

Investments in renewable energy could balance the excess demand, resulting in a more sustainable energy mix and helping to meet the renewable energy targets. All in all, the region should apply modern, efficient technologies that reduce the impact on the environment. Also, there is a large potential for energy efficiency in the region. This can enhance the security of supply, increase competitiveness and reduce the energy dependency and energy costs, as well as, the harmful impact of energy systems on the environment.
V. ENERGY DEMAND SCENARIOS AND INVESTMENT NEEDS

In an effort to evaluate the direction of the energy sector in the Energy Community and to demonstrate the importance of a regional energy strategy, three scenarios were examined. It should be noted that these scenarios used a common data set, such as for total final energy consumption that did not align exactly with the information provided by the Contracting Parties. For instance, the Contracting Parties used differing assumptions regarding economic growth as well as its impact on energy demand growth. Some of the forecast information provided by the Contracting Parties embedded assumptions on energy efficiency while others treated it separately from the demand forecasts. However, for the purpose of the scenario analysis, it is more critical that the base line be consistent and allow for a comparison of the differences between the scenarios. It is the differences between the scenarios that provide the insight for the analysis.

1. Overview of the Scenario Analysis

To evaluate the scenarios, the Task Force built a model in spreadsheet form. This allowed for an analysis of energy demand by type, current and planned new capacities, retirements, fuel prices, investment needs, energy costs, environmental factors and capacity adequacy on a regional basis to be analyzed across the three scenarios. Additionally, the analyses relied extensively on other work undertaken within the Energy Community (e.g., Study on the Potential for Climate Change Mitigating in Power Generation in the Energy Community, March 2011, the South East Europe: Regional Gasification Study Final Report), from other donor reports (e.g., World Bank’s Lights Out? South East Europe: Regional Gasification Study Final Report), from other institutions (e.g., ENTSOE, IEA) and from data collected by the consultant (e.g., additional plant specific information such as possible project development and retirements).

The current trends scenario presumes that the energy system will develop slowly (and inadequately) as seen in the past several years. It presumes that large combustion units that should be retired are delayed further (beyond 2020) in an effort to try to retain as much of the current generation stock as possible, and that little new generating capacity is built. Investment needs focus on keeping aging plant in service. It is critical to note that under this scenario, electricity demand is not able to be met by 2020, implying curtailments or massive imports, and these shortages extend further into 2025 and 2030. These curtailments also contribute to higher costs, given the impact on technical losses that results from a rationing or curtailment regime for electricity. Of course, there is always the possibility of additional external imports of electricity into the region to make up such short-falls, but this should not be relied upon as a sound and secure development strategy. At the same time, there is an assumed substitution from electricity to other fuels as consumers adjust to a lack of adequate electricity supply by taking up other measures and alternative fuels to meet their energy needs that electricity cannot provide (e.g., kerosene, wood, diesel for generators). Even though the investment needs are lower than with the other two scenarios, the supply costs are much higher due to reduced efficiency and substitution to other fuels.

The minimal investment cost scenario examines the impact of a modest amount of activity in an attempt to move towards partial compliance with the energy efficiency and renewable energy targets. It provides an overall reduction in total energy usage of about five percent, roughly half of the target, and a level of renewable energy supply consistent with the targets reported by the various Contracting Parties, which are at a level below the renewable energy targets. Importantly, it presumes that the electricity system will be able to meet demand fully. This scenario is more expensive than current trends in terms of total energy system costs, but importantly, even though the investment needs are much higher, on an annualized basis, the costs are not vastly different between the two scenarios. Although the investment needs are higher, the savings in primary fuel costs offset much of this, to lead to a result in which meeting basic energy demands costs 20% more than the current trends scenario. When one considers the damage caused to an economy by an unreliable electricity system, which could easily constrain economic growth and investment attraction, it is easy to see the importance of moving from the current trends to a scenario that ensure demand requirements are met.

The third scenario is a low emissions/sustainable scenario that assumes the energy efficiency targets are met (9% reduction in total final energy consumption by 2018), that renewable energy resource targets are also achieved, and importantly, that the ‘gas ring’ is introduced into the Western Balkans, allowing for both gas supply at the distribution level and for gas supply to be used in power generation. Not surprisingly, this scenario shows the highest amount of investment required (at almost EUR 130 billion from 2012 through 2030) for the Contracting Parties, but at the same time, the total energy system costs (fuel, operations and maintenance and annual investment needs) are almost identical between the minimal investment cost scenario which just meets demand, and the low emissions/sustainable scenario that offers added benefits (in addition to a modernized energy system, the emissions of carbon are reduced by close to 17% by 2020 when comparing minimal investment costs and the low emissions/sustainable scenario, and approximate 30% when comparing the low emissions development path with current trends).

The scenario analysis was crafted using various assessments relying on information provided by the Contracting Parties as well as other primary and secondary information sources. The specific processes used for the scenarios included the following five main elements:

- Energy demand analysis;
- Supply resource assessment for both generation and capacity;
- Investment cost analysis;
- Fuel price and O&M analysis; and,
- Environmental analysis.

The information that was used in the scenario analyses also came from a variety of sources including the Contracting Parties (e.g., information on new projects planned, 2009 reference year data and in some cases, scenarios for energy development), from the Energy Community Secretariat (e.g., energy demand forecasts, information on fossil plants), from other donor reports (e.g., World Bank’s Lights Out? South East Europe: Regional Gasification Study Final Report), from other institutions (e.g., ENTSOE, IEA) and from data collected by the consultant (e.g., additional plant specific information such as possible project development and retirements).

The following tables (1a and 1b) provide the results of the Energy Demand Scenario Analysis.

The first table (1a) examines the results of the scenarios for the Contracting Parties, not including Ukraine. Given the relative size of the Ukrainian energy system in comparison with the remainder of the Energy Community, it is useful to consider the results for the remainder of the Energy Community Contracting Parties, without Ukraine, and then for the Energy Community Contracting Parties as a whole, including Ukraine.

Further, it is important to note that current trends scenario does not meet in full the demand for electricity. Uitnet need for electricity ranges from about 10% to 2020 growing to potentially a much higher level in 2030 (perhaps as much as 30%).
### Table 1a. Results of the Scenario Analysis for Three Selected Years – Excluding Ukraine
(AAll Monetary Values Shown are in Nominal EUR)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Final Energy Consumption (ktoe)</th>
<th>Total Final Energy (TWh)</th>
<th>Total Electricity Generation including Net Imports (TWh)</th>
<th>Net Imports (TWh)</th>
<th>Total Electricity Generation (Gt)</th>
<th>Total CO2 emissions (Gt)</th>
<th>Total Investments Required between 2012 and Year Shown (Bln)</th>
<th>Total Annual Energy Costs (Bln)</th>
<th>Annualized Investment Costs (Bln)</th>
<th>Total Investments (Bln)</th>
<th>System Costs (Fuel + O&amp;M) (Bln)</th>
<th>Total Variable Energy System Costs (Fuel + O&amp;M) (Bln)</th>
<th>Total Variable Energy System Costs (Fuel + O&amp;M) (Bln)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>37.058</td>
<td>136.5</td>
<td>128.6 (unmet demand of 15.1 TWh)</td>
<td>33.723</td>
<td>31.255</td>
<td>33.723</td>
<td>12.648</td>
<td>5.680</td>
<td>11.174</td>
<td>33.723</td>
<td>443.5</td>
<td>150.7</td>
<td>443.5</td>
</tr>
<tr>
<td>2025</td>
<td>41.933</td>
<td>150.7</td>
<td>125.4 (unmet demand of 36.1 TWh)</td>
<td>38.713</td>
<td>35.310</td>
<td>35.310</td>
<td>18.448</td>
<td>6.540</td>
<td>12.874</td>
<td>35.310</td>
<td>499.152</td>
<td>197.689</td>
<td>499.152</td>
</tr>
<tr>
<td>2030</td>
<td>47.673</td>
<td>170.7</td>
<td>122.2 (unmet demand of 63.5 TWh)</td>
<td>43.382</td>
<td>39.558</td>
<td>39.558</td>
<td>23.904</td>
<td>8.633</td>
<td>15.268</td>
<td>43.382</td>
<td>590.8</td>
<td>223.567</td>
<td>590.8</td>
</tr>
</tbody>
</table>

Source: Tetra Tech analysis and calculations

Notes:
(1) The Total Final Energy Consumption for 2020 is based on the forecast used by the Renewable Energy Task Force to establish renewable targets by country. It should be noted that this forecast varies substantially from that included in information provided by the Ukrainian delegation and in the latest update of the Ukrainian energy strategy. The current trends have the highest amount of total final energy consumption due to the low amount of energy efficiency and that as electricity becomes increasingly unreliable, some customer switching to other fuels sources is assumed.
(2) This analysis is based on information taken from the latest version of the Ukrainian energy strategy. Unmet demand in this case is taken as the difference between the electricity demand expected in the minimal costs investment scenario and the estimated electricity supply available – excluding imports – under the current trends scenario.
(3) The emission factors used have been adopted from the Study on the Potential for Climate Change Combating in Power Generation in the Energy Community (30 March 2011) and supplemented with other emission factors for end-use fuel consumption. An important assumption is that the emissions are calculated as a single Contracting Party and requires a regional approach if it is to be realised. The benefits of the gas ring to the region can only be achieved through multiple Contracting Parties working in concert, something a regional energy strategy and framework for supporting projects of regional importance would support.
(5) Total variable energy system costs are calculated using both the primary fuel inputs for electricity generation, natural gas and oil products as well as variable operating cost assumptions applied to each general type of plant in service or planned.
(6) This represents the sum of the annualized investment costs and the total variable energy system costs shown above.
VI. CONCLUSIONS AND RECOMMENDATIONS

Over the next eight years, energy investments in the order of EUR 44.6 billion are needed in the region to diversify existing resources and replace ageing equipment, as well as to supply the increasing energy demand. Investment decisions and choices will have a long term impact, and will lead to structural changes in energy supply, partly resulting from changes in indigenous production.

Nevertheless, the “current trends” scenario presumes that the energy system will develop slowly (and inadequately) as seen in the past several years. It presumes that large combustion units that should be retired are delayed further (beyond 2020), and that little new generating capacity is built. Investment needs focus on keeping aging plants in service.

It is critical to note that under this scenario, electricity demand is not able to be met by 2020, with 15.1 TWh (assumed to be met from imports), implying curtailments or additional imports, and these shortages extend further into 2025 and 2030. These curtailments also contribute to higher prices, given the impact on technical losses on the electricity network. The possibility of additional external imports of electricity into the region to make up such shortages should not be relied upon as a sound and secure development strategy. The wholesale reference price, transparency and market trading method is called Day-Ahead Market (DAM) auction trading, and this provides a neutral reference price for the traded physical contracts are delivered.15 The trading method is called Day-Ahead Market (DAM) auction trading, and this provides a neutral reference price for the traded physical contracts are delivered.15

The differences in allocation of cross border capacity (in particular non market based allocation) as well as the differences in pricing methodologies constitute obstacles to trading.

1. Barriers to investments

Some of these barriers are also common to EU Member States14, but others are particularly present in the Energy Community region, as follows:

• A key investment barrier stems from regulated and/or non-cost-reflective prices and tariffs. In the prevailing majority of cases, regulated end user prices do not reflect the real costs of electricity supply, including the costs of generation (short run marginal cost), reflecting the full generation portfolio, necessary investments, and appropriate rate of return, the costs of imports, the costs of supply services and bad debts.


• Asymmetric distribution of cost and benefits among beneficiaries; externalities (positive or negative) that are not properly reflected by existing market signals and revenue streams.

• Lack of innovative financial instruments, other than grants.

• Lengthy and ineffective permit granting procedures, along with public opposition, that impede the timely implementation of energy infrastructure projects.

• The regulatory framework, although in progress, is not fully in line with the acquis especially with regards to wholesale market opening, transparency of capacity allocation and third party access to network.

• An important barrier to market opening is that supply and distribution have, in general, not been unbundled, which creates an unequal playing field between the incumbent supplier and a new entrant.

• The differences in allocation of cross border capacity (in particular non market based allocation) as well as the differences in pricing methodologies constitute obstacles to trading.

15 Pöyry and Nord Pool Consultants, SEE Wholesale Market Opening, Final report 2010

The wholesale reference price, transparency and market liquidity which are prerequisites for successful power trading, are still missing in most countries. Long term predictability of feed-in tariffs which is crucial for new renewable energy projects, is nevertheless not always ensured.

1. Coordinated Auction Office

One of the major tasks of harmonization of the SEE region is the establishment of a Coordinated Auction Office (CAO). A well-functioning Day Ahead Market for the whole SEE region requires among other things, that all transmission capacity should be made available for the implicit auctions. In this respect, the main function of the CAO is to provide correct transmission capacities to the market, irrespective of the market concept. In December 2008, a Memorandum of Understanding was signed in Tirana, by all the relevant TSOs, with the exception of Bulgaria and Serbia. In June 2012, the TSOs of Albania, Croatia, Bosnia and Herzegovina, former Yugoslav Republic of Macedonia, Greece, Montenegro, Romania, Slovenia, Kosovo* and Turkey signed the treaty, in order to achieve the minimal costs of energy sector development. Nevertheless, bearing in mind the tight fiscal space and the somewhat high level of public debt related to GDP of many of the Western Balkan countries, private capital is crucial to achieve these investments.

A new approach to attracting the private sector’s participation in the development of gas fired power plants in the Western Balkans is currently being developed and promoted to private investors – in form of a special Consortium, as proposed by the World Bank’s experts. In this model, the Consortium would consist of a group of investors, as shareholders, that could be private energy companies, international financial institutions, state-owned companies (electricity generators, suppliers, gas suppliers, traders), big electricity consumers, municipalities etc. The Consortium would establish national companies in the interested Contracting Parties based on public – private partnership model (PPP companies). Shareholders may vary from country to country, including or not the participation of national companies (electricity consumers and utilities). The shareholders of each national PPP Company would be responsible for all the costs of the electricity produced and would buy the electricity at production cost.

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15 Pöyry and Nord Pool Consultants, SEE Wholesale Market Opening, Final report 2010

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1. Gas to Power Initiative in the Western Balkans

In spite of the political will of the countries to gasify more their economies, that was expressed on several high level meetings, it is clear that investment decisions to build new gas-fired power plants, with a total gas demand in the range of 2 - 3 Bcm per annum, is key to the progress of the new gas infrastructure in the Western Balkans.

2. Regional day ahead market

A SEE Regional power market should be developed as a competitive market environment where TSOs, power exchanges, traders, suppliers, generators are working together to establish efficient and liquid market prices. The key underlining concept is a physical day-ahead trading and market organization where markets for all energy carriers (besides gas) are entered. This market structure would be in line with the development intentions of the “gas ring”. There could be two alternatives – (a) the Consortium develops the required gas infrastructure; and (b) national gas network companies develop the pipeline and the Consortium develops the balance. In either option, the role of TSOs would be important. However, the Consortium would be responsible for gas supply to its PPP companies.

This is an innovative approach in the Western Balkans, but has successfully used in Finland since 1930s for the development of hydro power plants. The modernization of the Ukrainian gas transportation system (GTS) and increasing its efficiency will contribute to in-
creasing the energy security of the Energy Community. This is also beneficial for the well functioning of the single European gas market, and can play a key role in the implementation of the Energy Community “gas ring” concept.

Ukraine has set itself a goal to achieve the modernisation by 2020, while the Commission, as well as EBRD and World Bank, confirmed their support to it, in the context of the energy security of the EU and the Energy Community countries, whereby third party access and transparent management in line with the Energy Community Treaty should be fully ensured.

4. Projects of Energy Community Interest – an integrated approach

In order to facilitate the development and implementation of PECIs, the Energy Community will adopt a holistic approach, in which regulatory measures will be enforced in order to remove some of the barriers to cross border investment; these may involve permitting procedures, information for decision makers, cost benefit analysis, incentives for projects with a cross border impact, and others. To complement these, more innovative financial instruments will be taken into account, and special funding mechanisms for PECIs will have to be adequately designed, using the pre-accession funds or other similar instruments. The Western Balkans Investment Framework focusing on supporting strategic projects in the Energy Community is a potential channel to secure financing for priority investments and to finance relevant sectoral studies that can contribute to this Strategy.

To this end, the Energy Community, through its Secretariat will work closely with DG ENER and DG ELARG to develop a more comprehensive package to remove some barriers to investments.

3. The way forward

Key regional themes for the Energy Community to address include the following:

- Gasification of the Western Balkans and Moldova. Further gasification of this region is important both for energy security and de-carbonisation; modernization of the Ukrainian gas transport system is also critical.

- Pursue price liberalization, as this is the sine qua non for investments.

- Improve cross border interconnections – also a fundamental requirement to support the investments required.

- Pursue actively the regional initiatives. These include the Coordinated Action Office, Regional Day Ahead Market, Gas to Power Initiative, and Projects of Energy Community Interest, as well as others; additional initiatives are certain to be developed. It is of significant importance that these are coming to fruition through timely implementation, and thus sending the right signals to investors.

- Implement the Actions required to meet the Energy Community objectives in a timely and coordinated manner. All Contracting Parties are making progress in the implementation of the Energy Community Treaty, but some are still lagging behind; the more they will do so, the more the gap between these and the more advanced ones is increasing, become another hurdle for investors to overcome.

- When it comes to updating or developing new national energy strategies, such strategies should align with this Strategy.

- Take policy measures at a regional level that would bring additional benefits to the high-ranking projects. These may involve accelerated and coordinated permit granting and licensing procedures, coordinated regulatory authorizations and coordinated tariff methodologies adoption, support from relevant European Union funds, harmonization of criteria for IFI’s financing promotion to increase project visibility to investors.

As noted earlier, if past trends continue into the future, the Energy Community will face serious and growing shortfalls in supply, especially in electricity, and these shortfalls will adversely impact the ability of the Contracting Parties to achieve optimal economic growth. Further, the social and environmental impacts associated with an inadequate response to these challenges will be detrimental and undercut significant the region’s ability to meet its development indicators in a sustainable manner.
3. Projects of Energy Community Interest
3. Projects of Energy Community Interest

I. INTRODUCTION

The Energy Community Strategy acknowledged that the Contracting Parties need substantial investments, in the range of EUR 44.6 billion in the energy sector to maintain the supply-demand balance in the coming decade, and even more financial resources to manage the transition into a low-carbon economy. Because of the current economic crisis, public funding is limited and attracting private investment is likely to become more and more difficult.

The scarcity of investment sources necessitates the identification of priorities for future development of the electricity, gas and oil infrastructure at the Energy Community level.

Furthermore, the Contracting Parties – with the exception of Ukraine – represent small markets with relatively small investment projects, which may be less attractive to investors than bigger ones. Due to the logic of economies of scale, it will be definitely more expensive, if each Contracting Party pursues full energy independence and strives to achieve security of supply alone rather than cooperating and planning together its infrastructure developments with its neighbours and increasing the reliance on the regional energy trade. For this reason, the Contracting Parties agreed to cooperate in the process of identifying those projects which have the highest positive impact in the largest possible number of Contracting Parties, so called Projects of Energy Community Interest (PECIs). The selection of these projects was achieved in a collaborative process undertaken by the same Task Force – Chaired by the European Commission, the Task Force was funded from the technical assistance of a Consultant sponsored from the Community Secretariat. Any project promoter, within or outside the Energy Community was able to apply for PECI (Projects of Energy Community Interest) subject to the following conditions:

- the project is located in at least one Contracting Party and, if necessary missing data and clarifications were requested from the project promoters.
- it will impact at least two Contracting Parties, or a Contracting Party and an EU Member State.

In line with the practice at EU level for the identification of Projects of Common Interest (PCI), a public consultation on the list of submitted projects (including only the names of the projects and basic information) took place from 5 March to 29 April 2013. The aim of the public consultation was to collect a feedback and comments from stakeholders on the proposed projects and possible proposals for additional projects to be considered.

The submitted project proposals covered the Energy Community Contracting Parties area, namely Albania, Bosnia and Herzegovina, Croatia, former Yugoslav Republic of Macedonia, Kosovo*, Moldova, Montenegro, Serbia and Ukraine.

For the purposes of classification and pre-assessment the following steps have been carried out:

- all project proposals have been reviewed and classified into four groups
- eligibility criteria have been suggested based on the Energy Strategy of the Energy Community and consequently projects which may not be eligible, or whose eligibility may be questionable, have been identified and presented to the Energy Strategy Task Force
- cross-border projects suggested by promoters from both sides of the border as individual projects (matching projects) have been identified and considered as single projects in the assessment process
- strongly complementary projects have been clustered and considered as single projects in the assessment process
- the project data were verified using comparative cost analysis and engineering assessment to identify outliers, data errors and inconsistencies\(^17\)

II. GENERAL APPROACH

In November 2012, the Energy Community invited promoters to submit their project proposals in the area of electricity, gas and oil infrastructure. The project proposals were submitted by 31 December 2012 and collected by the Energy Community Secretariat. Any project promoter, within or outside the Energy Community was able to apply for PECI (Projects of Energy Community Interest) subject to the following conditions:

- where necessary missing data and clarifications were requested from the project promoters.

The approach for the assessment of the submitted investment projects included two parts, namely:

- Pre-assessment steps
- Check of the eligibility of the proposed projects
- Verification of the submitted project data
- Identification of matching projects and identification competitive potentials between the proposed projects
- Identification of complementarities between projects and clustering

Project assessment

- Application of an economic Cost-Benefit Analysis (CBA) for each project (or project cluster)
- Assessment of additional qualitative and quantitative criteria and integration with the results of the CBA; calculation of a single score for each project or project cluster
- Ranking of all eligible projects according to the calculated scores with separate lists for electricity infrastructure, power generation and gas infrastructure.

1. Pre-Assessment Steps

All projects submitted by the project promoters until 31 December 2012 or during the public consultation phase (until 29 April 2013) were investigated according to the pre-assessment steps explained below.

The eligibility of the proposed projects has been assessed on the basis of the information provided in the separate project questionnaires, as well as any additional information given by the project promoters throughout the process. The eligibility check followed the criteria specified in the Energy Strategy of the Energy Community. The accuracy of the submitted technical and commercial project data was then further verified to the best possible extent in order to achieve a complete set of the necessary project data which served as a basis for the project assessment.

In order to avoid duplication in the assessment, overlapping (or matching) projects (such as an interconnector between two countries consisting of sections in the two neighbouring countries or a run-of-river power plant to be constructed directly at the border) were taken into consideration as single projects. In addition, the observed complementary projects – these projects which necessarily require the implementation of specific other projects – were grouped as clusters and consider them as single projects in the assessment.

Project clusters are assessed as single projects.

16 In this context the word “economic” relates to the point of view of the assessment; in that possible costs and benefits are evaluated for all stakeholders affected by an investment project taking into account the monetary costs and benefits of the investor as well as the costs and benefits to other stakeholders and the society as a whole.

19 Project clusters are assessed as single projects.

18 In this context the word “economic” relates to the point of view of the assessment; in that possible costs and benefits are evaluated for all stakeholders affected by an investment project taking into account the monetary costs and benefits of the investor as well as the costs and benefits to other stakeholders and the society as a whole.

17 It should be noted that the comparison of costs conducted here does not constitute a detailed international benchmarking of individual cost elements of the proposed projects, but rather provides a high level assessment. A detailed assessment of the cost efficiency of the proposed projects is not within the scope of this study.
III. OVERVIEW OF SUBMITTED PROJECTS, PROJECT CLASSIFICATION AND PRE-ASSESSMENT STEPS

1. Project Classification

In total, 100 project proposals (85 project proposals until 31 December 2012, and 15 project proposals during public consultation) were submitted to the Energy Community Secretariat. In pre-assessment process these projects were reduced by 82 due to non-compliance with eligibility (6 projects), complementarity (1 project) and matching (11 projects).

These groups are in line with the guidelines contained in Energy Community Strategy which was adopted by the Ministerial Council of the Energy Community on 18 October 2012. The following table shows the classification of project proposals by Contracting Party and project group.

<table>
<thead>
<tr>
<th>Contracting Party/Project Promoter Country</th>
<th>Electricity infrastructure</th>
<th>Electricity generation</th>
<th>Gas infrastructure</th>
<th>Oil infrastructure</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>3</td>
<td>15</td>
<td>4</td>
<td>-</td>
<td>22</td>
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<tr>
<td>Croatia</td>
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<td>2</td>
<td>4</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>FYR of Macedonia</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Kosovo*</td>
<td>6</td>
<td>4</td>
<td>-</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Moldova</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Montenegro</td>
<td>3</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Serbia</td>
<td>6</td>
<td>13</td>
<td>9</td>
<td>2</td>
<td>30</td>
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<td>Ukraine</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Multi-Country Project – TAP</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30</td>
<td>43</td>
<td>23</td>
<td>4</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: compiled by the Consultant

The total investment volume of submitted project proposals (of those that indicated the investment cost) is estimated at approximately EUR 30 billion. The following figure shows the estimated investment sums for each project group in each Contracting Party.

Figure 6. Estimated investments in EUR million by Contracting Party and project group

Table 2. Classification of project proposals by Contracting Party/project promoter and project group

2. Project Eligibility

According to the Energy Community Strategy guidelines for the identification of Projects of Energy Community Interest, eligible projects, need to be located in one of the Contracting Parties and need to provide an impact for at least two Contracting Parties, or a Contracting Party and an EU Member State (first level criteria).

Furthermore, only the following categories of projects are eligible, according to the Energy Community Strategy:

1. Power Generation

- New generation capacities (including bundling of different projects or adding new units to existing facilities), which have an added value in enhancing cross-border supplies and trade and grid stability in at least two Contracting Parties.
- Modernisation, retrofitting of existing power plants which have an added value in enhancing cross-border supplies and trade and grid stability in at least two Contracting Parties, allowing for more efficient and environmentally safe production.

2. Electricity Transmission

- High voltage lines (overhead lines for minimum 220 kV, underground and submarine transmission cables, if they have been designed for a voltage of 150 kV or more)
- Electricity storage facilities, including pump storage
- Smart meters and ancillary equipment
- Equipment for the safe, secure and efficient operation of the system

3. Gas Transmission

- New transmission pipelines and related equipment (metering and compressor stations) for the transport of natural gas that form part of a network which mainly contains high-pressure pipelines, excluding high pressure pipelines used for upstream or local distribution of natural gas, with emphasis on bi-directional capacity
- Equipment for the safe, secure and efficient operation of the system
- Enhancing the capacity of existing transmission pipelines
- Refurbishment of existing pipelines

4. Gas Storage

- New underground storage facilities
- Expansion of existing underground gas storage facilities.
- LNG, CNG facilities
- LNG and CNG terminals (reception, storage and re gasification facilities)

5. Oil

- Refinery improvements for facilitating improved fuel quality
- Storage facilities to contribute to the security stockholding obligations
- Pipelines used to transport crude oil

The Consultant checked whether the submitted projects fulfill the eligibility criteria listed above. As a result, there were six projects that did not meet the eligibility criteria mentioned above. For proposed investment projects where the cross-border impact is not directly observable, the eligibility is assessed as part of the electricity and gas market modelling.

20 According to the Strategy, an impact to one Contracting Party and at least one EU Member State is also eligible.
21 Examples of projects with a directly observable impact include interconnections of two (or more) Contracting Parties or one Contracting Party and one EU Member State (or a hydro power plant located on the border with connections to both sides.)
3. Matching Projects

Matching projects are defined as projects that share the same transmission routes / branches / pipelines / facilities or at least a part of it. These are essentially the same projects, but proposed by different project promoters. Consequently such projects should be evaluated jointly, i.e. as single projects. There were several matching projects among the proposed investment projects. Some of the cross-border projects (transmission and gas projects, for instance) have been proposed as two different projects – one proposed by each Contracting Party – although they are part of the same interconnection. Matching projects were also found in the group of electricity generation. This applies for hydro power plant projects located on border rivers. After having evaluated the matching projects, the total number of individual investment projects decreases to 84.

4. Comparison of Project Data

The aim of this comparative analysis was to provide verification of the investment costs submitted by the project promoters for their electricity, gas and oil projects. For this purpose, the project cost by technology against each other and with typical reference figures was compared. The latter stemmed from publicly available data and engineering analysis. The Consultant also used its experience, previous work in the Contracting Parties and the internal data base.

IV. PROJECT ASSESSMENT METHODOLOGY

1. General Approach

The assessment methodology aimed to provide a framework for evaluating benefits and costs to the Contracting Parties caused by the individual projects and to rank them according to their economic feasibility. For this purpose, a multi-criteria framework based on an economic Cost-Benefit Analysis (CBA) and a set of additional criteria was applied.

The economic CBA systematically compares the benefits with the costs arising over the life span of an investment project to all relevant groups of stakeholders within a geographic area. The conduction of an economic CBA is a widely used technique for project valuation and is also foreseen as a central element for both electricity and gas by the recently adopted EU Infrastructure Regulation. Since not all possible costs and benefits can be quantified and monetised – which is a requirement for an inclusion in the economic CBA – additional criteria have been selected to complement the CBA.

Given the limited number of submitted and eligible oil infrastructure projects (three) and the specifics of the oil market, the assessment of these projects is based on qualitative analysis only.

The assessment of the proposed investment projects (and project clusters) was done from an overall economic point of view. Costs and benefits of the individual projects were, therefore, assessed in economic terms for all the affected stakeholders and for all Contracting Parties of the Energy Community. The assessment and the associated modelling provided a high level indication of the economic benefit of the investigated project proposals, which was then used to rank the different projects. They neither aim to nor can substitute detailed project feasibility studies focusing on the specific details related to every individual project. In this respect the exact implementation potential related to every single project can only be established by a detailed analysis of the project specifics and the legal and regulatory framework in the specific country (including the compliance with environmental legislation), which has been outside the scope of this project. The assessment does not imply any conclusion related to pending court cases on individual project proposals. The project funding scheme, the associated equity and debt structure and possible project grants were also not considered in the assessment. These categories are strictly relevant for the financial analysis of the projects but are not relevant for the adopted economic framework of the analysis.

The selection of the criteria has taken into account the criteria defined in the Energy Strategy of the Energy Community, the approach described in the proposed EU regulation, other relevant academic and applied studies on the assessment of infrastructure projects, as well as the expert opinion of the members of the consortium. These criteria have been further adjusted and condensed in order to:

- avoid duplications resulting from a strong correlation or an overlapping of criteria
- avoid a discrimination of projects because of differences in the quality and quantity of information submitted by the project promoters
- account for the fact that the analysis is conducted in economic terms and irrespective of any financing arrangements
- avoid a subjective and potentially discriminatory assessment based on a lack of detailed information that can only be provided by a detailed feasibility study or environmental impact assessment
- account for the specific characteristics of the electricity and gas markets within the Energy Community
- ensure the compatibility of the criteria with the proposed assessment framework

Criteria related to investors’ perceived commercial attractiveness of specific projects or expected public support (governments or local communities) are not explicitly considered in the economic assessment. It is therefore possible – if not likely – that the economic assessment of Projects of Energy Community Interest provides different results and ranking than an assessment carried out on a national level (only) or by a financial investor.

2. Proposed Project Assessment Criteria

Based on the principles explained above the following criteria have been agreed with the Energy Strategy Task Force to be applied in the project assessment.

1. Change in Socio-Economic Welfare

The changes of socio-economic welfare are estimated with the net benefits (benefits minus costs) that the individual investment projects (or project clusters) can bring to the Contracting Parties. The costs are determined by the capital and

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22 Access to different data only available to specific stakeholders as well as changes which occurred from the time of preparing this report may lead to some differences in the outcome.

23 In this context economic relates to the point of view of the assessment, in that possible costs and benefits are evaluated for all stakeholders affected by an investment project taking into account the monetary costs and benefits of the investor as well as the costs and benefits to other stakeholders and the society as a whole.


operating expenditures of the project. The socio-economic benefits are estimated and monetized through the project’s impact on market convergence / price changes*26. In order to estimate security supply related benefits for electricity investment projects, reference data on non-supplied electricity and information on the contribution of generation, transmission and distribution to outages / non-supplied electricity was collected for the Contracting Parties. For gas investment projects security supply related benefits were estimated following a three step procedure. Security of supply related benefits of a project were measured by the change in economic welfare due to the implementation of the project in the case of a gas supply disturbance. A gas supply disturbance was assessed as a 30% reduction of gas deliveries on the interconnectors from Russia/Ukraine to the region in January for a given year. The economic welfare change due to the realization of the proposed infrastructure was calculated as the difference between the welfare under disturbance conditions with and without this project.

4. Reduction in CO₂ Emissions

Within the CBA the sustainability benefits were estimated by the impact of projects on changing greenhouse gas emissions. For the electricity network and generation projects this was done by directly estimating the changes in the regional electricity production patterns and the related CO₂ emissions.

In the case of gas infrastructure projects, the project related environmental benefit is estimated by multiplying the corresponding change in the countries’ CO₂ emissions by an exogenous carbon value (based on the EC Low carbon roadmap values).

5. Enhancement of Competition

In some circumstances the price reductions caused by an interconnection or generation project may be driven not only by decrease of congestion and introducing sources with lower production costs but also by additional enhancement of competition. The latter does not affect the production costs but just transfers monopoly rents (the price-mark-ups over production costs), gained by producers / importers / traders (due to insufficient competition) to consumers.

As the market models used in the CBA assume competitive market equilibria, an explicit additional criterion on enhancement of competition was incorporated.

6. System Adequacy

An electricity transmission project could potentially enhance system reliability by reducing loading on parallel facilities, especially under outage conditions. A new electricity transmission facility can provide more options for the maintenance of outages, provide load relief for parallel facilities, and provide additional flexibilities for switching and protection arrangements. Moreover, it can potentially increase reserve sharing and firm capacity purchases, and therefore decrease the amount of contingency that needs to be constructed in this importing region to meet reserve adequacy requirements.

Similarly at the regional level, the expansion of gas interconnections may also improve the overall system reliability and reduce the loss-of-load probability. The projects may also provide increased operational flexibilities for the TSOs and thus further enhance the reliability of the grid.

Electricity generation projects – in case they do not just replace existing power plants – may directly increase the reserve margin by providing additional generation capacities that can be particularly used in peak demand situations or when generation capacities are not available. The latter can for example be related to weather conditions (hydro, wind and solar generation)*27 or to unplanned or planned outages of power stations (e.g. revisions). When assessing the impact of wind power plants on system adequacy, it has also to be taken into account that wind power plants may increase balancing needs since production is not only intermittent but may also not coincide with demand. Although CBA incorporates aspects of security of supply, an explicit structural criterion to account for the system adequacy impact was incorporated.

7. Progress in Implementation

This criterion aims to test the preliminary implementation potential and favours projects which have a clear implementation plan and/or have already commenced their preparatory activities.

8. Support of renewable energy sources

As mentioned above, the environmental impact of an individual project on the reduction of CO₂ emissions is already considered in the CBA.*28

Since the promotion of renewable energy account for core areas of the Energy Community Treaty, a separate renewable energy (RE) criterion was applied. This criterion looks at the contribution of the power plant projects to reach renewable energy RE target levels and at the flexibility of different generation technologies to provide support to the integration of (intermittent) renewable energy RE production. Electricity generation projects such as hydro power plants or wind power farms directly contribute to the development of renewables. On the other hand the expansion of renewable energy if a generation network requires additional balancing support by conventional power stations in order to offset the intermittency effects.*29

In the case of electricity or gas transmission projects such direct contribution on the development of renewable energy RE cannot be easily observed. None of the hydro and wind power projects are directly associated with the proposed transmission projects. Similarly none of the proposed transmission projects is specifically constructed to evacuate renewable energy RE generation (e.g. large scale offshore wind capacities). For this reason, the criterion on renewable energy RE support was applied on electricity generation projects only.**30

3. Economic Cost-Benefit Analysis

A cost-benefit analysis (CBA) is a common tool used to provide criteria for investment decision making by systematically comparing the benefits with the costs over the life span of an investment project. It is widely applied on the sector level (collective impact) as well as the company (i.e. the investor’s) level (individual impact). Whereas in the private sector, appraisal of investments and financial analysis of company’s costs and benefits takes place against maximizing the company’s net benefits, the economic CBA focuses on the overall long-term costs and benefits taking a broader perspective and including externalities, such as environmental and reliability impacts, to broader groups of stakeholders. This gives the economic CBA a wider economic character with the objectives of maximizing welfare of a society (at national or at regional level) as a whole.

CBA is also foreseen as a central element for both electricity and gas by the proposed EU Infrastructure Regulation*31. The proposed EU Regulation foresees a system-wide CBA to be carried out for the identification of Projects of European Interest (PEI) and for the allocation of costs between different jurisdictions affected from an investment. The specific details for such a CBA at the EU level are currently still under discussion.

*26 For example electricity interconnection will reduce electricity prices in the region that imports electricity. Conversely, the exporting region will experience an increase in its electricity price such that the prices in the two regions will tend to converge. Generations in the exporting region will increase in output, while generation in the importing region will decline. Benefits would in this case accrue to consumers in the importing region and generators in the exporting region.

*27 Power plant projects are subject of a systematic cost-benefit analysis. Projects supplying additional capacity are also particularly addressed as a key element in the EU legislation**32 as well as the legal framework of the Energy Community.*33

*28 To that end the value of environmental impacts is associated with the social welfare in the respective country. The assessment was carried out with the EC Low carbon roadmap values.

*29 For example electricity interconnection will reduce electricity prices in the region that imports electricity. Conversely, the exporting region will experience an increase to its electricity price such that the prices in the two regions will tend to converge. Generators in the exporting region will increase in output, while generation in the importing region will decline. Benefits would in this case accrue to consumers in the importing region and generators in the exporting region.

*30 See for example Articles 29 and 36 of the Treaty establishing the Energy Community and Procedural Act No 2008/02/MC-EnC of 11th December 2008 on the implementation of the Energy Community. To that end the value of environmental impacts is associated with the social welfare in the respective country. The assessment was carried out with the EC Low carbon roadmap values.

*31 Additional environmental impacts such as the impact of a project or project cluster on hydrology, soil, fauna or flora can only be assessed in a detailed project specific environmental impact assessment, which is outside the scope of this project assessment and the cost-benefit analysis.

*32 These effects are simply caused by meteorological conditions such as solar irradiation levels and wind speed. Depending on the meteorological conditions the electricity production of solar or wind power farms directly is determined.

*33 It is recognised that the situation may change in the future and suggest monitoring the RE development in the Energy Community. It should eventually be considered to extend the scope of the CBA to also cover the electricity production technologies to provide support to the integration of intermittent renewable energy RE production. Electricity generation projects such as hydro power plants or wind power farms directly contribute to the development of renewables. On the other hand the expansion of renewable energy if a generation network requires additional balancing support by conventional power stations in order to offset the intermittency effects.

*34 Regulation (EU) 347/2013 on Guidelines for Trans-European Energy Infrastructure
The economic CBA was carried out applying two market models: the European Electricity Market Model (EEMM) and the Danube Region Gas Market Model (DRGMM). Descriptions of the models are contained in the chapter to follow. The project costs (incremental cost) include the direct investment and operating costs of each project, after the verification checks explained earlier in the report. The project benefits (incremental benefits) are estimated and monetized by their contribution to regional market integration, security of supply and the reduction of CO2 emissions. The change in socio-economic welfare is calculated by summing up all project benefits and costs.

1. Investment Appraisal Methods

Within the project assessment, it was decided to apply the same social discount rate for all projects (and project clusters). Based on the existing practices in the EU,6 the discount rate was set to equal 5%.

2. Perspective of the Analysis and Distributional Effects

The economic cost-benefit analysis studies the impact on the aggregated welfare of the parties affected by the project. The costs and benefits of an investment project may however be unevenly distributed between different stakeholders and across different states. Clearly costs and benefits directly affect the project developers carrying out the investment. But costs and benefits also affect (indirectly) other market participants, such as other network operators, generators, suppliers or customers and the society as a whole. Different stakeholders are also likely to benefit to different extents from a specific investment project. Costs might for example only be borne by one market participant (e.g. the investor), whereas benefits might be split across a larger number of market participants (network operators, suppliers, customers, etc.).

4. Multi-Criteria Assessment

The results of the CBA have been complemented by the use of additional criteria that are relevant for the project assessment but are not incorporated within the CBA. For the overall integration of the CBA results and the additional criteria, the AHP (Analytic Hierarchy Process) technique was being applied.

1. Scoring System

In order to measure the fulfilment of each criterion by each investment project, specific indicators were defined for each criterion. As a next step, the indicators are given scores reflecting the ability of each project to fulfill the respective criterion. Accordingly minimal points (one) was attributed to a project when the degree of fulfilment is low and maximal points when the degree of fulfilment is high (five). A linear interpolation to allocate scores between the minimum and the maximum values was applied.

2. Determination of Weights

The weights for each criterion were set according to the AHP approach. The weights for the different groups are presented below. Since oil infrastructure projects were not assessed within the multi-criteria framework, no weights are provided for oil infrastructure projects in the following table.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic welfare</td>
<td>47%</td>
</tr>
<tr>
<td>Enhancement of Competition</td>
<td>19%</td>
</tr>
<tr>
<td>System Adequacy</td>
<td>17%</td>
</tr>
<tr>
<td>Facilitation of RE</td>
<td>6%</td>
</tr>
<tr>
<td>Progress in Implementation</td>
<td>11%</td>
</tr>
</tbody>
</table>

Criteria weights for electricity infrastructure projects (or project clusters)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic welfare</td>
<td>48%</td>
</tr>
<tr>
<td>Enhancement of Competition</td>
<td>20%</td>
</tr>
<tr>
<td>System Adequacy</td>
<td>18%</td>
</tr>
<tr>
<td>Progress in Implementation</td>
<td>14%</td>
</tr>
</tbody>
</table>

Criteria weights for gas infrastructure projects (or project clusters)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic welfare</td>
<td>48%</td>
</tr>
<tr>
<td>Enhancement of Competition</td>
<td>20%</td>
</tr>
<tr>
<td>System Adequacy</td>
<td>18%</td>
</tr>
<tr>
<td>Progress in Implementation</td>
<td>14%</td>
</tr>
</tbody>
</table>

5. Calculation of Total Scores and Final Ranking

The total score for each project was calculated as the sum of the weight of each criterion multiplied with the score for each criterion. The projects were then ranked according to the total score. The ranking was conducted separately for the project categories: electricity infrastructure, power generation and gas infrastructure.

The following graph summarises the different steps of the project assessment methodology described above.
V. APPLICATION OF THE PROPOSED METHODOLOGY

This chapter provides further details on the economic market models used in the economic CBA to monetize the project-driven change in socio-economic welfare for the region of the Energy Community and Bulgaria, Hungary, Greece and Romania. The change is determined against a reference scenario (step 2 in the Figure 7. Proposed Project Assessment Methodology) and by using electricity and gas market models. Two different market models, one for the electricity infrastructure projects (EEMM) and one for the gas infrastructure projects (DREGMM) are being applied.

Map 1. Geographical coverage of the European Electricity Market Model *

*Countries coloured in blue are modelled in the EEMM.

Source: Consultant, Report on the Projects of Energy Community Interest Assessment

The model simulates short-term market competition (e.g. day-ahead) based on SREMC (short-term marginal cost) of the generating units. The SREMC comprise of three main components: fuel costs, variable operational expenditure (OPEX) and costs of purchasing CO2 emission rights (in countries which are obliged to follow the emission trading scheme).38

There are three types of market participants in the model: producers, consumers, and traders. All of them behave in a price-taking manner, i.e. they take the prevailing market price as given and cannot influence it.

Consumption is represented in the model in an aggregated way by price-sensitive demand curves. This relationship is approximated by a downward sloping linear function, where demand response is highly inelastic.

Cross-border trade takes place on capacity constrained interconnectors between neighbouring countries, where each country is represented as one node. Cross border capacities are represented by net transfer capacity (NTC) values.

The model establishes a simultaneous and unique equilibrium in all investigated markets with the following properties:

- Producers maximize their short term profits given the prevailing market prices
- Total domestic consumption is given by the aggregate electricity demand function in each country
- Electricity transactions (export and import) occur between neighbouring countries within the limits of available transmission capacity. In the absence of transmission constraints the model generates uniform electricity price within the constrained area
- Energy produced and imported is in balance with energy consumed and exported

38 For the non-EU countries that do not participate in the emission trading scheme, such as the Contracting Parties of the Energy Community, CO2 costs are not included in the marginal generation costs and therefore addressed separately (as discussed further below).
The new installed capacities for the period of 2012-2020 and the decommissioning rates were taken from the Strategy (excluding potential PECIs), while own estimations were used for the rest of the modelled countries.

3. Carbon Values Applied in the Modelling and CBA Calculation

For the CO2 price, the European Commission’s (EC) estimates for the countries participating in the Emission Trading Scheme (ETS) were applied. The EC estimates a price of 16.5 EUR/tCO2eq carbon values for 2020 and a price of 36 EUR/tCO2eq in 2030. Starting from the present level of 3.6 EUR/tCO2eq, the assumption of a linear growth for the modelling period of 2012 – 2021 was made.

4. Infrastructure Assumptions

The starting values of the net transfer capacity (NTC) of the interconnectors in the EU member countries are based on ENTSOe data. For the Contracting Parties, the values reported in the Strategy were applied. The extensions of transmission interconnection capacity are based on the TYNDP (excluding potential PECIs in the reference scenario) for both Contracting Parties and EU Member States.

The proposed interconnection projects were incorporated into the modelling process with their NTCS. In cases where the project promoters failed to provide these values, the NTC were approximated using the total transfer capacity (TTC) adjusted by the NTC/TTC ratio for the respective country or region.

5. Fuel Price Assumptions

The table below summarises the various sources and actual values for the fuel prices applied in the model.

Table 5. Source of information for fuel prices in the EEMM model

<table>
<thead>
<tr>
<th>Fuel type</th>
<th>Information source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil price</td>
<td>Based on US Energy Information Administration (EIA), International Energy Agency (IEA) and Economist Intelligence Unit (EIU) forecasts.</td>
</tr>
<tr>
<td>Natural gas price</td>
<td>West-European gas price: Based on EIU and IEA other forecasts.</td>
</tr>
<tr>
<td></td>
<td>East-European gas price: Mix of the oil-indexed gas price and West-European gas price. Natural gas prices are harmonised with those values applied in the gas model.</td>
</tr>
<tr>
<td>Coal price</td>
<td>Hard coal price: ARA price is used for setting the initial level. Future coal price forecasts are based on IEU and IEA forecasts. For the lignite price 70% of the hard coal price is used, whereas in case of Serbia 50%.</td>
</tr>
<tr>
<td>Nuclear</td>
<td>Fuel price is based on research reports.</td>
</tr>
<tr>
<td>Heavy fuel oil</td>
<td>Indexed to crude oil price</td>
</tr>
</tbody>
</table>

Source: Consultant, Report on the Projects of Energy Community Interest Assessment

The model consists of several building blocks: local (national) demand, local (national) supply, gas storages, external markets and supply sources, cross-border pipeline connections, take-or-pay (TOP) contracts and spot trading.

All market participants in the model behave in a price-taking manner, i.e. they take the prevailing market price as given, and assume their actions have a negligible effect on the prices.

Based on the input data, the model calculates a dynamic and simultaneous competitive market equilibrium for the endogenously modelled countries. The equilibrium takes into consideration the constraints resulting from the physical gas infrastructure and contractual arrangements. The equilibrium is calculated monthly for 12 consecutive months (a full gas year).

The model generates several outputs: monthly market prices, pipeline flows, production, consumption and trading quantities, storage utilization levels, long-term contract deliveries and measures of socio-economic welfare.

2. Gas Modelling Assumptions

1. Demand and Production Assumptions

Table below shows the assumed consumption levels and growth rates for the Contracting Parties based on the latest consumption forecast provided by the Energy Community Secretariat in March 2013.

Table 6. Assumed yearly gas consumption in the modelled years and gas consumption growth rates

<table>
<thead>
<tr>
<th>Contracting Party</th>
<th>2015, mcm</th>
<th>2020, mcm</th>
<th>Average yearly growth rate between 2015 and 2020, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>10</td>
<td>96</td>
<td>172%</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>478</td>
<td>902</td>
<td>18%</td>
</tr>
<tr>
<td>Croatia</td>
<td>3,830</td>
<td>4,670</td>
<td>4%</td>
</tr>
<tr>
<td>FYR of Macedonia</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Kosovo*</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Moldova</td>
<td>908</td>
<td>1,069</td>
<td>4%</td>
</tr>
<tr>
<td>Montenegro</td>
<td>2,323</td>
<td>2,579</td>
<td>2%</td>
</tr>
<tr>
<td>Serbia</td>
<td>3,203</td>
<td>3,817</td>
<td>4%</td>
</tr>
<tr>
<td>Ukraine</td>
<td>55,273</td>
<td>54,405</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: Consultant, Report on the Projects of Energy Community Interest Assessment
2. Infrastructure Assumptions

For the two reference years, it is assumed that the infrastructural projects of the latest TYNDP are built. The submitted projects for a potential PECI status were not included in the reference case. Whilst South Stream was excluded from the reference scenario, the model includes a scenario analysis for the case that South Stream would be built. Where ever available (according to the ENTSOG capacity map), the model also allows virtual reverse flow (non-physical backhaul) transactions on the pipelines.

3. Price Assumptions for the Markets External to the Model

The external price assumptions are the same for 2015 and 2020. For the German and Italian markets, the model applies 2012 annual average TTF40 spot price. The Russian spot contracts are traded at a premium to TIF contracts as well as to the Russian TQP contracts. The Russian long-term contract prices are calculated by 80% oil price and 20% spot price indexation (uniform for all countries). Long-term contracts expiring until 2015 (HU, HR) are assumed to be renewed with a reduced rate of annual contracted capacity (80% of the former contract) but at the same price.

4. Transmission Tariff Assumptions

The model uses effective 2013 transmission tariffs for a standardized transmission service. Tariffs are expressed in a common measurement unit (EUR/MWh) for the following standard service:

- The duration of the transmission contracts is one year.
- Contracts refer to firm transportation services.

5. Storage Tariff Assumptions

The storage tariffs used in the model are the 2013 prices set by the storage operators. However, the actual tariffs in Austria, Slovakia and Poland appear to be too high compared to the seasonal spot gas price spread estimated for Germany. In medium and long-term such a difference may discourage the use of storage service and lead to a significant underutilization of storage facilities. Therefore we cap the Austrian, Slovak and Polish storage tariffs at the level of 5.30 EUR/MWh which is roughly in line with international estimation of long-term average incremental storage cost. The same storage tariff is used for pricing new storage investment projects.

6. LNG Tariff Assumptions

The LNG tariffs used in the model are the 2013 prices set by the LNG operators. For pricing new LNG facilities a uniform 4.5 EUR/MWh fee was used.

7. Strategic Storage Assumptions

In the case of Austria, Bulgaria, Croatia, Czech Republic, Poland, Romania, Serbia, Slovakia, and Ukraine, it is assumed that storage will meet the supply obligation of EU Regulation 994/2010 to serve residential consumers for a maximum of 30 days in winter peak periods. This amount is considered as ‘strategic storage’ so that the quantity of stored gas will only be available for customers under supply crisis situations.

VI. ASSESSMENT RESULTS

Since some of the data, which has been used within this assessment, is of commercially sensitive nature, the detailed results including the scores and ranks of individual projects cannot be presented as part of this publication.

1. Explanatory Notes on Results

The assessment conducted does neither aim to nor can substitute detailed project feasibility studies focusing on the specific details related to every individual project. In this respect the exact implementation potential related to every single project can only be established by a detailed analysis of the project specifics and the legal and regulatory framework in the specific country (including the compliance with environmental legislation). Furthermore the assessment does not imply any decision on pending court cases on individual project proposals.

Based on the results of the assessment, the list of PECI was presented to the Ministerial Council in October 2013 for adoption.

2. The List of Projects of Energy Community Interest

The table below lists the projects proposed for PECI label in each eligible category: electricity generation, electricity transmission, gas, oil. They are presented in alphabetical order of the host Contracting Party. These projects have been considered to be a priority, to have a regional impact, to contribute to security of supply, to generation adequacy, to contribute to the targets for renewable energy.

Table 7. List of Projects of Energy Community Interest (PECI)

<table>
<thead>
<tr>
<th>Contracting Party</th>
<th>Project ID</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>EG038</td>
<td>Hydro Power Plant Skavica</td>
</tr>
<tr>
<td>AL</td>
<td>EG001</td>
<td>Wind Park Đag-Velipoje</td>
</tr>
<tr>
<td>BiH</td>
<td>EG027</td>
<td>Combined Heat and Power Plant KTG Zenica</td>
</tr>
<tr>
<td>BiH</td>
<td>EG003</td>
<td>Hydro Power Plant Dabar</td>
</tr>
<tr>
<td>BiH + HR</td>
<td>EG004</td>
<td>Hydro Power Plant Dubrovnik (Phase II)</td>
</tr>
<tr>
<td>BiH + RS</td>
<td>EG002</td>
<td>Hydro Power Plants Upper (HPV Buk Bijela, HPV Foča, HPV Paunci, HPV Sutjeska) and Middle Drina (HPV Tegare, HPV Rogacica, HPV Dubravica)</td>
</tr>
<tr>
<td>Kosovo*</td>
<td>EG013</td>
<td>Kosovska e Re Power Plant (KRR)</td>
</tr>
<tr>
<td>ME</td>
<td>EG015</td>
<td>Hydro Power Plants Lim River</td>
</tr>
<tr>
<td>RS</td>
<td>EG035</td>
<td>Combined Heat and Power Combined Cycle Gas Turbine Plant in Panecevo, Serbia</td>
</tr>
<tr>
<td>RS</td>
<td>EG022</td>
<td>Thermal Power Plant Kolubara B</td>
</tr>
<tr>
<td>RS</td>
<td>EG024</td>
<td>Thermal Power Plant Nikola Tesla B3</td>
</tr>
<tr>
<td>RS</td>
<td>EG017</td>
<td>Combined Heat and Power Plant Novi Sad</td>
</tr>
<tr>
<td>RS</td>
<td>EG019</td>
<td>Hydro Power Plants Barske (10 HPs)</td>
</tr>
<tr>
<td>RS</td>
<td>EG018</td>
<td>Hydro Power Plants Velika Morava (HPV Lubicevo, HPV Tmavo, HPV Sulajzac, HPV Mijatovac, HPV varsar)</td>
</tr>
</tbody>
</table>

40. TTF (Title Transfer Facility) is a virtual trading point for natural gas in the Netherlands, the most liquid gas hub on the continent, the second in Europe after National Balancing Point (NBP), the British virtual trading point for natural gas.
### Electricity Infrastructure

<table>
<thead>
<tr>
<th>Contracting Party</th>
<th>Project ID</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL - FYR of MK</td>
<td>ET001</td>
<td>400 kV OHL SS Bitola (FYR of MK) – SS Elbasan (AL)</td>
</tr>
</tbody>
</table>
| HR - BIH          | ET004      | 400 kV OHL Banja Luka (BIH) – Lika (HR)  
| HR internal line reinforcement | ET004 | 400 kV OHL Bitola (HR) – Velebit – Konjice including 400 kv substation Brinje |
| IT - AL           | ET024      | 400 kV HVDC SS Vlora - Bari West |
| Kosovo* - AL      | ET014      | 400 kV OHL Tirana (AL) - Pristina (Kosovo*) |
| MD - RO           | ET015      | OHL Bari (MD) and Suica (RO) |
| ME - RS BiH and ME internal line reinforcement | ET016 | 400 kV OHL SS Tuzla (RS) – SS Pljevlja (ME) – SS Visegrad (BIH)  
|                   |            | 400 kV OHL Pljevlja - Lastva |
| HR               | ET018      | 400 kV OHL SS Kragujevac - SS Kraljevo |
| RS               | ET021      | 400 kV OHL SS Bajina Basta - SS Kraljevo |
| RS               | ET022      | 400 kV OHL SS Obrenovac - SS Bajina Basta |
| RS - RO          | ET020      | 400 kV OHL SS Resita (RO) - SS Pancevo (RS) |

### Gas Infrastructure

<table>
<thead>
<tr>
<th>Contracting Party</th>
<th>Project ID</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL-ME-HR-BiH</td>
<td>G008</td>
<td>Ionian Adriatic Pipeline (IAP)</td>
</tr>
<tr>
<td>GR-AL-IT</td>
<td>G022</td>
<td>Trans Adriatic Pipeline (TAP)</td>
</tr>
<tr>
<td>AL</td>
<td>G002</td>
<td>EAGLE LNG Terminal</td>
</tr>
<tr>
<td>BiH - HR</td>
<td>G006</td>
<td>Interconnection Pipeline BiH - HR (Slobodnica-Bosanski Brod-Zenica)</td>
</tr>
<tr>
<td>BiH - HR</td>
<td>G003</td>
<td>Interconnection Pipeline BiH - HR (Pljevlja - Mostar - Sarajevo/Zagvozd - Posušje/Travnik)</td>
</tr>
<tr>
<td>BiH - HR</td>
<td>G007</td>
<td>Interconnection Pipeline BiH - HR (Lika Jesenica-Trzac-Rosanska Krupa)</td>
</tr>
<tr>
<td>HR</td>
<td>G010</td>
<td>LNG Terminal in Croatia + Pipeline Zlobin-Bosiljevo-Sisak-Kozarac-Slobodnica</td>
</tr>
<tr>
<td>HR - RS</td>
<td>G009</td>
<td>Interconnection Pipeline HR - RS (Slobodnica-Sotin-Backo Novo Selo)</td>
</tr>
<tr>
<td>RS</td>
<td>G013</td>
<td>Interconnection Pipeline RS (Nis) - BG (Dimitrovgrad)</td>
</tr>
<tr>
<td>UA</td>
<td>G021</td>
<td>Modernization of Urengoy-Pomary-Uzhgorod Pipeline</td>
</tr>
</tbody>
</table>

### Oil Infrastructure

<table>
<thead>
<tr>
<th>Contracting Party</th>
<th>Project ID</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>OIL001</td>
<td>Project of Inspection, Evaluation, Rehabilitation, Upgrading and Reconstruction of the existing JANAF Oil Pipeline</td>
</tr>
<tr>
<td>UA</td>
<td>OIL004</td>
<td>Construction of the Brody – Adamovo oil pipeline</td>
</tr>
</tbody>
</table>

*This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and ICJ Advisory opinion on the Kosovo declaration of independence.

Source: Energy Community

The maps below illustrate the geographical location of the Projects of Energy Community Interest. The numbering on the maps correspond with the Project IDs in the tables above.
**GLOSSARY**

This publication makes a reference to the following institutions, treaties, support programmes, energy policy related concepts and measurement units.

**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHP</td>
<td>Analytic Hierarchy Process technique</td>
</tr>
<tr>
<td>CAPEX</td>
<td>capital expenditures</td>
</tr>
<tr>
<td>CAD</td>
<td>Coordinated Auction Office</td>
</tr>
<tr>
<td>CBA</td>
<td>cost-benefit analysis</td>
</tr>
<tr>
<td>CSEE</td>
<td>Central and South-East European region</td>
</tr>
<tr>
<td>DAM</td>
<td>Day-Ahead Market</td>
</tr>
<tr>
<td>DG ENER</td>
<td>European Commission Directorate General for Energy</td>
</tr>
<tr>
<td>DG ELARG</td>
<td>European Commission Directorate General for Enlargement</td>
</tr>
<tr>
<td>DRGMM</td>
<td>Danube Region Gas Market Model</td>
</tr>
<tr>
<td>EEMM</td>
<td>European Electricity Market Model</td>
</tr>
<tr>
<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
</tr>
<tr>
<td>ETS</td>
<td>Emission Trading Scheme</td>
</tr>
<tr>
<td>ENTSOE</td>
<td>European Network of Transmission System Operators for Electricity</td>
</tr>
<tr>
<td>ENTSOG</td>
<td>European Network of Transmission System Operators for Gas</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>GHG</td>
<td>greenhouse gas</td>
</tr>
<tr>
<td>GTS</td>
<td>gas transportation system</td>
</tr>
<tr>
<td>HPP</td>
<td>Hydro Power Plant</td>
</tr>
<tr>
<td>HVDC</td>
<td>High-voltage direct current</td>
</tr>
<tr>
<td>IAP</td>
<td>Ionian Adriatic Pipeline</td>
</tr>
<tr>
<td>IEA</td>
<td>International Energy Agency</td>
</tr>
<tr>
<td>IRI</td>
<td>International Financial Institution</td>
</tr>
<tr>
<td>IPP</td>
<td>Independent Power Producer</td>
</tr>
<tr>
<td>IRR</td>
<td>Internal Rate of Return</td>
</tr>
<tr>
<td>LCP</td>
<td>Large combustion plant</td>
</tr>
<tr>
<td>LNG</td>
<td>Liquefied Natural Gas</td>
</tr>
<tr>
<td>NTC</td>
<td>net transfer capacity</td>
</tr>
<tr>
<td>NPV</td>
<td>Net Present Value</td>
</tr>
<tr>
<td>OHL</td>
<td>an overhead electric line</td>
</tr>
<tr>
<td>OPEX</td>
<td>operational expenditure</td>
</tr>
<tr>
<td>PCI</td>
<td>Projects of European Interest (EU)</td>
</tr>
<tr>
<td>PECs</td>
<td>Projects of Energy Community Interest</td>
</tr>
<tr>
<td>PHLG</td>
<td>Energy Community Permanent High Level Group</td>
</tr>
<tr>
<td>PPP</td>
<td>public – private partnership model (companies)</td>
</tr>
<tr>
<td>RAP</td>
<td>Regional Action Plan</td>
</tr>
<tr>
<td>RE</td>
<td>renewable energy</td>
</tr>
<tr>
<td>SEE</td>
<td>South East European region</td>
</tr>
<tr>
<td>SRMC</td>
<td>short-term marginal cost</td>
</tr>
<tr>
<td>SS</td>
<td>sub station</td>
</tr>
<tr>
<td>TPP</td>
<td>Thermal Power Plant</td>
</tr>
<tr>
<td>TSO</td>
<td>Transmission System Operator</td>
</tr>
<tr>
<td>TTC</td>
<td>total transfer capacity</td>
</tr>
<tr>
<td>TYNDP</td>
<td>Ten-Year Network Development Plans (EU)</td>
</tr>
<tr>
<td>UGS</td>
<td>Underground Gas Storage</td>
</tr>
<tr>
<td>UNFCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>VAT</td>
<td>value added tax</td>
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<tr>
<td>WBIF</td>
<td>Western Balkans Investment Framework</td>
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</table>

**Measurement units**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>kilovolt</td>
</tr>
<tr>
<td>MW</td>
<td>megawatt</td>
</tr>
<tr>
<td>GW</td>
<td>gigawatt</td>
</tr>
<tr>
<td>TW</td>
<td>terawatt</td>
</tr>
<tr>
<td>kWh</td>
<td>kilowatt hour</td>
</tr>
<tr>
<td>MWh</td>
<td>megawatt hour</td>
</tr>
<tr>
<td>GWh</td>
<td>gigawatt hour</td>
</tr>
<tr>
<td>TWh</td>
<td>terawatt hour</td>
</tr>
<tr>
<td>toe</td>
<td>ton of oil equivalent</td>
</tr>
<tr>
<td>cm</td>
<td>cubic meter</td>
</tr>
<tr>
<td>mcm</td>
<td>million cubic meters</td>
</tr>
<tr>
<td>bcm</td>
<td>billion cubic meters</td>
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