# Roadmap

# EU-Russia Energy Cooperation until 2050

***March 2013***

In February 2011, the European Commission and the Russian government agreed to establish a long-term perspective to their mutual energy relations. The relevant document[1] specified that the Roadmap "*should concentrate on an analysis of different scenarios and their impact on EU-Russia energy relations, look into their consequences for the energy sectors, elaborate long-term opportunities and risks of the overall energy supply and demand situation and investigate the potential for long-term cooperation in the field of energy. After approval of this Roadmap by the Coordinators of the Dialogue, the EU and Russian sides should provide for using the respective potential for long-term cooperation as one of the priorities of their energy policies.*"

More than ever, energy markets are becoming interdependent, global and complex, with forecasts increasingly difficult to make. The objective therefore is to achieve a tolerable level of uncertainty in the context of the robust and mutually advantageous future development of EU-Russia energy relations.

Recognising the sovereign policy decisions of the EU and its Member States and of the Russian Federation, the Roadmap should be forward-looking and make recommendations for a series of steps to enhance EU-Russia energy cooperation over the coming decades.

While covering a large range of issues, the Roadmap cannot discuss all potential items of relevance for the development of energy relations between the EU and Russia. Nuclear and coal for example are only covered to a limited degree in the chapter on cross-sectoral issues and the chapter on electricity.

The Roadmap should be a living document and should be regarded as a common reference in the context of the EU-Russia Energy Dialogue. The actions proposed by the Roadmap should be monitored and be revised within the EU-Russia Energy Dialogue in line with progress achieved and new developments.

The Coordinators of the EU-Russia Energy Dialogue

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[1] Common Understanding on the Preparation of the Roadmap of the EU-Russia Energy Cooperation until 2050, Brussels, 24 February 2011

# 1. Cross-sectoral issues

**History and perspective**

Over the past half century, Russia has been a vital supplier of energy to the EU. But if Russia is important to the EU, the EU as a neighbour with half a billion energy consumers in a unified internal market is just as important to Russia.

Energy was chosen at the Paris EU-Russia Summit of 30 October 2000 as the component in bilateral relations with most potential to lead the European subcontinent into deeper, mutually-beneficial integration. Since then, energy markets have become increasingly globalised, concerns about climate change have grown and volatility in oil and gas markets has increased, leading producer and consumer countries to seek stability, sustainability and security – both of demand and supply of energy resources.

In the meantime economic and industrial cooperation between several if not most of the EU Member States and the Russian Federation and between European and Russian companies in and outside the energy sector have been developing significantly. Today more than 10,000 EU and Russian companies are developing activities in each other's markets, creating the firm basis for a positive interdependency. The experience on the ground would indicate that energy companies over the past ten years have often been ahead of their respective governments in establishing relations by advancing commercial ties at industrial level, thereby strengthening energy cooperation and security in Europe and contributing to the further economic integration of our subcontinent.

A long term perspective is essential in cooperation on energy, particularly at this time of deep changes in energy systems. Energy markets need to adapt to emerging new patterns of global energy demand, supply and transport. The EU is going through a transition aiming towards a low-carbon energy system, with concrete targets for 2020. The Russian Federation is on the path of an innovative and efficient energy sector development, meeting the energy needs of a growing economy as well as the foreign economic interests of the country, with concrete targets for 2030.

A number of scenarios for the development of the EU and Russian energy systems are available, including from governments and the European Commission (Russian Energy Strategy until 2030, EU 2050 Energy Roadmap), multilateral institutions and the private sector. This Roadmap for EU-Russia energy cooperation in a long-term perspective starts from some of these scenarios and their potential impact on EU-Russia energy relations, identifying the new potential for long-term cooperation.

**Energy demand** in emerging economies is increasing rapidly, particularly in China and India, and, according to the IEA[2], this could result in global energy demand increasing by 40% between 2009-35, It is estimated that 90% of the growth in energy demand over this period will be in the non-OECD countries and that the absolute growth in natural gas demand will be nearly equal to that of oil and coal combined, with trade in natural gas nearly doubling. Estimates indicate that global investments of some $38 trillion in energy infrastructure are required over this period.

This will have implications for both Russia and the EU. The EU will account for a shrinking share of global fossil fuel markets. Emerging economies, particularly to the east, will become more prominent in Russian exports. Domestic factors also come into play, with the contribution of oil and gas to Russia's GDP expected to decline from 24% in 2011 to 15% in 2035.[3] In the EU, the transition to a low-carbon energy system will limit the growth in the use of fossil fuels.

[2] IEA World Energy Outlook 2011, page 69.
[3] See above

**Price volatility** in oil and also in gas markets has increased over the past decade. Shale gas and other unconventional oil and gas sources have become potential important new sources of supply. The greater use of liquefied natural gas (LNG) will make gas markets increasingly global with transport more independent of pipelines.

**The climate challenge** is now universally accepted (UN agreement on the 2 degrees objective), global cooperation is increasing and several parties, notably the EU but also key players in industry, are pursuing climate strategies with concrete actions, particularly on energy. At the UN climate conference in Durban in December 2011, the 195 Parties to the climate change convention agreed on a Roadmap for drawing up a legal framework by 2015 for climate action by all countries and agreed to enhance the level of ambition and mitigation efforts up to 2020. At the Doha conference in December 2012, the EU also committed itself to a second commitment period of the Kyoto Protocol, allowing for the continuation of existing mechanisms including Joint Implementation. This will have significant repercussions on the future development of the energy sector.

To mitigate the risks related to energy production, both sides have an interest to strengthen their cooperation on safety issues. This includes the exploration and production of hydrocarbons, as well as increased cooperation on nuclear safety. Following the Fukushima accident in 2011, both sides have launched measures to ensure extended nuclear safety, with the EU undertaking a stress-test exercise including, for the first time, a peer review at European level.

Euratom and Russia are closely cooperating in the area of nuclear research. Nuclear fission is one of the energy technologies considered in the European Strategic Energy Technology Plan (SET-Plan) to accelerate decarbonisation through the development and deployment of cost-effective low carbon technologies to mitigate climate change risks. Russia and Euratom will continue to cooperate bilaterally and multilaterally on increasing the safety and security of nuclear power plants. Bilateral cooperation between Technological Platforms on closed fuel cycle with fast neutron reactors also offers promising perspectives.

In fusion research, both sides are highly committed to ITER and its success is recognised as the paramount condition for consolidating the present roadmap towards fusion power deployment.

In general, there are significant opportunities for further improvements in terms of the integration of the research work, communication between research teams, reciprocity and the balance of efforts in order to maximize the overall impact of EU-Russia energy research cooperation. The scope of proposed cooperation platforms should include the development of common approaches to research and support of innovation activities.

The correct response to these changes will be of key importance for the economic development of the European Union and the Russian Federation. Sustainable, effective and affordable energy prices are essential for ensuring the competitiveness of business in an increasingly global market and the well-being of citizens.

**The Roadmap vision**

The EU and Russian energy policies are different, but there do exist areas where these policies converge and thereby mutually beneficial synergies may arise which could not be reached without a deep energy cooperation.

Do the EU and Russia see each other as strategic partners or as simple trading partners in the energy sphere in the forthcoming years and decades? This Roadmap is based on both parties' commitment to the long term strategic EU-Russia energy cooperation.

The EU and the Russian Federation are closely interconnected through a dense energy network, notably concerning gas, oil and electricity. Although both sides will continue their diversification

policy, close cooperation on existing and new infrastructure will continue to be mutually advantageous.

By 2050, the EU and Russia should be part of a common, subcontinent wide, energy market. Such an enlarged market will require the gradual approximation of rules, standards and markets in the field of energy.

The Energy Cooperation Roadmap should contribute to the modernization of the Russian and the EU economies and thus to the Partnership for Modernization agreed between both sides. By 2050, the energy sector will have dramatically changed. The pathway to this new, cleaner and more affordable energy world will be challenging for both the EU and Russia, but provides also ample opportunities.

The significance of energy security issues requires a shift of EU-Russia energy relations from a pure supplier-consumer relationship towards a more technology-based cooperation. Significant joint cooperation between the EU and Russia in the development of an innovative sector of the economy will be vital in transforming the European subcontinent into a reference for sustainable growth and stability.

As a whole, the development of long term Russia-EU cooperation in energy sphere is a necessity for both sides. The recommendations presented in the Roadmap may help reach a new quality and scale of our energy partnership. But this will happen only if both sides include the corresponding issues into the priorities of their energy policies and follow-up the progress towards the cooperation target.

**The strategic target by 2050 should be to achieve a** Pan-European Energy Space, with a functioning integrated network infrastructure, with open, transparent, efficient and competitive markets, making the necessary contribution to ensuring energy security and reaching the sustainable development goals of the EU and Russia.

Such a result would have vast economic and political consequences. It would improve the energy security of the EU and Russia, and strengthen their positions on the global energy market. Such a Pan-European energy space would need to ensure a level playing field and a high level of transparency and safety. Generally speaking, the remaining content of this Roadmap is a more detailed interpretation of this statement.

This long-term objective could be achieved gradually, taking into account notably the improvement of the legal framework governing the relations, which should contain strong provisions on energy to lay a firm basis to permit the gradual approximation of rules, standards and markets in the field of energy which could be the basis for greater reciprocal investments and technology exchange. Concurrently, steps should be discussed to involve the neighbouring European countries in building a common subcontinent-wide energy market.

As a whole, this Roadmap should also serve as generalized Terms of Reference for the future EU-Russia Energy Dialogue. Continuous monitoring of the Roadmap and its "sub-roadmaps" implementation process should be provided, including regular presentation of the corresponding results in frame of the annual EU-Russia Energy Dialogue progress report. Necessary future revisions of the document should be timely performed, in line with achieved advancements and results of joint monitoring and refining the integrated energy scenarios field.

## 2. Electricity

The next 20-25 years will see a rapid evolution in the global electricity sector: electricity demand will grow twice as fast as the average of other energy types. This will require significant investments in infrastructure, energy efficiency and energy savings.

Most scenarios for the **EU energy system** show electricity playing a much greater role than now (almost doubling its share in final energy demand to 36-39% by 2050 in the EU decarbonisation scenarios), particularly after 2030. This means a steady increase in overall electricity consumption and an increasing share of electricity from renewable sources. Final demand for electricity should increase as part of growing energy demand in the current policies scenarios. In decarbonisation scenarios, electrification provides an important means of decarbonisation of transport and heating/cooling sectors. Electricity could also provide around 65% of the energy demand of passenger cars and light duty vehicles. This development will inter alia necessitate increased cooperation and trade with neighbouring countries to jointly exploit renewable energy resources more cost-efficiently[4].

EU energy systems are in the early phase of a major transition in electricity. Significant investments are needed to replace the EU's ageing network and generation systems, decarbonise electricity generation and make it more energy-efficient. Investments are taking place, but they must be stepped up.

To this end, the EU plans to encourage the further development of well-functioning, cross-border, wholesale markets; to promote demand response, including the roll out of smart grids and meters and the development of demand response services; and to promote the integration of storage and flexible generation to address the changes of decarbonisation. The internal energy market is crucial for the EU to make the transition. If properly designed, markets can promote and accompany the system change and effectively promote the most efficient solutions.

**In Russia**, electricity is also expected to play an increasing role in the future energy mix. According to IEA, Russian electricity consumption is expected to increase by nearly 2%/year, and will overtake EU per capita consumption by 2017.

The strategic objectives for the Russian electricity industry include the modernisation of the existing generation capacities and the development and implementation of capacities based on new generating technologies, including an accelerated development of renewable and nuclear capacities. Russia also plans the reinforcement of the Unified Power System (UPS) of Russia and its interconnections with neighboring countries. Further efforts are foreseen to strengthen the reliability and security of the system and to improve the organizational and market structure of electricity sector through the elaboration and the implementation of stable and clear rules for electricity and capacity markets' participants. The development of modern heating systems on the basis of combined heating/generation will be a specific challenge, using the potential of renewable energy resources.

Nuclear energy currently provides an important share of the electricity generation both in Russia and the EU, despite big differences between EU Member States. While Russia plans to increase the share of nuclear in its energy mix and to replace its older nuclear plants, the key

[4] Cf. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions, Renewable Energy: a major player in the European energy market, COM(2012)271

question in the EU is whether the existing nuclear plants will be replaced by new nuclear plants or by other energy sources at the end of their lifetime. In any case, for both the EU and Russia, it remains essential to ensure the highest international standards of nuclear safety and security.

The fuel mix used for production of electricity will remain under the sovereign responsibility of Russia and the EU Member States respectively. Irrespective of the choices made, both sides have a joint interest to apply to the highest environmental and safety standards, including as regards the implementation of the relevant international conventions.

Today, the EU and Russia power systems are strongly interlinked. The Russian electricity exclave, the Kaliningrad power system, has no direct links with the main grid of UPS of Russia, being interconnected only with Lithuanian power system. The power systems of Estonia, Latvia and Lithuania are synchronously interconnected with the power systems of the Russian Federation and the Republic of Belarus but have very limited interconnections with the power systems in the rest of Europe. New interconnectors in the Baltic Sea region will be built (Estlink-2, LitPollink and NordBalt) between the Baltic States and the EU electricity markets which will allow increasing and diversifying regional electricity trade.

The negotiations over an agreement between the Russian Federation, the Republic of Belarus and the European Union on the Coordinated Operation of the Unified Power System of the Russian Federation and the Power Systems of the Republic of Belarus, the Republic of Estonia, the Republic of Latvia and the Republic of Lithuania are progressing with the objective of having them concluded in 2013.

**Cooperation pathway**

The main drivers for future cooperation should be the need to ensure the reliability of power supply, the optimisation of the operation of the EU and Russian power systems, optimal grid management, and promoting investments in clean and flexible power generation on the base of clear and stable rules. This in turn will require close cooperation on technology and regulatory issues.

**Consumers** will have a major role to play in modernising electricity markets. Energy efficiency labelling of appliances is a good example of a policy tool that facilitates consumer choice and behaviour. Large industrial consumers already today adapt their consumption based on market signals. In future, smart metering and smart grids will also allow small consumers to have an active consumer-supplier role. This profound revolution in electricity markets over the coming decades will provide a new field for cooperation between Russia and the EU.

In the context of the moves towards the **decarbonisation of the energy systems**, carbon capture and storage is likely to play very important role for coal-fired and oil-fired electricity generating capacity and, in the medium to longer term, also for gas-fired capacity. Demonstrating carbon capture and storage, and exchanges on how to reduce greenhouse gas emission in general through new technologies and market signals should therefore be an item for further EU-Russia cooperation.

The **investment in combined heating/cooling plants and the modernisation of the power sector** more generally is an important challenge both in the European Union and the Russian Federation. Cooperation in this area should include the promotion of joint projects and exchanges on regulatory best practices and reforms.

There is a significant potential to increase electricity **trade** between both sides. Electricity exchanges between the Russian Federation and the EU are forecast to increase over the coming years. This calls for both Parties to investigate further market evolutions and infrastructure developments needs.

A first necessary step is to make necessary provisions aimed at ensuring the reliable and predictable functioning of power systems, and improving cooperation at a technical level. Within the Energy Dialogue, contacts and cooperation between the System operators, the regulators and the industry associations should be stimulated and reinforced.

**Recommendations, actions and milestones.**

**Before 2020:**

- Make necessary provisions aimed at ensuring the reliable and predictable functioning of the EU - Russia interconnected power systems; investigate further market evolutions and infrastructure development needs, notably as regards cross-border exchanges; develop working mechanisms for the identification and joint promotion of mutually beneficial cross-border infrastructure projects;

- Elaborate forward-looking scenarios for the integration of the power systems on the way to a pan-European energy space; implement joint assessment of the EU – Russia cross-border network infrastructure, analysis of options to improve this infrastructure and promotion of best options, especially in the Baltic sea region, and a continuous exchange of information on the respective development of EU and Russian grid infrastructure and its modernisation, including on smart grids;

- Technical cooperation:

- Working arrangement between ENTSO-E and the Russian System Operator and Federal Grid Company on the base of corresponding agreement(s);
- Cooperation of regulatory and infrastructure organisations with the aim of elaborating and introducing technological, economic and legal mechanisms regarding the development of cross-border trade between the EU and Russia's energy systems;
- establishing a platform for interaction involving the Federal Tariff Service of Russia and EU regulatory bodies, including ACER, on urgent regulatory and market design issues; approximation of legislation, optimal development of market relations, reliability of power supply and favourable conditions for investments and power development, including discussion on pricing policies and policies to support generation;
- sharing best practices across the whole range of regulatory cooperation including dedicated events such as annual EU-Russian regulatory conferences as well as targeted workshops.

- Joint actions to support the development of electricity from renewables in Russia and the modalities for increased trade in renewables between EU and Russia, and the possibility to establish joint projects in this area;

- Work towards mutually beneficial and non-discriminatory treatment of market participants and access to markets for both sides (where applicable).

- Establishment of an EU-Russia cooperation platform or centre for sustainable development of a transcontinental energy system, serving as a cooperation platform and promoting the implementation of innovations (renewable energy, energy-efficiency, balanced approach towards the perspective development of future power system, smart grids, future

transmission grids, carbon capture and storage, etc…) in line with the Russia-EU Partnership for Modernisation initiative.

**Up to 2030**

- Joint elaboration of a programme for the coupling of power systems and strengthening of interaction between the markets;
- Coordination of EU and Russian strategies in the electricity sector, including on large investment projects of mutual interest and the step-by-step development of electricity trade based on renewable and clean energies;
- Implementation, on the basis of a common platform or centre, of joint projects, including on grid modernisation, renewables and new technologies;
- Increase cooperation on modern electricity technologies and systems, including smart grids;
- Roadmap for solving EU and RF power systems/markets interaction problems (power and capacity markets) with the objective of moving towards a subcontinent wide interconnected electricity system and market;
- Revision and confirmation of targets up to 2050 depending on the results already achieved.

**Up to 2050**

- Establish a common energy space (power systems and markets coupling), including harmonised minimum rules on third party access; harmonised regulations based on competitive markets and a level playing field;
- Further cooperation on innovation in generating and transmission equipment to increase its efficiency and environmental sustainability;
- Increased cooperation concerning the management and operational control of power systems, increasing their adaptability against accidents, power cuts etc;
- Joint seminars, conferences (including international) on any electricity aspects at any stage according to mutually agreed programmes and priorities.

## 3. Gas

Natural gas is of immense importance in the energy relationship between the EU and Russian Federation. While it is not as large – in energy and financial terms – as the trade in crude oil and oil products, its importance for many EU member states is greater because of the high level of dependence on Russian gas. For the Russian Federation, EU countries represent by far its largest export market for gas and a very substantial source of foreign exchange earnings. This inter-dependence is likely to remain a key feature of the EU-Russia energy relationship in the coming decades.

According to the strategic objectives of the **Russian gas industry** the following goals will be reached:

- an increase in gas production by putting into operation new deposits which will more than compensate the decline in gas production in existing fields;
- renovation of existing and the further development of additional gas transport infrastructure to ensure adequate gas deliveries onto the domestic market and for export;
- promotion of geological exploration works in major gas-producing regions and on the continental shelf of the Russian Federation;
- development of the production and export of liquefied natural gas;
- development of gas-processing and gas-chemical industries aimed at the rational utilization of valuable fractions of hydrocarbons and associated petroleum gas;
- gas market liberalization, the creation of competitive environment and the further improvement of non-discriminatory access to pipeline and other gas infrastructure for all business entities.

Meanwhile the Russian strategy foresees:

- the delivery of gas supply to the European market in line with its demand (and mainly on the basis of oil products price linked long-term contracts) while exports in the eastern direction will increase very significantly;
- the gradual, economically sound, expansion of the Unified Gas Supply System in the east of Russia;
- the participation of Russian companies in the development of gas deposits in other countries and the construction of new inter-regional gas pipelines;
- a consistent energy savings policy with respect to gas production, transportation, processing and underground gas storage in Russia.

Inside the **Russian Federation**, there are questions about the development and future needs of the internal gas market. There are ongoing discussions concerning the structure and regulation of the Russian market, where independent producers (including those which have foreign investors/shareholders) are increasing their share of gas supplies. The development of Russian markets, as foreseen by the Russian Energy Strategy and other guiding documents, would complement well the EU's policy of market integration, giving companies bot in the EU and the Russian Federation greater choice to do business, strengthening commercial ties and benefiting

consumers. Significant investments will be needed and are underway to upgrade the Russian gas transportation network and to develop – under difficult climatic and environmental conditions – the huge resources in the Russian Arctic, both onshore and offshore.

The objectives of the **EU** energy policy[5], as specified by the European Heads of States and Governments, are to ensure safe, secure, sustainable and affordable energy contributing to European competitiveness. The EU objective is also to progressively decarbonise the EU economy, especially post-2030. The Energy Roadmap 2050 (RM 2050) illustrates some pathways as to how this objective can be achieved in the energy sector. Among fossil fuels, gas nevertheless remains the first option due to its lower emissions, sunk costs for transmission and distribution, its continued use in certain industrial sectors (such as in the production of fertilisers and chemicals), and, in particular, its flexibility in balancing intermittent renewables generation.

The completion of a fully integrated and more open EU internal market for gas is aimed at providing a stable long-term platform for a successful continuation of the EU-Russia gas partnership. Seen from the Russian side and some observers however, the ongoing transformation of the EU gas market is sometimes perceived as a complex process which may create uncertainties and concerns including for infrastructure investments.

**EU and Russian gas scenarios, risks and uncertainties**

According to current forecasts[6], natural gas will play an increasingly important role in the global energy economy. Under some conditions, the IEA projects an appearance of a "Golden Age of Gas". It is the only fossil fuel for which demand rises in all three WEO 2011 scenarios. In the New Policies Scenario, world demand increases in the coming 20-25 years at an average rate of 1.7% per year. Global gas consumption catches up with coal consumption. Economic growth and energy policies in non-OECD countries will be the key determinant of future gas consumption: non-OECD countries account for 81% of demand growth in the New Policies Scenario of the IEA. Growth in unconventional output will depend on the industry dealing successfully with the environmental challenges.

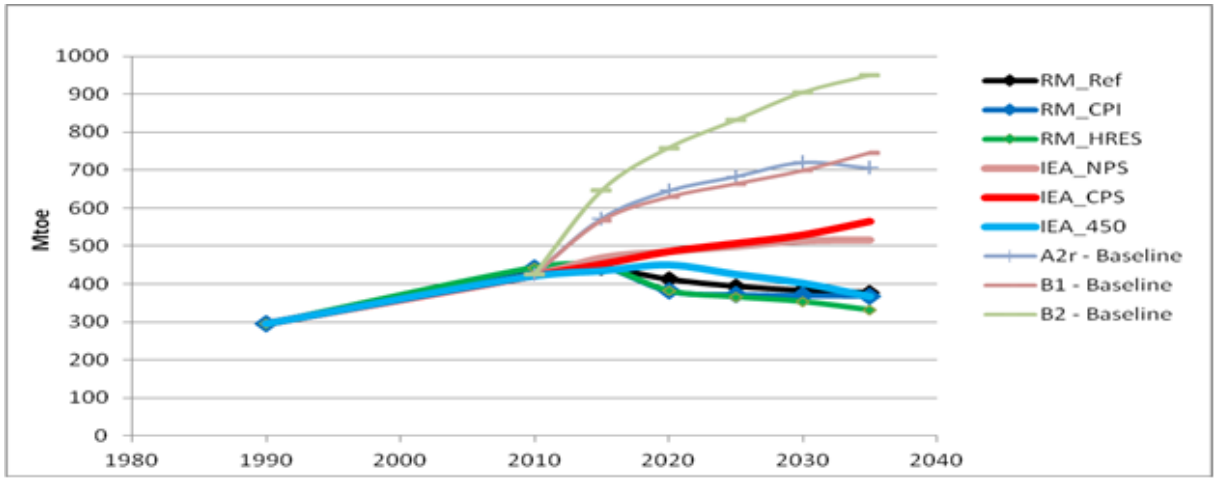
By IEA projections, Russia will be the world largest gas producer in 2035 and make the largest contribution to supply growth over the projection period. Fundamental factors on both the supply and demand side point to an increased share of gas in the global energy mix, as by its nature gas is most environmentally clean, least GHG emitting fossil fuel and its flexible applications in electricity and heat production. In the longer run, much depends on the global consent regarding ways to reduce GHG emissions and on technology development including possible wide penetration of Carbon Capture and Storage (CCS) technology.

Currently, the low GHG emission price and global decline of coal prices (as a result of coal being replaced by shale gas for electricity generation in the USA), combined with high gas prices and the economic crisis in several EU Member States, has resulted in the increase share of coal in the EU's power mix – so, after years of impressive growth, EU gas consumption has at most stagnated in last couple of years. As to long term projections, different scenarios reach significantly different conclusions about future trends, even over the next two decades. The European Commission's Roadmap 2050 and the IEA 450 scenarios show the lowest consumption mainly due to the fact that they assume a strong reduction of final energy demand due mainly to energy efficiency in buildings. This has a direct impact on natural gas which is one

[5] See also Annex
[6] IEA, WEO 2011, New Policies Scenario

of the main fuels for heating. However, growth of natural gas utilization in other sectors such as transport or back-up for renewables, can provide opportunities for additional growth in gas consumption.

Figure 1: EU Natural Gas Consumption Scenarios to 2035 [Mtoe]*




*RM = Roadmap 2050; IEA = World Energy Outlook 2011; A2r, B1 and B2 = IIASA.

Figure 1 represents the outcome of scenarios contained in a number of different studies concerning EU natural gas consumption and imports until 2035.[7] Due to the different specificities of the scenarios, the comparison can only be approximate but nevertheless shows the big differences between the visions developed by different organisations.

Forecasts for the Russian internal gas markets indicate a strong increase of domestic gas consumption. According to IEA, gas demand should rise by 0.8% per year on average and could reach 530 bcm in 2035.

The **main conclusions** which can be drawn from the above mentioned scenarios and forecasts are that:

- EU gas demand will depend on several uncertain factors: gas prices compared to those of alternative forms of energy; the evolution of low-carbon, energy efficiency and renewable support policies; economic growth, the penetration of gas in other sectors such as transport, deployment of CCS technology etc...
- A substantial reduction in EU gas demand prior to 2035 is possible, but is not foreseen in the majority of scenarios.
- Due to the expected depletion of EU indigenous gas resources, the gas import needs of the EU are growing in most scenarios at least until 2030/35.
- Post-2035 and particularly post-2040, the future for EU gas demand and imports – and therefore the role of Russian gas - is significantly less predictable.

[7]Energy Road Map 2050, 2011, European Commission; World Energy Outlook 2011, IEA; IIASA GHG Scenarios, 2007, IIASA; BP World Energy Outlook 2030, 2011. A large number of scenarios are included in *Energy Forecasts and Scenarios 2009-2010 Research*, published under the umbrella of the EU-Russia Energy Dialogue 2011.

Meanwhile, as it was agreed in the Gas Advisory Council work, the RM 2050 scenarios should not be considered as the definitive gas scenarios for the EU and Russia, and that new scenarios could be developed in the framework of the Energy Dialogue (see chapter on scenarios).

In particular until 2030, the price of gas imports is projected to have a significant impact on level of EU demand and imports. Regional gas markets, notably in North America and Asia, will have an increasing influence on EU-Russia gas relations and may impact the price levels in the EU. Asian markets will play an increasingly important role for Russian suppliers over this longer projection period. By 2030, Asian markets may start competing with the European market on gas import volumes from the Russian Federation. Nevertheless, the EU is expected to remain by far the largest market for Russian gas exports.

Recognising that, in a time frame up to 2050, the world will see significant changes in energy systems and technologies, new challenges arise for both sides in the EU-Russia gas relationship. The aim must therefore be to **reduce uncertainty to what can be considered as a "tolerable level" for both Parties**, recognising that a continuation and deepening of the gas relationship will require substantial investments, and that **stranded investments will be detrimental to both sides**.
To **reduce the uncertainties in future EU-Russia gas relations**, Russia needs to be regularly informed on the long-term perspectives of the EU demand for Russian gas, including on implementation of the EU low-carbon policies and on EU best estimates of the implications for gas imports. This is important for Russia when taking decisions on resource depletion, infrastructure investment and its role in the EU gas market.

Equally, the EU needs to be informed of Russia's long-term ability to supply gas to Europe. In that perspective, the EU has an interest in seeing the Russian upstream further placed on an internationally competitive investment basis, allowing also more sustained EU investment to flow into the country. Consequently, the EU needs to be able to follow the status of Russian decisions on gas resource and infrastructure development in view of its implications for future gas supplies to the EU.

There exist concrete current and future risks in EU-Russia gas relations. Reducing them to a tolerable level requires identifying these risks and suggesting ways to mitigate them. According to Gas Advisory Council's analysis, the risks should be divided into the three following groups.

**Supply/Demand Risks:**
- That the decline in EU gas demand in the post-2008 period is a permanent, rather than a temporary, phenomenon and that despite the anticipated decline in domestic gas production, EU demand for gas will not increase from 2009-12 levels even in the period up to 2030 and will decline thereafter;
- That the market share of Russian gas could be influenced by the competition from other suppliers and other commodities and energy sources;
- That the EU will need more Russian gas than it currently anticipates and will have put in place commercial, regulatory or political measures that translate into a disincentive for receiving sufficient future supplies.

**Infrastructure and Regulatory Risks:**
- That the Russian side will not be able to deliver gas to its EU customers, notably under existing and new long term supply contracts, in the volumes and according to provisions specified in those contracts;
- That the transportation of Russian gas under existing contracts will cost more under a new regulatory framework than under the current one;

- That the environment for large scale investments in gas infrastructure will remain too uncertain, and that some infrastructure investments may become "stranded";
- That possible new EU imports need could not be accommodated by existing infrastructures and that sufficient new infrastructure is not built.

**Political Risks:**
- That the internal energy policies of the Parties could be insufficiently predictable because of uncertainty of economic costs, technological development, and the environmental acceptability of different policy options, aggravated with external political factors;
- That the strategic Russia-EU energy cooperation policy could be insufficiently consistent and forward-looking in such an uncertain environment.

In fact, all of these risks should be considered by Parties as bilateral – because they directly affect vital issues of mutual energy and economy security.

**Cooperation pathway**

In line with the overall Roadmap 2050 objectives, the target for strategic cooperation in the gas sector includes developing a Pan-European gas infrastructure and building open, transparent, efficient and competitive gas markets, where any producers (including Russia) will be able to sell, and consumers to buy gas without any artificial trade barriers and discriminating rules, at any delivery point and at a fair price.

**Main drivers** on this cooperation pathway include, but are not limited to, compliance with international law obligations; improvement of international law base for energy cooperation on the grounds of the principle of mutual benefit; ensuring the short- and long term reliability of gas supply and demand; secure and non-discriminatory investments on both sides; a wider and more efficient use of natural gas; economically viable and safe gas production, treatment, transportation and consumption; and a reduction of the energy sector's environmental impact.

**Common themes** of cooperation are:
- alternative uses of gas, including in the transport sector;
- sharing gas production, supply and demand prospects;
- exchange of information and support for infrastructure projects of mutual interest;
- approximation of market rules influencing EU-Russia gas trade;
- coordinated and secure functioning of gas infrastructure;
- the potential development of CCS projects;
- a focus on safety and environmental issues;
- innovations in gas production, treatment, transportation;
- energy efficiency and decarbonisation.

**Recommendations, actions and milestones**

**Before 2020**

➢ Mitigate the infrastructure and regulatory risks in the EU-Russia gas relations, providing inter alia:

  - the secure and stable delivery of gas to the specified EU customers under existing and potential new supply contracts, including under long term contracts;
  - a consistent regulatory approach for gas infrastructure projects that allows for demand to be covered while avoiding "stranded" investments;

- the support of major gas infrastructure developments considered by the Parties to be projects of mutual interest;

- Entrust the Gas Advisory Council with elaborating forward-looking recommendations to mitigate the supply/demand and political risks in the EU-Russia gas relations, and providing inter alia:

  - a sustainable and sufficient level of security of gas supply and demand with a fair distribution of risks among counterparties, taking into consideration potential gas sector and energy policy developments, and the need to reduce relevant risks to a "tolerable level" (see chapter on scenarios);
  - enhanced flexibility of gas markets, including such issues as general gas pricing models; policy measures regarding subsidies and fair inter-fuel competition; minimal levels of guaranteed deliveries on predicted pricing for groups of consumers which need this; joint work on incentives for the development of gas storage capacities etc;
  - steps towards the creation of a joint pan-European operational platform for European, Russian and other concerned parties gas transmission system operators, supporting integrated gas market(s) and the functioning of gas infrastructures;

- Further cooperation within the EU-Russia Energy Dialogue on specific gas infrastructure projects, continuing close and regular proactive exchanges on relevant domestic policy measures that impact on Russian business in the EU and EU business in the Russian Federation;

- To discuss and co-ordinate cooperation on new developments in gas use (including on technical developments in the gas-chemical industry, the production of synthetic liquid fuel from natural gas, LNG and CNG as a motor fuel, the role of unconventional and biogas, micro-CHP devices, etc.) and their development and promotion via favourable investment and regulatory regimes;

- Promotion of Russian business investments in the EU gas sector and EU business investments in the Russian Federation gas sector;

- Consultations to provide short-term security of gas deliveries to the EU in the context of the Early Warning Mechanism;

- Cooperation on energy efficiency measures in the gas sector, notably gas flaring, efficiency of pipelines and other infrastructures (see chapter on energy efficiency);

- Continued participation of Russian and EU gas sector companies' representatives in major summits, forums, workshops, conferences for innovative development of gas exploration, production and transportation;

- Development of joint training programmes (with business support) for gas specialists;

- Communication to stakeholders and citizens about the positive results of the cooperation;

**Up to 2030**

- Further development of research and technology cooperation notably in the areas of production, transportation and utilization efficiency, CCS, unconventional and biogas etc;

- Close exchanges on gas scenarios and discussions on possible pathways for the development of a strategic Russia-EU cooperation (see chapter on scenarios) and the mitigation of possible risks and challenges;

- Implementation and effective use of a joint pan-European operational platform for European, Russian and other concerned parties gas transmission system operators;

- Development of further innovative uses for gas and the development of joint projects in these fields;

- Approximation of market rules and standards to smoothen the trade of natural gas and the reciprocal investments in production infrastructure;

- Further development of joint training programmes and activities (with business support) for gas specialists from both sides.

- Communication to stakeholders and citizens about the positive results of the cooperation;

**Up to 2050**

- Removal of all barriers for the integrated functioning and coordinated development of gas infrastructures and markets;

- Advanced joint technology programmes for the development of future uses of natural gas.

## 4. Oil

According to current forecasts[8], **global oil demand in coming 20-25 years will increase slowly** (with average annual growth rate 0.6%), but all the net growth in demand will come from non-OECD countries, mostly in Asia; **OECD oil use decrease**. Global oil production will grow at the same slow rate, but an increasing share of global output will come from natural gas liquids, unconventional sources and light tight oil.

Russia and the EU are strongly interdependent in terms of oil supply and over the coming years oil will remain a centrepiece of EU-Russia energy relations**.** Russia is the EU's leading supplier of crude oil, accounting for 34% of EU imports in 2010. In addition, the EU imports significant volumes of refined products from Russia, especially diesel oil. Trade in oil is more important in terms of value than any other traded good- oil and oil products together represent 64% of the total value of all Russian exports to the EU. EU-Russian cooperation in the oil sector has been largely driven by industry. EU companies are active in the Russian upstream sector and Russian players are part of the EU's oil downstream market, predominantly through Rosneft in the refinery sector and Lukoil in refining and marketing/ retail.

**Russia** is the world's second oil exporter, with export volumes (crude and refined products) of over 7 Mb/d in 2010[9] and **has been the world's largest oil producer** for the last six years, currently at 9.920 mb/d, with only Saudi Arabia occasionally overtaking it for brief periods. Production has been increasing since 2009 from 494 million tonnes to 512.4 million tonnes in 2011. However, the existing main oil fields in Western Siberia are depleting and significant investments will be needed to replace these fields. Existing resources in the Arctic shelf or other regions, including for unconventional oil, are significant, but will be increasingly difficult to explore. It is forecasted that crude oil production in Russia will continue to be around 510 - 515 million tonnes per year until 2020.

The Russian government in its 2030 Energy Strategy announced a continuation of its diversification policy for oil exports. According to this document, the share of Russian exports to the Asian countries would grow from 6% to 22-25% in 2030. Nevertheless, Europe will in 2030 remain the main export market and Russia's role as a stable oil supplier may increase in case of continued political instability in Northern Africa and the Near East. In view of these developments, Russian policy aims at

- The gradual reduction of oil supply to the European market while significantly increasing exports eastwards;
- ensuring stable revenues for Russia's consolidated budget at the different stages of energy and economy development while raising the value-added of the oil production sector;
- supporting the development and successful functioning of SMEs in the oil industry;
- the active participation and integration of Russian companies in the oil upstream and downstream sectors in other countries;
- active energy saving policies in oil production, transportation and processing.

**Oil is still the EU's first source of energy**. In line with a global trend that is seeing a reduction in the share of oil in the global energy balance, its share in the EU's primary energy demand should decrease in the coming decades from 35% in 2008 to 29% in 2035 according to the IEA's

[8] IEA, WEO 2011, New Policies Scenario

current policy scenario. This could lead to a reduction in oil consumption in the EU from 606 Mtoe to 537 Mtoe (-11%). In view of declining domestic production, the EU anticipates, however, a growing dependence on oil imports, from 82% in 2005 to 94% in 2030.

**Trends beyond 2030** are much more uncertain. In the EU 2050 current policy scenario, oil imports will decrease by 0.2% annually between 2030 and 2040. The situation is more marked in decarbonisation scenarios. At global level, the IEA anticipates in its "Blue Map" scenario[10] a reduction of oil consumption by 27% as compared to its level of 2007. In Europe[11], the drop is expected to be more significant (-51%). This should be made possible, notably, by a reduction by half of fossil fuel consumption in the transportation sector through a **shift towards alternative fuels**, including electric vehicles, biofuels, synthetic fuels, methane and LPG (Liquefied Petroleum Gas.

**Looking at the EU decarbonisation scenarios, oil** import needs will significantly decrease after 2030, but oil is likely to remain in the EU energy mix even in 2050, mainly fuelling parts of long distance passenger and freight transport. The challenge for the oil sector is to adapt to the changes in oil demand resulting from the switch to renewable and alternative fuels and the uncertainties surrounding future supplies and prices. As a first step, a continuous decrease in GHG emissions and an improvement in efficiency will be needed and is in the interest of both sides. Cooperation should therefore identify these issues as a priority.

**Uncertainty remains as to the trajectory of oil demand in Europe as well as to Russian export possibilities**, as several factors may exert upward or downward pressures, including:

- the worldwide availability of oil, as oil production may begin to decline before the end of the period; though this has become less of a worry due to recent shale oil plays and oil sands in North America;
- the absolute and relative energy prices, which may influence the energy mix and efforts to increase energy efficiency;
- other decisions relating to the energy mix, including the role of nuclear energy;
- policies aimed at reducing GHG emissions, notably through carbon prices, energy efficiency, fuel switching, taxation policies and environmental standards, as well as investment framework;
- technological progress, including electric, hybrid, or natural gas-powered vehicles, and energy efficiency; but also regarding unconventional oil.

The EU and Russia share common interests in terms of energy; the predictability and stability of the oil markets. As a part of this shared concern, infrastructure development and investments along the value chain are crucial. Both sides also have an interest in a stable investment climate for their companies active in the other's market. Existing investments should be protected in line with highest international standards. The currently existing legal framework between the EU and Russia will need to be strengthened to achieve that. To attract future reciprocal investments, it is necessary to refine on existing procedures that limit the access for example to exploration and production activities.

Oil infrastructure issues have received much less attention in the past than gas infrastructure also due to the flexibility of oil transportation, but are nevertheless key for oil demand and supply. Given that "Druzhba" trunk oil pipeline is the most important "oil artery" between the EU and Russia the maintenance of its operation should be always kept under continuous attention in order to ensure the steady supplies of Russian oil to the EU. In particular, it may be suggested

[10] IEA, ETP 2010
[11] OECD Europe

that both sides should regularly exchange information on prospects of demand for oil supplied via "Druzhba" trunk oil pipeline, indicating the country of origin of the oil and delivery direction, as well as on data on technical possibilities for the transportation of Russian oil to the EU. These issues should continuously be discussed in the EU-Russia Energy Dialogue. If possible and necessary, both sides should agree on priorities for further infrastructure development.

In addition, within the frameworks of cooperation, the coordination channels of the Early Warning Mechanism between the EU and Russia should be used to prevent failures in oil supplies to the EU.

Within the oil sector, improving efficiency and safety in oil production, transportation and consumption deserves continuous attention as part of a global effort to reduce the carbon footprint of oil and to minimise its environmental impact.

In line with the general Roadmap 2050 objectives, both sides should aim at a **progressive integration** of the oil infrastructure functioning and the harmonized development of **oil markets**.

**EU-Russia Cooperation** should evolve around the following topics:
- sharing oil production, supply and demand prospects;
- exchange of information and support of infrastructure projects, including transit pipelines, which don't infringe on the interests of the both Parties;
- cooperation on investments in the oil upstream and downstream sectors; legislative initiatives and taxation legislation;
- a focus on safety and environmental issues (including the elimination of gas flaring);
- energy efficiency and decarbonisation;
- potentially Carbon Capture and Storage for enhanced oil recovery in maturing fields.

In the first stage (before 2020), the Parties should essentially improve their dialogue and diminish existing risks to stable Russia-EU relations in the oil sector, develop a future cooperation perspective for the refining sector, and start implementing joint priority projects.

The main task in second stage (to 2030) should be to intensify scientific and technical cooperation, to improve the joint stability of the EU and Russia oil markets in view of possibly mitigating adverse global oil market developments.

In the third stage (to 2050), both sides should work towards the formation of a common Pan-European space for energy/oil and oil products.

**Recommendations, actions and milestones:**

**Before 2020:**

- Regular updates of supply / demand forecasts.
- Common analysis of existing oil infrastructures in view of future transportation needs; notably for the Druzhba pipeline system;
- Joint evaluation of oil transportation through sensitive areas such as the Black Sea (Bosporus and Dardanelles) and the Baltic Sea;
- Establishment of an action plan to facilitate and improve investment conditions in the upstream and downstream sectors;

- Implementing a bilateral gas flaring reduction initiative to reduce GHG emissions and increase efficiency in the sector; consideration of CCS projects and exchange on CCS activities in Russia and the EU;

- Exchange of assessments of the perspective for the development of oil refining capacities;

- Establishment of an action plan to facilitate and improve investment conditions in the upstream and downstream sectors;

- Common analysis of alternative motor fuel issues (government incentives, legislation, public initiatives, market status and forecast);

- Establishment of a platform for a regular dialogue between EU and Russian representative stakeholders from oil industry, academic bodies and governments, providing an information exchange and joint expertise on such issues as: the development and adoption of innovative technologies, methods of new technologies and engineering development management; best practices in standardization (including the experience of the leading standardization institutes) and oil sector regulation, in the monitoring and maintenance of infrastructure(including pipelines), information exchange on regulatory developments with interest for oil companies in both the EU and Russia (e.g.: regarding oil products quality requirements, standards etc);

- Regular reciprocal participation of representatives of the large Russian and EU oil companies in major summits, forums, workshops and conferences for the innovative development of oil exploration, production and refining, oil and oil products trunk pipeline transportation;

**Up to 2030**

- Further develop research and technology cooperation to improve the efficiency of oil consumption, improve oil recovery rates, reduce losses and introduce automated management systems;

- Further reduction of gas flaring in the Russian Federation;

- Joint work on new technologies, production of synthetic liquid fuels from second generation biofuels (see also chapter 5);

- Increased cross-investments in the respective competitive and market-oriented oil markets;

**Up to 2050**

- Removal of all barriers for the functioning and coordinated development of oil production, infrastructures and markets;

- Joint technology programmes, including for alternative fuels .

## 5. Renewables

In view of the projected increase of electricity demand in the Russian Federation and the EU over the next years, and in view of global climate policy commitments, renewable energy resources (RES) should play an increasing role in the respective energy sectors. Consequently, the importance of renewables for EU-Russia energy relations should grow too.

Russia has an immense renewable energy potential. Whereas the large hydropower sector in Russia has a strong tradition, Russia is only starting to develop other RES. Russia has established an objective to achieve a 4.5% share of renewables (besides big hydroelectric power stations) in 2020. In view of the abundance of traditional fuels in the domestic energy sector, the short-term growth potential for renewable energies in Russia is limited, except in remote regions where renewables can replace diesel-generators. By 2030 it is planned to provide a share of renewable energy in the total electricity production, which corresponds (except large hydro) to at least 80-100 billion kilowatt hours per year.

The Russian RES sector development aims at:

- providing state support for the consistent development of renewable energy with the simultaneous enhancement of the investment attractiveness of this area for non-budget investments;
- developing the component parts and equipment markets as well as energy consumer services in the area of renewable energy;
- establishing a personnel training system to solve current and advanced scientific, design and engineering tasks in the industry;
- developing active international cooperation in the area of renewable energy and to increase the competitiveness of Russian technologies in the field of RES.

**The European Union in 2009** set the ambitious goal of achieving a 20% share of renewable energy and a 10% share of renewable energy in transport by 2020[12] and has flanked these objectives by a series of supporting policies**.** Currently, the EU is well underway to achieve these objectives. Based on Member State projections for renewable energy use and their sectoral targets, the combined EU renewable energy share in electricity will grow from 19,4% in 2010 to 34% in 2020, in heating and cooling respectively from 12,5% to 21,5% and in transport from 5% to 11%.[13] Whatever form the post 2020 renewable energy milestones take, they should ensure that renewable energy is part of the European energy market, with limited but effective support where necessary and substantial trade. The EU also would like to maintain its research and industrial leadership globally.

All relevant scenarios assume that the share of RES in the EU will rise substantially. In EU decarbonisation scenarios, it reaches at least 55% in gross final energy consumption in 2050, up 45 percentage points from today's level of around 10% and some 30% in 2030. Renewables will move to the centre of the energy mix in Europe, from technology development to mass production and deployment, from small-scale to larger-scale, integrating local and more remote sources, from subsidised to competitive. This changing nature of renewables requires changes in policy parallel to their further development.

[12] Directive 2009/28/EC on the promotion of the use of energy from renewable sources.

[13] Commission staff working document, accompanying the document COMMUNICATION FROM THE COMMISSION Renewable energy: a major player in the European energy market, COM (2012)271 final, 6.6.2012

Incentives in the future, with increasing shares of renewables, have to become more efficient, create economies of scale, lead to more market integration and as a consequence to a more European approach**. Trade among Member States and imports from outside the EU could reduce costs in the medium to long-run.**

The creation of a European energy market, and the ongoing desire to reduce costs wherever possible, should result in a greater trade in all forms of renewable energy.

EU-Russia cooperation on renewables is currently underdeveloped. The main challenges and uncertainties regarding an increased EU-Russia cooperation in renewables energies relate in particular to:

- the different starting conditions and the different existing legal and institutional framework;
- the long term development of renewable energy resources in the Russian Federation and the reduction of existing market entry barriers;
- the future of support schemes in the European Union and the question whether there will be new renewable targets after 2020, as well as the integration of renewables into the EU internal energy market;
- energy taxation schemes of both sides relevant for the sector and the existing discrepancies in the regulatory framework and in technical standards;
- information barriers and different levels of awareness about the potential of renewables in the EU and Russia;
- the development of a framework for the import / export of renewable energy between the EU and Russia.

**Closer cooperation** could be mutually beneficial for both sides. The Russian Federation could develop its own legislation based on the experiences and lessons learnt in the leading markets in the EU. It could import the latest technology and experience as well as innovations for the promotion of the RES market in Russia. Through an improved investment climate, it could attract EU companies and foster its renewables potential implementation.

The EU could benefit from the development of a new market for European renewable energy technologies and related services. By doing that, EU companies could use the engineering expertise and scientific capabilities in the Russian Federation. Moreover, the availability of Russian RES resources, and in the medium to long run - “green energy”, could contribute to reducing costs for energy, including electricity, in the EU.

Over the coming decades, the growth of renewables in the EU energy mix will require back-up capacity, for example by gas-fired power generation. A partnership needs to emerge between “renewables” and “gas”-fired power generation which could be a strong basis for deeper EU/RF cooperation.

Based on these considerations, cooperation in the area of renewable energy resources should focus along the following axes:

- the support and promotion of renewable energy resources in the Russian Federation with the help of EU technology and best practice;
- the approximation of RES legislation and standards where practicable;
- exchange on financial and other support mechanisms;
- to develop synergies between renewable energy resources and traditional fuels as back-up capacity, notably natural gas;
- explore the potential for an increased exchange (export / import) of renewable energy resources, including electricity produced from renewables;
- strengthen cooperation on new technologies relevant for the development of renewable energy resources and promotion of relevant scientific and technological developments;

- joint training measures and increased information exchange.

In the short term, the focus should be on improvement of market environment in Russia based on the EU best experience and on development of modern forms of biomass, wind, small hydro as well as solar energy in the Russian Federation depending on the region. In line with the development of renewable energy resources in Russia, both sides should discuss also projects that could lead to the export of electricity produced from renewable resources from Russia to the EU (see electricity chapter). The main task of the second stage (2030) should be to intensify scientific and technological cooperation, to further reduce existing barriers, and to shift to larger commercial projects. In the third stage (2050), RES cooperation should contribute to the aim to create a Pan-European wide energy area.

**Recommendations, actions and milestones:**

**Before 2020:**

- Support for the creation of a better market environment for renewables in the Russian Federation, including a comparative analysis of support schemes for renewables in the EU and development of a best-practice plan based on lessons learnt for the Russian Federation;
- Cooperation on awareness campaigns, information and professional training for the use of renewables, including development of training programmes in RES area, with participation of relevant higher engineering education institutions in Russia;
- Mutually beneficial transfer of latest European RES technologies with the subsequent production localization in Russia; evaluation of promising areas for joint R&D projects;
- Consideration of bilateral agreement on biofuel sustainability criteria and promotion of biomass trade if ecologically sustainable;
- Establish a joint action plan to develop synergies between renewables and natural gas for electricity production;
- Approximation of technical standards (for example: for pellet boilers, wind turbine generators, solar panels, smart grids as renewables integrators etc.);
- Further support to cooperation agreement between different EU and Russian agencies and institutions in the sector;
- Increased exchange and support to EU-Russia workshops, conferences, seminars, study visits in the area;
- Support to a platform for regular technological cooperation and exchange on relevant EU and RF initiatives;
- Joint pilot projects to assess the potential of different technologies (e.g. pellet producing plants, small hydro, biogas etc.).

**Up to 2030**

- Further implementation of joint projects and cooperation programmes;
- Implementation of the potential for export of Russian “green energy” to the EU;
- Further cooperation on renewable energy resources and elimination of trade barriers;

- Joint R&D projects;
- Shift from pilot projects to cluster-based projects or larger commercial projects.

**Up to 2050**

- Implementation of further measures for a transition to a low carbon economy through close cooperation, including on technology development.
- Improve and expand EU-Russia cooperation in global and regional RES initiatives.

## 6. Energy Efficiency

The efficient use of energy and an efficient energy supply chain in all sectors of the economy is one of the major pillars of energy and climate policy both in the Russian Federation and the EU. Energy efficiency provides economic, environmental and social benefits which go far beyond the energy sector. In addition to many specific energy policy measures, energy efficiency objectives have a strong impact on other policy areas, notably in transport sector and urban planning. Accordingly, the implementation of energy efficiency policy requires close coordination between many stakeholders and actors, and a well-functioning governance system.

In the **EU**, energy efficiency is a "no-regrets" option and priority for energy policy throughout the energy system. Very significant energy savings are needed in all EU decarbonisation scenarios, with primary energy demand dropping by some 30-40% by 2050.

The **EU** is implementing an important policy package on energy efficiency including legislation, financing, information, networking and technology support measures, and is active in many fora of international co-operation. EU legal tools have been key enablers notably in the appliances and buildings markets. The new Energy Efficiency Directive adopted in 2012 provides for further key measures such as efficiency obligations for energy distributors or retail energy sales companies, for central government purchasing and renovation of buildings, and national indicative targets for energy efficiency, all with the aim to put the EU back on track for achieving its objective of 20% energy saving by 2020.

The **Russian Federation** has an even higher potential for energy savings and energy efficiency. Being the world largest oil and gas supplier, Russia belongs to the group of countries with high energy efficiency potential. Energy efficiency is included in the Energy Strategy of the Russian Federation till 2030 and defined as one of the priority directions of modernization of the Russian economy. A strategic goal is to reduce energy intensity of the country's GDP by 40% till 2020 compared to 2007 level.

The main savings potential is in the energy (electricity and heat) sector, buildings and residential, and industrial sectors. Implementation of the strategic goals will lead to saving of more than 1 billiontonnes of coal equivalent or more than 300 billion USD by 2020. The main focus of Russia's state policy is on: performance of energy audits, installation of metering devices, energy saving obligations for budgetary organizations, energy efficiency labeling and standards for certain products, revision and adoption of standards for existing and newly-built buildings, energy efficiency promotion.

For **Russia** the main task in this sphere is utilization of the currently untapped potential of energy saving by the creation of legislative, economic, technological and informational conditions. This includes first of all the elaboration and adjustment of the appropriate federal and regional legislation and institutional base, including the elaboration of necessary standards system. Economic stimulation of the corresponding business activities and private investments is another important task. The liberalization processes at electricity and natural gas markets leading to incrementally growing prices underline the need of energy efficiency and energy saving development and are currently the main economic drivers thereto. Introduction of the appropriate system of state support is another important issue, which resulted in the adoption of the State Program on Energy Saving and Energy Efficiency by 2020.

As in other sectors, there are several challenges for EU-Russia collaboration in this area. Energy efficiency by definition is dependent on local implementation and at the same time requires

actions by many actors in a complex chain of exploration, generation, transmission, distribution and end-use. This makes energy efficiency policies complex, demanding the involvement of numerous stakeholders and decision-makers through to individual consumers who take the final, daily decisions concerning their homes, travel, appliances and energy services they use. The cooperation therefore needs to be adapted to this multi-dimensional structure and to recognise that many measures bring full results only by dissemination and repetition.

The starting point and the regulatory environment is very different in the EU and the Russian Federation, including different levels of awareness about energy efficiency and its benefits among the general public and industry in Russia and the EU.

At the same time, cooperation potential is immense and could both in the short and long term contribute to the objective of a Pan-European energy area.

There are also some commonalities which should be used for a mutually beneficial cooperation in this area, such as different climatic zones requiring flexible, but coherent sets of standards, for example for buildings, and large domestic markets for industrial energy-efficiency products.

It is important that the cooperation includes a thorough and regular exchange of information on policy frameworks, institutions, business and market environment. The EU has, for example, substantial knowledge on the energy performance of buildings, on appliances and product efficiency, as well as on energy generation and transmission at the urban and community level which could be shared with Russia. In addition, common activities on energy management, new technology innovations and employment support, including on training activities, could be envisaged. The EU could also support the Russian side in further developing its policy and institutional framework on energy efficiency. Cooperation between local and regional authorities should be strengthened also using existing initiatives.

Both sides should aim at developing favorable economic conditions for Russia-EU cooperation in the field of energy efficiency; improving information, technology and best practices exchange; stimulating R&D in the energy efficiency sphere; developing joint programs, feasibility studies and implementation of demonstration projects in energy efficiency sphere; pursuing training projects and work towards approximation of energy efficiency legislation in Russia and the EU.

This should include common activities on the demand side, but notably also in the area of production and transportation where the energy efficiency potential for Russia is enormous.

Several EU Member States have developed extensive bilateral cooperation activities with Russia on energy efficiency and renewables partly based on specific institutions and centres. The EU-Russia Energy Dialogue should be the forum where the activities at Member States' and EU level with Russia are discussed to avoid overlapping activities and to ensure smooth coordination.

Furthermore, both Russia and the EU participate in a number of multilateral cooperation forums in the area. It is a joint interest to organize and manage their activities in a coordinated way to maximise results.

In the short term, the focus should be on should be on mutual learning and exchange of best practices between the EU and the Russian Federation, and also on the interaction mechanisms improvement in energy efficiency area. The main task of the second stage (2030) should be to improve scale and depth of the Russia-EU cooperation in this sphere – including shift to larger mutually beneficial commercial projects. In the third stage (2050 work towards a strong energy efficiency component inside the Pan-European energy space aiming at “energy efficiency without borders” should continue.

**Recommendations, actions and milestones**

**Before 2020:**

- Comparing and analysing respective legislations with the aim of moving towards approximation, notably with regard to energy efficiency standards and promotion of the alignment of energy efficiency requirements;
- Facilitating and supporting energy efficiency investments in the Russian Federation through accompanying some investment projects for policy lessons;
- Exploring the possibility to bundle EU-Russia projects for energy efficiency and renewable energy resources involving EU and Russian financial institutions; development of projects in the area of sustainable region and city development;
- Defining priorities for joint R&D projects on energy efficiency;
- Joint development and carrying out of training/retraining programs for different aspects of energy efficiency (with inclusion in this process of leading engineering higher education institutions of Russia and the EU), including training in energy management sphere;
- Increasing cooperation and developing shared information on best available gas flaring and clean energy technologies;
- Assistance in the development of a Russian Energy Efficiency Roadmap until 2050 based on global best available practice;
- Increased public awareness about energy efficiency to promote the emergence of a society with energy efficient behaviour in Russia;
- Ensuring closer cooperation, as appropriate, between the various EU and EU Member State projects in Russia to enhance synergies;
- Facilitation of Russian entities participation in EU energy efficiency initiative, namely participation of Russian cities in the Covenant of Mayors and Smart Cities Initiatives.

**Up to 2030**

- Further in-depth exchange of policy experience and best practices;
- Identifying and eliminating remaining barriers to a mutually beneficial exchange of technologies, information etc.;

- Continuing joint development of training programmes with the involvement of academic institutions in Russia and the EU;
- Investigation of possibilities to introduce coordinated systems of energy management, monitoring and statistical data gathering;
- Further gradual approximation of energy efficiency standards for appliances and products;
- Discussion on a long-term program of EU-Russia cooperation in energy efficiency;

**Up to 2050**

- Implementation of further measures for the transition to an efficient and low carbon economy;
- Further cooperation on mutually beneficial shared projects, including sustainable city development;
- Increased international cooperation in global and regional energy efficiency initiatives.

## 7 - Cooperation regarding energy scenarios and forecasts

The role of scenarios and forecasts in energy is increasingly important for public authorities, industry and consumers and becoming more and more interacted with other key activities in this field.

The number of existing and new energy scenarios is growing; their authors represent, besides the EU and Russia official bodies, many different organizations (IEA, EIA, Eurogas, CERA, BP, Exxon, Shell etc) and research projects (e.g. SECURE). The spread of scenario estimates is not only significant (even with a 2030 perspective), but also reveals different perspectives (e.g. scenarios of governmental vs. business origin).

In this context, insufficient transparency of assumptions behind scenarios and concrete modeling procedures could create considerable risks for building sound policy decisions. Moreover, the EU and the Russian Federation use different approaches regarding such tools as modeling the future via the construction of various kind scenarios in energy sphere.

**In the Russian Federation,** in the context of the preparation of strategic documents in energy sphere, the modeling techniques which are involved are mostly aimed at clarifying the temporary contradictions between various assumptions and to finding the way of mutually adjusting specific solutions to achieve their overall optimization. The principle of the scenarios and strategic guidelines differentiation was clearly declared in the Energy strategy of Russia up to 2030 (adopted in 2009).

**In the EU,** the Commission regularly publishes scenarios until 2030; the last update of these scenarios "EU Energy Trends to 2030" was published in August 2010[14]. In addition, in December 2011 the Commission published an Energy Roadmap 2050[15] which explored the challenges posed by delivering the EU's decarbonisation objective of reducing greenhouse gas emissions to 80-95% below 1990 levels by 2050, in the context of necessary reductions by developed countries as a group, while at the same time ensuring security of energy supply and competitiveness. The Energy Roadmap 2050 is the basis for discussions with all EU Member States and stakeholders.

Cooperation activities are already taking place in the context of the Russia-EU Energy Dialogue (notably its Energy scenarios and forecasts Subgroup). However, in view of the future energy markets challenges, and ambitious long term strategic target of the Russia-EU energy cooperation, these initial activities could be extended, taking into account available resources.

**Cooperation pathway**

The Roadmap vision requires regular joint assessment procedures. In this context, the main role of common activities in the sphere of energy scenarios should consist of providing a sound, regularly refined and structured picture of possible and expected future cooperation options and their potential consequences. The main drivers for this cooperation include ensuring a higher efficiency of the Early Warning Mechanism for long-term challenges in energy; a lowering

[14] http://ec.europa.eu/energy/observatory/trends_2030/index_en.htm

[15] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0885:FIN:EN:PDF

of uncertainty and risks for investment activities of both parties' companies; a higher degree of coordination of future benchmarks in energy strategies, long term planning; a common understanding of the spectrum of scenario background characteristics and of important factors (economic, technological etc...) that impact future energy cooperation options and results; lower misconception risks that results from more transparency in the modeling systems for the development of energy scenarios for both parties (including development of a reciprocal, reasonable, degree of access to the results, assumptions, methods, databases, decision making etc).

In particular, it is reasonable to develop, as part of Early Warning Mechanism, a Strategic Early Warning System (SEWS), which presupposes a detailed evaluation of a set of different strategic scenarios of the future development of Russia-EU energy cooperation and the regular reporting of corresponding threats and opportunities to the Energy Dialogue Coordinators.

**Common themes of cooperation:**

- Exchange of information on representative sets of energy system development scenarios in the EU and Russia;
- Regular monitoring of main newly published or important world and regional energy scenarios;
- Comparative analysis of different scenarios and their assumptions;
- Bringing together experts;
- Collaboration with major energy stakeholders, organisations and research centreson scenarios issues.

**Recommendations, actions and milestones**

**Before 2020:**

- Developing mutually beneficial scenarios for the development of Russia-EU strategic energy cooperation ;
- Developing the activities of the Scenarios and Forecasts Subgroup and notably in view of integrating scenario-oriented activities in the framework of Russia-EU Energy Dialogue:
  - analyzing the trends in the field of scenarios development, creating an international pool of experts on energy scenarios and forecasts;
  - regular meetings of the experts in energy scenarios and modeling fields, with the purpose of discussing the modeling tools and assumptions which form the basis of scenarios;
  - regular reporting on the results of the assessment of complex energy scenarios;
- Exchange of information on different sets of scenarios of Russia and EU energy development;
- Harmonisation of statistical data in energy sector in cooperation with the statistics authorities of the EU and the Russian Federation;
- Joint development of Strategic Early Warning System (SEWS) as part of the Early Warning Mechanism based on regular scenario-oriented activities;
- Support to the development of an internet-portal to access scenarios access and to serve as a forum for discussions for available EU and Russian experts;

**Up to 2030**

- Further developed a deep and regular dialogue in the field of assessing energy scenarios;
- Regular monitoring, reassessment and refining of the spectrum of energy development scenarios, and also the working of the SEWS;
- Improved cooperation with international research centers on global and regional energy scenario issues, potential institutialization of the scenario-oriented activities in the framework of Russia-EU Energy Dialogue;

**Up to 2050**

- Joint continuous assessment of energy scenarios on the way to achieving the strategic Russia-EU energy cooperation target for2050.

# ANNEX

## Russian energy policy developments

Russia's energy policy aims at the maximising the efficient utilization of natural energy resources and the energy sector's potential to ensure the sustainable growth of the economy, to improve the quality of life of the country's population, and also to promote the strengthening its economic positions abroad.

The main challenges highlighted in the Energy Strategy of Russia to 2030 are (ES-2030):

- To enhance the efficiency of the extraction, production and processing of fuel and energy resources to meet domestic and external demand for them;
- To modernize and create new energy infrastructures based on the large-scale technological upgrade of the energy sector of the country's economy;
- To shape a sustained favourable institutional environment in the energy sphere;
- To raise the energy and ecological efficiency of the Russian economy and energy industry, including also through structural changes, and invigorating technological energy conservation;
- To further integrate the Russian energy industry into the global energy system.
- The Energy Strategy is continuously updated through a number of policy documents. An official strategy document covering the period up to 2050 does not yet exist.

## EU energy policy developments

EU energy policy is guided by three principal objectives – sustainability, security of supply and competitiveness - all underpinned by a well-functioning and integrated internal energy market and a coherent approach to its external energy partners and neighbours. The EU's political commitment to 2020 climate and energy targets was translated into legally-binding frameworks for GHG emissions and renewable energies and a strong focus on energy efficiency. The EU's Energy 2020 Strategy gives a kick-start to the transition to a low-carbon energy system.

In October 2009, the European Council committed itself to an 80-95% reduction in GHG below 1990 levels by 2050, in the context of necessary reductions by developed countries as a group. The Commission analysed the implications of this target in its "Roadmap for moving to a competitive low-carbon economy in 2050" (March 2011), followed up by a "Roadmap to a Single European Transport Area" (March 2011) and an Energy Roadmap 2050 (December 2011).

In September 2011, the Commission published a Communication on security of energy supply and international co-operation "The EU Energy Policy: Engaging with partners beyond our borders" which spelt out a comprehensive strategy for the EU's external relations in energy. This recognised the uniquely important role of Russia in Europe's energy market and underlined the importance of increased convergence of the two energy markets, the need for a new and strong

legal base and the need for this Roadmap to identify opportunities for long-term co-operation. The EU Member States adopted Conclusions based on this Communication in November 2011.