THE WIDER BALTIC SEA REGION (INCLUDING RUSSIA WITH KALININGRAD): PERSPECTIVES IN THE FIELD OF ENERGY POLICY

(Project EP/IV/A/2003/07/01)

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Executive Summary

In geographical terms, the Wider Baltic Sea region comprises the nine countries bordering the Baltic Sea: Denmark, Finland, Sweden, Germany, Estonia, Latvia, Lithuania, Poland and the Russian Federation/Kaliningrad. Norway, as an active member of the main Baltic Sea co-operative efforts, can be considered as part of the region, too.

The Baltic Sea region displays many disparities, especially in political tradition, civil society, living standards and technological level. On the other hand the different countries face several common trans-boundary challenges. One of the major issues is the environment: Pollution of the highly sensitive eco-system as well as possible maritime accidents and the danger of nuclear proliferation are of great risk to the whole area. Barriers to trade and investments still have a negative impact on the economies. The region is on the other hand very rich in natural resources. In the first place oil and gas make this region extraordinarily interesting for the European Union.

In energy terms, there are two main players in the field: Russia and Norway. Russia has become the biggest exporting nation of natural gas and the second biggest exporter of oil-products worldwide. Norway meets one quarter of the European Union's gas and one fifth of its oil demand. With the exception of Denmark all other states in the region are net-energy importers and highly dependant on oil and gas supply from abroad.

Three different groups of countries have been identified:

<u>First Group – EU countries (Denmark, Finland, Germany, Sweden) and Norway</u>

High GDP[(1)] per capita and high energy efficiency standards are common characteristics of this group.

The electricity markets of these countries have been completely liberalised. Liberalisation of gas markets is developing, but does not go beyond the requirements of the EU[(2)] Gas Directive. Especially in Germany, a strong support system for the utilisation of renewable

[1] See Abbreviations (p. 41)
[2] See Abbreviations (p. 41)

energies is in place, resulting in an increasing number of installations. However, large renewable energy potentials are still unexploited in the countries of the first group.

Second Group – New EU Member States (Poland, Estonia, Latvia and Lithuania)

Low energy prices and special subsidies for private households and the public sector were some of the legacies of the Soviet system, where energy was treated as a public good. Energy intensity was much higher than in the EU-15-countries, although total energy supply per capita was slightly lower. The drop of economic production led to a sharp decline in energy consumption, which was however, less than the drop in GDP. Therefore, energy intensity increased even further.

Since the mid-1990s, considerable success in improvement of energy efficiency has already been achieved. Nevertheless, the level is still far below the EU-15 average. So far, energy efficiency improvements have not as a rule been treated as challenges of the first priority in the second-group countries.

All three Baltic states are heavily dependant on energy imports, especially oil and natural gas from Russia. Only Estonia has considerable energy resources of its own. Some initial steps have been taken toward liberalisation of the electricity and gas markets. However, monopoly suppliers still exist.

The Polish energy sector reform project was among the most ambitious of all central/eastern European countries. However, implementation has been slow.

Currently, the best investment climate for renewable energy, especially for wind energy projects, exists in Lithuania, due to fact that it provides the highest feed-in tariffs in the Baltic states.

Third Group – Russia and its Exclave Kaliningrad

One third of the world's natural gas reserves, 6.4% of the world's oil reserves and 47% of the world's coal reserves are located on Russian territory.

Among the energy sectors, the oil sector is the first and most advanced as regards privatisation and the building of competitive structures. The coal industry has largely been privatised, and competition also exists. Less advanced are the electric-power and gas sectors.

Except for nuclear power generators, the Russian electricity sector as a whole was effectively transformed into the joint stock corporation called RAO EES Rossii[3]. The main owner of the holding itself remains the Russian Federation. Although a market reform has been discussed for several years, so far there is no free access to the grid. The same is true of the gas sector. Gazprom which has been at least partially privatised, has monopoly power and controls the pipelines as well.

The energy intensity of the GDP in Russia is among the highest in the world. Since 2001, energy efficiency improved, but at a much slower rate than in the Baltic States. According to estimations of the Russian Energy Strategy an energy savings potential of up to 39-47% of the current energy consumption could be realised.

In 2001, the Russian share of the EU-15's oil imports was 17%, and 40% for the natural gas imports. For the EU-25 plus EU candidates and neighbouring countries (Europe-30[4]) the Russian share even accounts for 30% of oil imports and 67% of natural gas imports in 2000. The new Energy Strategy of the Russian Federation envisages growing shares of nuclear energy and coal in electricity generation in order to increase export capacities of the oil and natural gas sector.

However, there are several apparent obstacles to Russia's future natural gas supply to the EU:

- Production costs of major future oil and gas fields are increasing. Gas fields highly relevant for exports to the EU will be largely exhausted after 2015, a time when natural gas demand in the EU is expected to grow substantially.
- LNG[5] might become an alternative for long-distance natural gas transportation via pipelines. Then, exports to the US[6] and Asia would have a comparative advantage because of higher gas prices in these markets.

[3] See Abbreviations (p. 41)
[4] Europe-30: The EU-25 plus Bulgaria, Romania, Norway, Switzerland and Turkey.
[5] See Abbreviations (p. 41)
[6] See Abbreviations (p. 41)

– A shift in the regional structure of energy exports is planned. Oil and natural-gas exports to other countries (China and the US) are planned to increase more rapidly than to EU countries.

Russia has a strong potential in renewable energy resources which have hardly been exploited.

In order to improve the framework for economic development of the region, the Russian government has declared Kaliningrad a Special Economic Zone. Since 1999, economic growth in the region has been higher than in Russia. However, the overall legal situation is very weak and foreign investment remains low.

The Kaliningrad exclave is short of energy. Natural gas from the Russian mainland has been the main energy source. Power shortages are made up by imports either from St. Petersburg or from Lithuania. Thus, at present Lithuania plays the most important role in the Kaliningrad Region's electricity supply, both as a transit country and as a supplier of electricity. Due to uncertainties regarding future developments, the plans of the Russian government to make the Kaliningrad region self-sufficient in power supply and potentially capable to exporting electricity have been reactivated.

In terms of energy efficiency, the situation of Kaliningrad is similar to that of the Russian mainland. Renewable energy sources hardly contribute to the region's energy supply today.

Network Integration

The creation of a competitive energy market is closely related to efforts of further integration of the energy infrastructure in the Baltic Sea Region. One of the major plans is the establishment of a common electricity market. This is a challenging goal, due to the three different power systems extant in the region – UCTE[7] (Germany, Poland and the southern mainland part of Denmark), NORDEL[8] (Norway, Sweden, Finland and the rest of Denmark), and IPS/UPS[9] (the three Baltic States and Russia). The systems are linked by DC[10] cables, which makes power trade technically possible to a certain extend.

[7] See Abbreviations (p. 41)
[8] See Abbreviations (p. 41)
[9] See Abbreviations (p. 41)

Important for further development in this field are the current negotiations between Russia and the UCTE on a system of linking the IPS/UPS and UCTE grids. At present, an OECD[11] study has been initiated to investigate all related questions.

As far as the natural gas network is concerned, additional volumes of gas demanded by the EU countries would be needed in order to economically justify the planned gas pipeline projects from Russia to the EU. The upcoming modernisation of the power-generating capacities during the next decades and the impact of the EU-Emission-Trading will play a crucial role. In addition, the further development of LNG could become more important for decision making.

The Opportunities of Joint Implementation

In the framework of BASREC[12], the Baltic Sea Region is positioned as an early mover in testing and exploiting the benefits of the Joint-Implementation (JI) mechanism. A carbon fund concept is planned for implementation in the context of the Nordic Environment Finance Corporation (NEFCO).

However, the uncertainty regarding Russia's ratification and therefore the coming into force of the Kyoto Protocol forms still a major barrier to the widespread use of JI. This uncertainty might partly be compensated by the framework of the European Emission Trading System (ETS) via the implemented linking of JI independent of the Kyoto Protocol's coming into force.

Conclusions

Major energy projects such as pipelines always comprise a high investment risk. Liberalisation leads to a much stronger influence of market rules and entrepreneurs on power and gas supply. The system companies, UCTE, NORDEL and IPS/UPS, and the respective gas transportation companies hold the responsibility for decision-making and investment in power transmission lines and gas pipelines. The future development of market demand for

[10] See Abbreviations (p. 41)
[11] See Abbreviations (p. 41)
[12] See Abbreviations (p. 41)

electricity and natural gas is the key criterion for respective decision making. It should be well assessed which of these projects are viable and useful, particularly against the background of energy-efficiency measures.

Most energy forecasts predict that gas demand will increase. On the other hand, this basic assumption has not been verified by the recent developments: Gas consumption has stagnated throughout the last three years. However, when the emission trading system finally comes into force, gas demand could increase dramatically, since CO_2 emissions will get a price-tag. Coal and oil prices will rise, while natural gas – a carbon-poor energy source – will benefit.

As a result, Russia will export large amounts of gas to the European Union. In order to meet its internal energy demands, Russia leans toward expanding its nuclear sector, including by prolonging the life-span of its overage installations, and boosting coal-based power generation. The European Union should be aware of this correlation and try to press for installation security standards within the strategic partnership, as well as for improvements in the institutional framework of energy efficiency in Russia.

As far as the Baltic Sea Region is concerned, in the security of supply question the European Union/ European Commission has so far concentrated on the supply side. It has relied primarily on the expansion of energy networks and the enhancement of the energy partnerships. It has not yet focused enough on the demand side, which includes a huge potential for energy savings. A comprehensive study should be carried out in order to investigate opportunities for and existing barriers to considerable increases in energy efficiency on the demand side. This is especially important as the number of actors on the demand side is much higher than on the supply side and their common action is less self-initiated.

The impressive share of CHP[13] and District Heating in the Baltic States, Poland and the northern region of Russia might play an important role for increasing energy efficiency. In order not to lose this potential, a reliable, transparent and predictable regulatory framework is necessary to guide this industry in the respective countries through reconstruction and decentralisation and towards business-like operation. Enlargement of cooperation in this area would be crucial in the short-term perspective.

[13] See Abbreviations (p. 41)

A large potential for JI projects in the Baltic Region can be identified. Its exploitation is supported by the mutual closeness of countries which in the future will have an excess of, or need for, respectively, AAUs[14] and EUAs[15] and the early actions already undertaken in the region. Further developments supporting a favourable business environment in the new EU member states and in Russia are necessary in order to access the benefits related to the widespread use of the JI mechanism. Therefore, it should be seen as a strategic issue of the European Union to support the respective countries in creating favourable business environments and increase capacity building for the use of the JI-mechanism and therefore to counteract the danger that it will be neglected. The BASREC network could ideally be used as a basis for this intensified capacity building due to already existing experience in the framework of the Testing Ground and the involvement of countries from Eastern and Western Europe.

The potential for renewable energies, especially for on- and off-shore wind energy, is not well exploited yet. For example Poland and Lithuania would offer good conditions for new projects in this area.

[14] See Abbreviations (p. 41)
[15] See Abbreviations (p. 41)

Introduction

Geographically, the Wider Baltic Sea region comprises the nine countries bordering the Baltic Sea: Denmark, Finland, Sweden, Germany, Estonia, Latvia, Lithuania, Poland and the Russian Federation/Kaliningrad. Norway, as an active member of the major Baltic Sea co-operation efforts, can be considered as part of the region, too.

The region underwent a total political and geostrategic upheaval in the aftermath of the Cold War: The Baltic countries gained their independence in 1991; Finland and Sweden became members of the European Union. With the accession of the Baltic states and Poland to the European Union in 2004, the region will again undergo fundamental change. The European Union now has a remarkably long border with Russia, including with the encircled exclave of Kaliningrad. The Wider Baltic Sea region, and in particular Kaliningrad, will be a place where east meets west directly; it will be a culmination and testing ground for east-west-cooperation as well as for the new neighbourhood strategy of the European Union.

The Baltic Sea region (BSR) is extremely disparate, especially in political tradition, civil society, living standards and technological level. On the other hand, the different countries face several common trans-boundary challenges. One of the major issues is the environment: Pollution of the highly sensitive eco-system as well as possible maritime accidents and the danger of nuclear proliferation are of great risk to the whole area. Moreover, climate change is beginning to seriously affect the far north. Sparsely populated areas, long distances, insufficient transportation facilities and poor cross-border cooperation are other characteristics of the region. Barriers to trade and investment still have a negative impact on the economies. The region is on the other hand very rich in natural resources: Especially oil and gas make it extraordinarily interesting for the European Union.

In energy terms, there are two main players: Russia and Norway. Russia has become the biggest exporting nation of natural gas and the second biggest exporter of oil products worldwide. Norway meets one quarter of the European Union's gas and one fifth of its oil demand. With the exception of Denmark, all other states in the region are net energy importers and highly dependant on oil and gas supplies from outside.

The EU recognised the "Northern Dimension" as an area of common interest in the late nineties. In its communication of 1998[(16)], the Commission stated that the Nordic region offered a huge potential for the exploitation of oil and gas if there were substantial improvements in energy and the transportation infrastructure. Since "gas production is

[16] Communication from the Commission: *A Northern Dimension for the Policies of the Union*, COM(1998)0589, European Commission, Brussels, 1998.

moving east while demand is moving west,"[17] and in view of the supply problems during the summer of 2003, the European Commission, with its infrastructure package of late 2003, underscored the need to accelerate current and future TEN[18] projects. The European Union obviously still counts primarily on the expansion of conventional energy networks, although there is a huge potential for energy efficiency measures and renewable energy sources in the enlargement states and in Russia. The region could therefore become a convenient area for the Joint Implementation regime.

This study presents a survey on the energy situation of the region. It describes the recent and forthcoming developments around the Baltic Sea region in light of enlargement. Moreover, it identifies both the problems and risks that this region will have to tackle, and the opportunities for the region itself and for the rest of Europe on the other hand.
In a first step, the study addresses the European Union's approach towards the region. In a second step, it provides a broad overview on the energy potential, energy production, existing infrastructure, energy policies and energy prospects in the different countries. Since it seemed useful to group the different countries, the study deals first with the EU member states and Norway, second with the new EU member states, and finally with Russia/ Kaliningrad.
Chapter 4 is dedicated to the present situation of energy network integration and energy transportation. Chapter 5 analyses the investment climate, which is tied to the perspective for new financial tools in the context of the flexible Kyoto mechanisms.
Finally, the study provides a general assessment of the region's energy prospects. It will also consider various policy options in order to propose a strategy towards a secure, diversified and environmentally sound energy scenario for the Baltic Sea region.

[17] Lausala, Tero, "The Role of Energy in the Northern Dimension", *The NEBI Yearbook 2003*, Hedegaard, L.; Lindström, B., Berlin/Heidelberg, 2003, p.136.
[18] See Abbreviations (p. 41)

1. European Union Activities

The Northern Dimension

With the accession of Finland and Sweden in 1995, the European Union regained a stronger northern orientation after the southern enlargement of the 1980s. The European Council in Luxemburg (1997) addressed this new situation by adding the item "Northern Dimension" to its agenda. The European Council in Helsinki of 1999 then called upon the Commission to elaborate an action plan on the basis of guidelines adopted under the Portuguese presidency six months later [(19)]. The EU relied on the added value through coordination of the instruments and programmes it had already launched.

The action plan identified several main areas in which action would have to be taken, such as the environment and natural resources, nuclear safety, transportation and energy, trade and investment, human resources and research, public health and trans-boundary crime, and finally the issue of Kaliningrad. The implementation of the action plan was based on the existing legal framework (i.e. the association agreements with candidate countries, the partnership agreement with Russia; the EEA[(20)] agreement with Norway and Iceland) and on the existing financial instruments (PHARE, TACIS, ISPA, Synergy, Sapard and Interreg [(21)]). It aimed to bring together all relevant actors: EU member states, non-member states, regional organisations, international financing regimes and the private sector. Right from the beginning, the Commission tried to integrate the existing regional platforms like the Council of the Baltic Sea states (CBSS), the Barents Euro Arctic Council (BEAC) and the Artic Council in its policy.

Energy

Energy had always been recognised as the key element of the Northern Dimension. Two main paths were pursued: the EU-Russia Energy Dialogue and the BASREC Initiative.

The EU-Russian energy dialogue, established in 2000, is designed to create a stable energy partnership and is focussed on the legal framework, the security of energy transportation networks, technology transfer and energy efficiency activities. With the steady increase of gas imports from Russia, the transportation facilities could soon prove insufficient; infrastructure

[19] Council of the European Union: *Action Plan for the Northern Dimension with External and Cross-Border Policies of the European Union 2001-2003*, 9401/00, Brussels, 2000.
[20] See Abbreviations (p. 41)
[21] See Abbreviations (p. 41)

projects therefore have priority. Nonetheless, three pilot projects for energy efficiency have been started, one of them in the oblast of Kaliningrad.
The Baltic Sea Region Energy Co-operation (BASREC) was founded in 1999 by the energy ministers of Denmark, Poland, Germany, Estonia, Latvia, Lithuania, Russia, Finland, Sweden, Norway and Iceland together with the European Commission in order to promote energy co-operation in the area. The Commission's sponsorship of various studies on the development of a market infrastructure in the field of electricity and natural gas supply shows the importance the region has gained for the European Union in terms of security of energy supply.
The various areas of energy co-operation and the various ongoing projects in the region will be illustrated further in the following chapters.

The European Commission came to a very positive assessment of the action plan's outcome and made a new effort towards the further development of the strategy. A second action plan was adopted in September 2003 at the European Council in Brussels[22]. It has primarily to be seen in the light of enlargement. The Second Action plan – though continuing with the strategy pursued in the First Action plan – constitutes a new phase of the Northern Dimension. For example, the full integration of the new EU member states into the Common European Energy Market and into the transportation system for energy has attained real urgency. But apart from that, the security of supply issue has been the predominant issue, almost to the point of exclusivity. The proposed actions put the main emphasis on the establishment of a new and better infrastructure, i.e. interconnectors, power transmission grids, and new gas pipelines. Alternative forms of energy production and the promotion of energy efficiency play a much less important role in these considerations, even though the Action Plan itself identifies a huge potential for energy savings, especially in Russia. The strategic partnership with Russia is yet another focus of this Action Plan.
In general, the Northern Dimension will be one decisive element in the framework of the new neighbour strategy of the European Union[23] as defined in the Commission's Communication of March 2003. The neighbour strategy addresses the new geographical situation after enlargement.

[22] Commission Working Document: *Second Action Plan for the Northern Dimension 2004-2006,* COM(2003)343 final, European Commission, Brussels, 2003.
[23] Communication from the Commission: *Wider Europe – Neighbourhood: A New Framework for Relations with our Eastern and Southern Neighbours*, COM(2003)104 final, European Commission, Brussels, 2003.

2. The Energy Situation in BSR Countries – An Overview

As mentioned above, the region has been broken down as follows for the purposes of the present study:

1. The members of the EU before enlargement (EU 15): Denmark, Finland, Germany and Sweden, plus non-member Norway, (included for analytical reasons, because of its major similarities with these countries in energy policy and economic development.)
2. The transition countries Poland, Estonia, Latvia and Lithuania, which became full-fledged EU members on 1 May 2004; and
3. The non-EU member Russia, including the Kaliningrad region.

Russia and Norway are the traditional big net energy exporters of the region. Denmark has become a net exporter since 1999. All other countries are net energy importers.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Denmark	-7.41	-5.74	-5.97	-7.31	-5.25	-3.52	-1.24	**3.67**	**7.53**	**6.12**
Finland	-16.03	-16.68	-20.68	-16.01	-17.86	-18.93	-18.32	-17.4	-18.77	-19.17
Germany	-188.72	-190.36	-193.88	-196.11	-209.38	-210.19	-214.72	-204.16	-203.25	-217.17
Sweden	-16.71	-17.38	-19.46	-18.35	-20.17	-18.65	-18.77	-17.21	-18.06	-17.85
Norway	**123.28**	**129.33**	**146.13**	**157.54**	**182.49**	**187.42**	**180.65**	**182.15**	**198.19**	**201.25**
Estonia	-2.31	-2.04	-2.14	-1.87	-1.8	-1.73	-1.98	-1.86	-1.69	-1.7
Lativa	-5.47	-3.72	-3.52	-3.25	-3.4	-2.64	-2.6	-2.22	-2.31	-2.55
Lithuania	-7.01	-5.23	-5.34	-5.63	-5.06	-5	-4.68	-4.26	-4.21	-3.76
Poland	-4.4	-2.74	0.03	0.11	-5.73	-7.64	-9.53	-9.4	-9.63	-9.57
Russia	**328.67**	**291.97**	**313.13**	**313.96**	**333.42**	**338.87**	**345.6**	**350.56**	**347.82**	**367.34**

Table 1: Net Energy Exports (+) and Imports (-) of the BSR Countries (Mtoe) [24]

Germany depends heavily on natural gas imports (import share: 78%). Furthermore it has to import oil, which accounts for some 40% of its total primary energy supply (TPES, 2000). This reliance will probably increase, since the government decided to phase out nuclear power by 2020. The first nuclear power plant was decommissioned in November 2003 [25]. To cope with the problem of energy security, Germany is focussing on the development of domestic fuels, renewables and energy efficiency.

[24] Sources: IEA; *Energy Balances 1999-2000, 2002*; IEA; *Key World Energy Statistics, 2003*.
[25] *Financial Times Deutschland* (ftd), "Atomkraftwerk Stade geht vom Netz", 14 Nov. 2003, http://www.ftd.de/pw/de/1068298487101.html?nv=rs

2.1. First Group – the Members of EU-15 and Norway

Common characteristics of this group are the high GDP per capita between 32,252 USD in Finland and 39,554 USD in Norway, stemming from the prosperous economic development under market conditions of the past 50 years; and considerable success in improving energy efficiency, expressed by very low indicators of energy intensity of GDP (see Table 2).

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Denmark	0.18	0.18	0.18	0.17	0.18	0.17	0.16	0.15	0.14	0.14
Finland	0.31	0.32	0.33	0.31	0.32	0.31	0.30	0.29	0.27	0.27
Germany	0.20	0.20	0.20	0.19	0.20	0.19	0.19	0.18	0.18	0.18
Sweden	0.28	0.28	0.29	0.28	0.29	0.27	0.27	0.26	0.23	0.24
Norway	0.25	0.26	0.24	0.23	0.22	0.22	0.22	0.23	0.22	0.22

Table 2: Energy intensity in EU-15 members and Norway (TPES/GDP in toe/1000 USD PPP) [26]

2.1.1. Liberalisation of Energy Markets

The electricity markets of these countries have been completely liberalised. The Nordic countries Norway, Sweden, Finland and Denmark are members of the NORDEL power transmission system and the "Nord Pool", which is the market place for competition and power exchange among these countries via a common carrier model. Electricity consumption per capita is well above the average level in the whole BSR. In 2001 it was 26,494 kWh in Norway; 16,013 kWh in Sweden and 15,687 kWh in Finland. This is mainly due to a high share of hydropower and nuclear energy in Total Primary Energy Supply (TPES) (See Table 3). In Denmark, power consumption per capita was 6,561 kWh and in Germany 6,806 kWh.

Country	Oil	Natural Gas	Coal	Hydropower/ Renewables	Nuclear
Denmark	45	22.9	20.7	11.3	--
Finland	29.5	10.3	15.3	24.1	17.7
Germany	38.7	21.1	23.7	3.4	13
Sweden	28.1	1.5	5.4	17.6	31.5
Norway	33.1	13.3	4	44.7	--

Table 3: TPES Structure of EU-15 members and Norway (% in 2000) [27]

[26] Sources: IEA; Energy Balances 1999-2000, 2002; IEA, Key World Energy Statistics, 2003; see Abbreviations (p. 41).
[27] Sources: IEA; Energy Balances 1999-2000, 2002.

Finland is a net importer of electricity. The supply comes from the Scandinavian market as well as from Russia, which is linked to the Finnish power market by a DC cable.

Liberalisation of the gas markets in these countries is developing, but does not go beyond the requirements of the EU Gas Directive [28]. There are two major gas suppliers for the region at present – Russia and Norway. Germany also imports some natural gas from the Netherlands and from the UK[29].

2.1.2. Energy Efficiency and Environmental Policy

All countries of this group are quite advanced concerning energy efficiency which plays a major role in the countries' energy policy. Due to the energy mix in TPES and their Kyoto commitments, however, there are differences in the instruments applied in individual countries. Thus co-generation is important in Denmark, Finland and Germany.

In **Denmark** energy policy is strongly influenced by environmental objectives. The country promotes energy efficiency, renewables and co-generation of combined heat and power (CHP), which reached about 40% in 2002[30]. As a result, energy intensity of GDP is the lowest in the whole Baltic Sea region. The Kyoto protocol was ratified in May 2001 and Denmark is aiming to reduce the CO_2 emissions by 21% by 2008-2012. In 2001 a national system of tradable CO_2 quotas for power plants was introduced.

If the national CO_2 quota system were abandoned, electricity exports could rise significantly, which would be a major obstacle to meeting the CO_2 reduction targets[31].

Finland is advanced in combined heat and power (CHP) production. In 2002, about 33% of electricity consumed was produced in CHP stations. Environmental and energy efficiency measures are of major importance. Voluntary agreements have been very successful and training programmes are intensively used in the transportation sector, as are information campaigns for the residential sector. Subsidies for investments in energy efficiency are granted. A CO_2, tax has existed since 1990. Efforts to reduce emissions of greenhouse gases were intensified in 2001 by the adoption of a "National Climate Strategy".

However, improvement of energy efficiency was not considered to be sufficient to cover increasing demand. A decision was made in 2002 to increase internal electricity generation by

[28] Market openness to competition, since Aug. 2000: 30%, in 2003 38%, in 2008 43%.
[29] Denmark does not import natural gas. It has sufficient reserves for 20 years at the present level of consumption.
[30] Bundesverband Kraft-Wärme-Kopplung e.V., 2002.
[31] IEA, "Energy Policies of IEA Countries", *2002 Review*, pp. 119-123.

construction of a new nuclear power plant[32]. It will be Finland's fifth reactor. It is remarkable, because it is the first time a new nuclear power plant had been approved in Western Europe in more than a decade. It is expected to go on line in 2010[33]. As alternatives construction of gas-fired generators had been discussed, which would have increased dependence on natural gas imports from Russia[34].

Germany's target for GHG[35] reduction according to the EU burden-sharing agreement is about 21% by 2008-2012. Phasing out nuclear power by 2020 presents an additional challenge toward achieving that goal. The Renewables Act of 2000, the Energy Efficiency Ordinance for Buildings (EnEV) and the Cogeneration Act of 2002, as well as a number of additional measures, are aiming at further improving energy efficiency and speeding up the market introduction of renewable energies in order to address this task. CHP was especially well developed in the eastern part of Germany, and reached a share of about 14% of overall German electricity generation in 2002.

The need to replace about 40,000 MW of existing fossil-fuel power capacity by 2020 is an additional challenge.

Sweden has committed itself to reducing GHG emissions by 4% over the 1990 level. The green electricity certificates trading system was designed to reach this target. Energy efficiency policy is a high priority. The CHP share of total electricity generation was about 7% in 2002.

In 2002, the Swedish government presented its Energy Policy Bill which contains three main proposals:

- a quota-based trading programme for green electricity certificates in order to promote environmentally-friendly and renewable electricity (planning objective: 10 TWh (860 ktoe) from wind power in 2015);
- increased energy efficiency by rationalisation of existing policy measures and by dissemination of information;
- support for CHP by tax exemption.

As in Germany, there are plans in Sweden to phase out nuclear energy. The first reactor, Barsebäck 1, was shut down in 1999; however, the shut-down of Barsebäck 2 has been postponed[36].

[32] http://virtual.finland.fi/finfo/english/energy.html
[33] http://www.fe.doe.gov/international/finover.html
[34] http://virtual.finland.fi/finfo/english/energy.html
[35] See Abbreviations (p. 41)
[36] IEA, Energy Policies of IEA Countries, 2002 Review, pp. 213-221.

In **Norway** there is a special situation. Electricity has been almost entirely generated by hydropower stations (99%). Any growth in electricity demand would make it necessary to import electricity. Hence, the government has agreed to build a gas-fired power station. Greenhouse gas emissions are projected to increase significantly. The development of an emission quota system may render this projection untrue[37].

2.1.3. Renewable Energies

In **Denmark,** installed capacity of wind energy turbines reached 2,916 MW in June 2003[38]. The Danish target is to produce 20% of electricity from renewables[39].
Denmark has the most experience worldwide in wind offshore technologies.
In **Finland**, biomass plays a major role. Biomass and waste contribute 19.5% to TPES and 11.8% to electricity generation. Finland's installed capacity of wind energy was 44 MW as of August 2003. In 2001 solar, tidal power and wind generated only 0.1% of electricity. Governmental plans aim at an installed wind power capacity of 540 MW in 2010.
In **Germany** in 2000, the Renewable Energy Act replaced the former Feed-In Law, establishing new remuneration tariffs for renewable electricity fed into the public grid. Installed capacity increased to 12,000 MW by the end of 2002. The share of electricity produced from wind also increased, to 3 % of total generation in 2002. The Government aims for a share of renewable electricity of 12.5 % by 2010 (2002: 8 %), in line with EU targets[40].
In **Sweden,** biomass contributed 17.5% to TPES, and hydropower 14.3% in 2000. Further increases are planned[41].
In **Norway,** hydropower plays the major role, and there are already capacity limits[42]. Wind power has an installed capacity of 100 MW as of June 2003. The government supports major wind energy projects (more than 1.5 MW) and wants to increase wind power capacity to at least 1,100 MW by 2010.

[37] Ibid., pp. 149-156.
[38] Europe's Wind Capacity - June 2003, http://www.suivi-eolien.com/francais/DocsPDF/WIND_CAP_JUNE03.pdf
[39] IEA, Energy Policies of IEA Countries, 2002 Review, p. 119.
[40] PEEREA, *Germany - Regular Review 2003*, Energy Charter Secretariat, Brussels, 2003.
[41] IEA, "Energy Policies of IEA Countries," *2002 Review*, pp. 213-221.
[42] Ibid., pp. 149-156.

2.2. Second Group – New EU Member States (Poland, Estonia, Latvia and Lithuania)

There is a common history of the countries of this group which belonged to the Soviet system of command economy and the former Comecon[43]. During this period, the energy systems were fully state owned and centralised. Poland already started market oriented economic reforms during the 1980s, although they did not involve the energy sector; the three Baltic States followed at the beginning of the 1990s. Reforms of the energy sector were much slower than in other sectors of the economy. Low energy prices and special subsidies for private households and the public sector were some of the legacies of the Soviet system, where energy was treated as public good. Energy intensity was much higher than in EU-15-countries, although total energy supply per capita was slightly lower than in the EU countries. The unexpected drop of aggregate economic production led to a sharp decline of energy consumption throughout the transformation countries, which was however, less than the drop of GDP. Therefore, energy intensity increased even further.

During the last decade, implementation of economic reforms and first steps towards modernisation of the energy sector led to an improvement in energy efficiency (see Table 4).

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Estonia	0.62	0.54	0.57	0.51	0.54	0.48	0.44	0.41	0.39	0.39
Lativa	0.41	0.39	0.36	0.32	0.32	0.32	0.29	0.26	0.23	0.26
Lithuania	0.42	0.41	0.40	0.41	0.42	0.38	0.38	0.34	0.29	0.30
Poland	0.42	0.42	0.38	0.37	0.37	0.34	0.30	0.28	0.26	0.26

Table 4: Energy intensity in new EU member states (TPES/GDP in toe/1000 USD PPP) [44]

Economic wealth in these countries is much lower than in the countries of the first group. In 2001 GDP per capita was between 2,310 USD/capita in Lithuania and 4,720 USD/capita in Estonia. Economic growth is relatively high. In 2002 the three Baltic States had exceptional high growth rates: Estonia 5.8%, Latvia 6.1% and Lithuania 6.7%. Poland, however, suffered

[43] See Abbreviations (p. 41)
[44] Sources: IEA, *Energy Balances 1999-2000,* 2002; IEA, *Energy Balances 2000-2001*, 2003.

an economic slowdown. Its economy grew by only 1.3 % in 2002 and by 1% in 2001[45]. In 2003, Poland's economy recovered with an estimated growth rate of 3%[46].

All three Baltic states are heavily dependant on energy imports, especially oil and natural gas from Russia. Only Estonia possesses considerable energy resources of its own. Oil shale contributes 50% to TPES. Other resources are mainly limited to wood, peat and a little hydropower. Lithuania is endowed with small oil deposits in the Baltic Sea.

The electric power grids of these countries are interconnected, and they are members of the IPS/UPS system, which covers the territory of the former Soviet Union. Electricity is traded between the three Baltic countries on an informal basis. No Baltic-wide power market yet exists. Today, Lithuanian electricity is almost entirely generated by the Ignalina nuclear power station, with available capacity of 2 x 1300 MW[47]; a certain amount of electricity is exported, mainly to Kaliningrad, Russia, to Latvia and to Belarus. Plans to build a new nuclear power station according to EU standards as a substitute for Ignalina, which has to be shut down according to the accession agreement, are currently being discussed. The population does not oppose these plans. The question of funding is still open[48].

The situation is different in Poland, which has large deposits of hard coal and lignite and some small deposits of natural gas; 90% of the natural gas supply is imported from Russia. Poland also exports hard coal to Germany.

Country	Oil	Natural Gas	Coal/Oil shale (in Estonia)	Hydropower/ Renewables	Nuclear
Estonia[49]	15.5	14.4	59.2	10.9	--
Latvia[50]	35.3	31.2	3.3	30.3	--
Lithuania[51]	30.4	28.5	1.4	9.1	30.6
Poland[52]	22.1	11.0	62.2	4.7	--

Table 5: Structure of TPES in new EU member states (% in 2000)

[45] Transition report update, EBRD, London, 2003, pp.74-75.
[46] *A Study of Poland's Economic Performance after the Three Quarters of 2003*, Polish Ministry of Economy, Labour and Social Policy, Warsaw, 2003.
[47] Installed capacity was 3000 MW. "Baltic Ring Study", (1998) *Main Report* Volume 2, p. 31.
[48] Minderjahn, "Litauen und die Energiereserven der Ostsee", broadcast by Deutschlandfunk, 5.10.2003
[49] Source: www.iea.org/stats/files/selstaats/keyindic/nmc/estonia.htm
[50] Source: http://www.iea.org/stats/files/selstats/keyindic/nmc/latvia.htm
[51] Source: http://www.iea.org/stats/files/selstats/keyindic/nmc/lithuan.htm
[52] Source: http://www.iea.org/stats/files/selstats/keyindic/country/poland.htm

2.2.1. Liberalisation of Energy Markets

Some initial steps have been taken toward liberalisation of the electricity and gas markets. From the technical point of view, market size and density of transmission networks are important conditions for competition in the power and gas sectors. The stability of the institutional framework is an important additional criterion. The size of the markets of each of the Baltic States is very small. Competition would be economically efficient only at the level of a common market between these countries and additional links to other external markets. Thus, it is not surprising that monopoly suppliers still exist.

In **Estonia,** there is only one electricity company: Eesti Energia AS. It is fully vertically integrated and carries out oil shale mining, electricity and heat generation, transmission, distribution and supply. Pro forma, Eesti Energia AS has been privatised, but although third-party access is guaranteed in principle, Eesti Energia prevents real competition from emerging(53).

The company Eesti Gas which is in charge of import, transportation and distribution of natural gas in Estonia has already been privatised(54). Third-party access is possible *de jure*; *de facto* Eesti Gas is the only actor.

In **Latvia** the restructuring of the electricity sector is also proceeding very slowly. Separation of production, transportation und distribution has been started. Privatisation has not yet been enacted. In the natural gas sector Latvijas Gaze is the only company which operates import, transportation and distribution of natural gas. It is already privatised. The liberalisation of the gas market has been postponed(55).

In **Lithuania** the monopolist of the electricity market was broken up into five joint stock companies (a transmission company, two power generation companies and two distribution companies) in 2002. The state owns 86% of the shares of all of these companies. E.ON owns 10.9%. Privatisation is scheduled to be finished by the end of 2003. The state wants to keep 34% of the shares of any company. The gas market is still dominated by a single company for transportation and distribution: Lietuvos Dujos(56).

In **Poland** the situation is different. Total electricity consumption was about 124.69 TWh in 2001. Total installed power capacity was 30.6 GW in the same year(57). The Polish reform

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[53] PEEREA*, In-depth Reviews of Energy Efficiency Policies and Programmes of Estonia, 2002*, p. 15.
[54] Owned by: Gazprom (37%), Ruhrgas Energie Beiteiligungs-Aktiengesellschaft (33.5%), Fortum (33.5%), Itera (9.7%), others (2.1%), World Energy Council, *Schwerpunktthema EU-Osterweiterung: Energie, 2003*, pp. 19-20.
[55] Ibid., pp. 21-22.
[56] Owned by: Ruhrgas Energie Beteiligungsaktien Gesellschaft /E.ON Energie AG 35.5% (together), 58% state owned, ibid., pp.23-24.
[57] http://www.eia.doe.gov/aer/pdf/pages/sec11_35.pdf

project was among the most ambitious of all central/eastern European countries. In its early phase, it consisted of a combination of a British-style pool model with competitive bidding between generators and large customers (above 40 GWh/a). Structural break-up was scheduled. Implementation, however, was slow[58]. So far, some power generators have been privatised. Moreover, the pace of liberalisation of the natural gas market has been slow.
The enlargement agreements with all candidate countries aim to reach the same standards in the new countries as in the old EU. It is of major importance to bring gas storage in line with EU standards, to restructure and to open the markets for competition. The following demands concerning liberalisation of the electricity and gas markets within these countries have been made:

Requirement to open the *electricity markets* in line with the EU Directive on the internal electricity market by

1) 1 July 2004 for all non-household customers (industrial, commercial and professional power users are free to choose their supplier);
2) 1 July 2007 for all households [59].

Only Estonia may implement the electricity directive by the end of 2008.

Requirement to open the *natural gas* markets in line with the EU Directive on the internal gas market by

3) 1 July 2004 for all non-household customers (industrial, commercial and professional power users are free to choose their supplier);
4) 1 July 2007 for all households [60].

According to the regular reports on enlargement, the present situation is as follows:

Estonia:

- Market opening, taking place in line with the commitments made in the negotiations, is presently 10% for electricity and 90% for gas.

[58] For more details see: Ch. Hirschhausen & P. Opitz, *Power Utility Re-Regulation in East European and CIS Transformation Countries* (1990-1999), DIW Discussion Paper No. 246, Berlin, 2001.
[59] Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity, Official Journal L 176, 15/07/2003 P. 0037 – 0056.
[60] Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas, Official Journal L 176, 15/07/2003 P. 0057 – 0078.

- The energy regulator, the Energy Market Inspectorate, functions satisfactorily under current market conditions. However, it needs to be strengthened, given more independence, given the potential conflict of interests stemming from the State's ownership of Eesti Energy and the Inspectorate's position under the jurisdiction of the Ministry of Economic Affairs.
- Restructuring of the oil shale sector should continue, in line with the Restructuring Plan for the Estonian Oil-Shale Sector 2001-2006 as a necessity for further electricity market opening. Eesti Energy is investing nearly € 191 million in the reconstruction of Narva oil shale power plants in the current year. At the same time, certain mines have been closed down and their workers redeployed or retrained[61].

Some transitional periods exist for:

- Build-up of oil stocks to the required level (90 days's supply) by the end of 2009
- Implementation of electricity directive, by the end of 2008.[62]

Latvia:

- Third-party access and the definition of eligible customers needs particular attention.
- Restructuring of the electricity company "Latvenergo" remains to be completed.
- The Energy Regulator (Public Utilities Commission) is in place, but needs further strengthening. Remaining gas and electricity price distortions need to be removed; further delays need to be avoided.
- The market opening is taking place in line with commitments made in the negotiations. In the electricity sector, approximately 20% of the market has been opened up, while in the case of gas, Latvia plans to seek an exemption, under the directive, as a non-connected area[63].

Some transitional periods exist for the build-up of oil stocks to required levels (90 days' supply), by the end of 2009[64].

[61] *Regular Report on EU Enlargement*, 5 Nov. 2003.
[62] http://europa.eu.int/comm/enlargement/negotiations/chapters/chap14/index.htm
[63] *Regular Report on EU Enlargement*, 5 Nov. 2003.
[64] http://europa.eu.int/comm/enlargement/negotiations/chapters/chap14/index.htm

Lithuania:

- At present, 26% of the electricity market and 80% of the gas market are open for competition.
- The regulatory body, the National Control Commission for Prices and Energy, whose task is to oversee the gas and electricity markets, has been established and is functioning well, but needs to be further strengthened[65].

Some transitional period also exists for the build-up of oil stocks to the required level (90 days' supply), by the end of 2009[66].

Poland:

- Framework legislation, the Energy Law, is in place and in line with the *acquis*, as is the implementing legislation for the electricity sector. The gas sector is less advanced; implementing legislation, including through the elaboration of a grid code, needs to be completed. The restructuring of the former monopoly PGNiG[67] should be accelerated.
- The process for removing price distortions as well as for addressing long term contracts in the electricity sector needs to be given due attention.
- The regulatory body, the Energy Regulatory Agency, whose task it is to oversee the gas and electricity markets, has been established, but needs to be further strengthened, in particular to carry out the necessary functions in the gas sector.
- Poland should transpose the recently adopted Electricity and Gas Directives in accordance with the timetable provided for by the *acquis*.
- The unprecedented scale of restructuring the solid fuels sector has resulted in a considerable reduction of coal extraction and employment in the coal industry. Poland must continue preparing for the application of EU state aid regulations for the hard coal industry, and will have to abolish any import restrictions for hard coal upon accession[68].

[65] Regular Report on EU enlargement, 5 Nov. 2003.
[66] http://europa.eu.int/comm/enlargement/negotiations/chapters/chap14/index.htm
[67] See Abbreviations (p. 41)
[68] *Regular Report on EU enlargement*, 5 Nov. 2003.

A certain transitional period also exists for the build-up of oil stocks to the required level (90 days' supply) by the end of 2008[69].

2.2.2. Energy Efficiency and Environmental Policy

As was already stated, although considerable success in improvement of energy efficiency has already been achieved (see Table 4 above) the level is still far below EU average levels, and remains one of the major challenges to the countries in this group. Energy tariffs for private households have been increased substantially during the past ten years in order to achieve cost-covering levels, and cross-subsidisation by higher prices for industry has largely been abolished. However, some price distortions still remain to be resolved. In addition, the legal framework for investment in energy efficiency, especially in the housing and district-heating sectors, still needs to be improved. Energy efficiency improvements are usually not treated as challenges of the first priority in these countries.

Some of the countries have set up energy efficiency programmes or are preparing energy efficiency laws (also in accordance with requirements of enlargement, in order to implement the respective EU directives).

For example, the assumptions for Poland's Energy Policy through the year 2020 and the Energy Law are important steps on the way towards more energy efficiency, but more concrete measures will be required. In Poland the residential sector has received priority attention[70]. The Thermo-Modernisation Programme and Fund provide technical and financial support for energy end-use improvements in residential buildings and reduction of energy losses in heat distribution networks. However, there have to date been only a small number of applications to the Fund. In the industrial sector as well as in the service and transportation sectors, it is still possible to achieve improvements in energy efficiency. Demand-side management and increased decentralised electricity and heat generation are considered helpful[71].

Environmental problems are huge. Special problems exist in Estonia, where oil shale contributes 50% to TPES and power generation is almost totally based on this fuel. Two big oil shale-fired power plants in Narva (in the northeast of the country) are crucial for electricity supply. There is strong political support for continuing utilisation of oil shale in energy production, for employment reasons. The high share of solid fuel (oil shale, peat)

[69] http://europa.eu.int/comm/enlargement/negotiations/chapters/chap14/index.htm
[70] PEEREA, In-depth Reviews of Energy Efficiency Policies and Programmes of Poland (2002), p. 40.
[71] Ibid., p. 5.

consumption causes relatively high CO_2 emissions[72]. Substitution of oil shale by natural gas as recommended by the EU Commission[73] could be a solution, but would increase reliance on Russian natural gas.

In Poland one reason for high CO_2 emissions and air pollution is the high share of electricity generated from hard coal and lignite and inefficient power stations (more than half of the power plants are older than 25 years)[74].

All countries have ratified the Kyoto Protocol. Reduction targets through 2008-2012 compared to the reference year are as follows: Estonia, Latvia, Lithuania – 8%; Poland – 6%. However, due to economic decline since the beginning of the 1990s, the countries might remain net exporters of CO_2-certificates.

	Change in CO_2 emissions 1990 – 2000 (2001)	**Reduction targets (2008/2012)**
Estonia	- 54.6 %	- 8 %
Latvia	- 65.6 %	- 8 %
Lithuania	- 53.7 %	- 8 %
Poland	- 31.6 %	- 6%

Table 6: Change in CO_2 emissions and reduction targets of the new EU member states[75]

2.2.3. Renewable Energies

In **Estonia**, wind power could play a major role. The technical wind energy potential is 550 MW in Estonia. Low feed-in prices, however, reduce the potential to an economically sensible capacity of 150-200 MW. Eesti Energia, the electricity monopolist, is not very cooperative. Hence, one obstacle to wind energy exploitation is unequal access to the grid. Moreover, in some regions the grid is poorly developed. Nevertheless, some bilateral cooperation projects exist.

The situation is different in **Latvia**. Almost 70% of the Latvian electricity is generated by renewables. Big hydropower plants are situated at the Daugava River. Some 160 small hydropower stations were reconstructed or built at smaller rivers. Latvia also has very good wind energy power potentials in areas located close to the cost.

[72] World Energy Council, op. cit., pp. 19-20.
[73] Ibid., pp. 19-20.
[74] Ibid., pp. 25-26.
[75] Source: Ziesing, H.-J., "Treibhausgas-Emissionen nehmen weilweit zu – Keine Umkehr in Sicht", *DIW-Wochenbericht* 39/03, Berlin, 2003.

However, Latvenergo, also electricity monopolist, is lobbying against new wind power plants. Wind power turbines of one MW or larger can only be erected with a special permission of the Ministry of Economic Affairs. At present, such permits are not issued at all[76].

Compared with Estonia and Latvia the best investment climate for wind energy projects exists in **Lithuania**. There is a guaranteed feed-in rate for wind power of currently 6.38 ct/kWh, the highest in the Baltic states. Furthermore, the Law on Renewable Energies ensures that wind power is bought by the energy supply company. Lietuvos energija is not opposed to electricity generation by wind power. One reason is the need for electricity when Ignalina is shut down. Maybe one off-shore project will be realised. Also, many small hydropower stations have been reconstructed. Local environmental activists are concerned about plans to build a 100-MW hydropower plant on the Njemen river[77].

Poland has huge potential for renewables, however at present development is still slow. The Baltic Coast of Poland has an estimated 3,000 MW of economic wind energy potential. Currently 28 MW of capacity have been installed. The investment climate is favourable in general, but there are strong coal lobbies which slow down the further development. Geothermal resources could be used for heat generation, and there are good possibilities for exploiting biomass and biogas. These fuels are available at low prices, and Poland has set specific targets in this sector. The Polish National Strategy for the Utilisation of Renewable Energy Sources by 2020 includes a plan for the use of biomass boilers, straw and wood fired district heating and biomass for CHP generation.

To reach the target of having a 7.5% renewable energy share in power generation by 2010, the government intends to spend 58 million USD per year[78].

2.3. Third Group – Russia and its Kaliningrad Exclave

2.3.1. Russia

In 2001 almost 145 million people lived in Russia, almost as many as in all the other BSR countries combined (152.14 million). The country is richly endowed with energy resources. One third of the world's natural gas reserves, 6.4% of world oil reserves and 37% of the world hard coal reserves are located on Russian territory[79].

[76] "In Wind und Wasser steckt die Kraft: Immer bessere Voraussetzungen für Erneuerbare Energien im Baltikum", *ost west contact,* 11/2003, p. 68.
[77] Ibid., pp. 66-69.
[78] 'Economies in Transition, The IEA and Renewable Energy', Background paper, IEA, Budapest, 2003, p.12.
[79] Götz, R., *Russlands Energiestrategie und die Energieversorgung Europas*, SWP Study, Berlin, 2004, pp. 10, 14, 19.

The contribution of natural gas to TPES is extremely high in Russia. In 2000, its share was about 52%. Oil accounted for 21% of TPES and coal for 18%.

With a total of 214 GW of power generation capacity installed in 2001, Russia is among the four largest generators of electricity in the world. Some 42% of electricity is generated by gas-fired power plants, which is significantly higher than in any other country in the region[80].

Russia is the second biggest exporter of oil and the biggest natural gas exporting country in the world. Its net energy exports in 2001 accounted for 367.3 Mtoe.

Almost all countries in the Greater Baltic Sea region import energy from Russia.

Only Norway (201 Mtoe in 2001) and Denmark (6 Mtoe in 2001) are net energy exporters of natural gas as well[81].

The area of Russia associated with the BSR is the Northwestern Region, consisting of 7 regional power systems. Installed capacity was about 19,000 MW in 1995. The region is an energy exporter to neighbouring countries (Finland, Norway, Latvia, Estonia, Belarus), and to central Russian regions[82].

As in the Baltic States, market reforms were started at the beginning of the 1990s, and received a substantial boost through price liberalisation and privatisation in 1992. In Russia, too, industrial output and GDP have declined sharply. Recovery started in 1997. The financial crisis of 1998 caused another decline, but since 1999, the Russian economy has been steadily growing (see Table 7), as have the economies of the other transition countries.

	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002** Estimate	**2003**[83]
(percentage change in real terms)									
GDP	-4.1	-3.4	0.9	-4.9	5.4	9.0	5.0	4.3	4.3
Industrial gross output	-3.3	-4.0	1.9	-5.2	8.1	9.0	4.9	3.5	n.a.

Table 7: GDP and Industrial Production in Russia[84]

Reforms in the energy sector, which is treated as a strategic sector, have been slower than in the overall economy.

[80] IEA, *Energy Balances 1999-2000,* 2002.
[81] IEA, *Key World Energy Statistics,* 2003.
[82] "Baltic Ring Study", op. cit, p. 31.
[83] Projection
[84] Source: EBRD, Transition report update, May 2003, p. 79.

Liberalisation of Energy Markets

Among the energy sectors, the oil sector is the most advanced concerning privatisation and build-up of competitive structures. The coal industry has been largely privatised, competition exists as well. The power sector and the gas sector are less advanced.

What is now the Russian electricity sector was formerly developed as an integrated part of the Unified Energy System (UES) of the USSR. Russia inherited generation capacity of 212 GW (70% thermal, 20.5% hydro and 9.5% nuclear) and 700,000 km of high and low voltage transmission lines from the Soviet UES. Although in 1992 two governmental decrees declared the intention of creating a wholesale market for electricity and of forcing transformation of the entities in the power sector into corporations, they did not insist upon the real separation of generation, transmission and distribution. Break-up was implemented only in terms of accounting and not of ownership. Except for the nuclear power generators, the Russian electricity sector as a whole was effectively transformed into the joint stock corporation called RAO EES Rossii. The main owner of the holding itself remains the Russian Federation. Real success in fact is small so far. There is no free access to the grid. The same can be observed in the gas sector. Gazprom, which is at least partly privatised, has a monopoly and controls the pipelines as well. Plans to break up the transmission units and to permit regulated third party access to the grids as well as to the high pressure pipelines are still being discussed.

Electricity prices have been liberalised, domestic gas prices, however, are regulated by the state. Prices increased and price distortions have been reduced, but tariffs still do not cover the long term marginal costs.

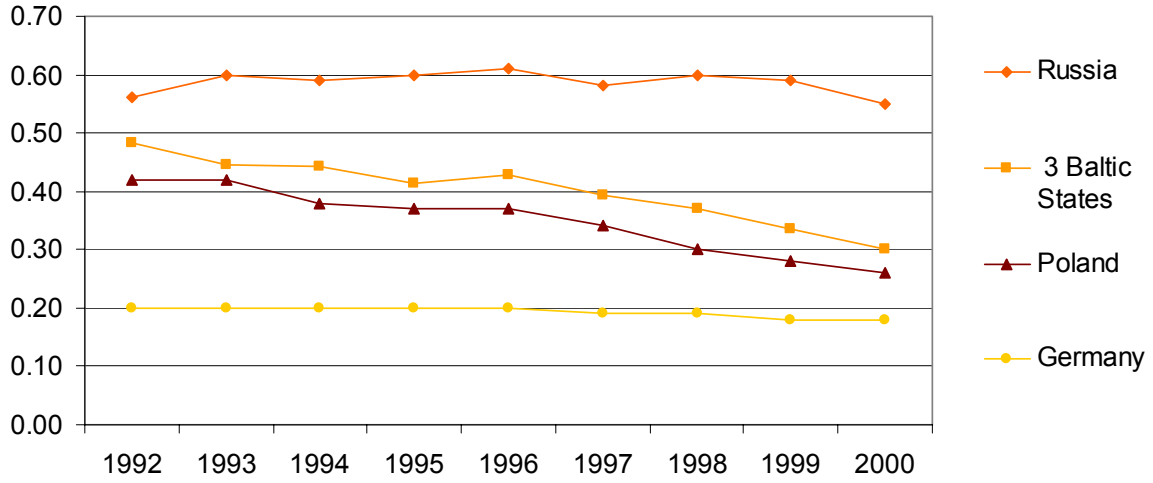
Environmental Policy, CO_2 Emissions, Energy efficiency

Energy intensity of GDP (measured in purchasing power parities (PPP)) in Russia is among the highest of the world. It was 0.56 toe/1000 USD PPP in 1992 and even increased until 1996 (0.61 toe/1000 USD PPP), reaching 0.55 toe/1000 USD PPP in 2000. Energy efficiency has slightly improved, albeit at a much slower rate than for example in the Baltic States, where energy intensity was almost at the same level as in Russia at the beginning of the 1990s[(85)] (see Graph 1). Thus, Russia has a huge potential for energy efficiency. According to estimates of the Russian Energy Strategy, the energy savings potential in Russia amounts to

[85] IEA, Energy Balances of the NON-OECD countries 1999-2000, 2002. In its 2003 publication, the IEA revised the energy intensity data for the Russian Federation. These new figures draw a different picture: Energy intensity of GDP (measured in purchasing power parities) in Russia was with 0.67 toe/1000 USD in 2001 even on a higher level. Anyway, the energy efficiency potential in Russia is huge. IEA, Energy Balances of the NON-OECD countries 2000-2001, 2003.

about 252-300 million toe, or about 39-47% of current energy consumption. The main share (about 40%) of this potential is within the energy sector itself; 30% of it comes from the industrial and 20% from the residential sector[86].

Because of the overall economic decline during the 1990s, Russia will easily be able to meet its CO_2 reductions targets resulting from the Kyoto protocol (keeping the CO_2 emissions at a constant level compared to 1990) for 2008. However, until now the Russian Duma has not ratified the protocol. There is still a debate between different interest groups in Russia about this issue. Utilisation of the Joint Implementation mechanism would help Russia to attract foreign investment to open the mentioned potential for improvement of energy efficiency. This would also be a strong argument to disprove the claims that Kyoto commitments are a barrier to Russia's future economic development.



Graph 1: Energy intensity (TPES/GDP in toe/1000 95 USD PPP) [87]

Russia's New Energy Strategy

In 2001 the Russian share of the EU-15's oil imports was 17% and in the EU-15's natural gas imports 40%[88]. Looking at the EU-25, EU candidates and neighbouring countries (Europe-30[89]), this share is much bigger: 30% of oil imports and 67% of natural gas imports came from Russia in 2000[90]. After the collapse of the Soviet Union, the EU became the main partner for natural gas and oil exports for Russia. The new Energy Strategy of the Russian Federation envisages growing shares of nuclear energy and coal in electricity generation in order to increase export capacities of the oil and natural gas sector.

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[86] IEA, Russia Energy Survey 2002, Paris, 2002, p. 223.
[87] Sources: IEA; Energy Balances 1999-2000, 2002; see footnote (85).
[88] Eurostat, No. 47/2002 – 19 April 2002 (oil), http://europa.eu.int/comm/energy/russia/events/doc/2003_presentation_gas.pdf (gas).
[89] Europe-30: EU-25 plus Bulgaria, Romania, Norway, Switzerland and Turkey.
[90] Götz, R., op. cit., pp. 12, 17.

However, several obstacles have been observed which have an impact on Russia's future natural gas supply to the EU.

- Production costs of major future oil and gas volumes are increasing. Gas fields in Western Siberia, which are important for exports to the EU, will be largely exhausted after 2015, the time when natural gas demand in the EU will grow substantially. Russian exporters fear loss of profits due to an assumed decline in natural gas prices on the European market, which might be caused by liberalisation of the European energy markets and/or by access of third parties to the Russian gas transit-pipelines (required by the EU and the Energy Charter Treaty).
- Huge investment, including foreign investment, will be needed for exploitation and transportation of natural gas from the fields in Yamal and Barents Sea. However, successful acquisition of foreign investment requires a stable und mutual beneficiary institutional framework, especially concerning the Production Sharing Agreements.
- LNG might become an alternative for long-distance natural gas transportation via pipelines when ever more natural gas would be supplied from Yamal and other northern Russian fields. Then, exports to the US and to Asia would have comparative advantages because of higher gas prices in these markets.
- Regional restructuring of energy exports. As for oil exports, the strategy envisages an annual growth of exports to EU countries of about 1.1%. The same figure is forecast for CIS[91] states. Exports to other countries (China and the US) will increase more rapidly and are planned to reach 100 million tonnes annually from 2010. This regional redirection of oil exports corresponds with an increased raw oil production in Eastern Siberia. The role of Russia for the EU's oil consumption will be reduced only slightly from 30% to about 26%. A similar development is planned concerning natural gas exports. Exports to the EU are planned to be increased by 31 billion m³ (23%) annually, whereas exports to China and the US are planned to reach 66 billion m³ annually. The share of natural gas imports from Russia of the EU's total natural gas imports would drop from 67% to 50% in 2010[92] (see also Tables 8 and 9).
- Rising natural gas prices on the internal Russian market will be a precondition for the planned increase of the share of nuclear energy and coal in Russian TPES. This would also lead to higher energy efficiency in gas consumption, setting free an additional amount of natural gas for exports.

[91] See Abbreviations (p. 41)
[92] Götz, R. op. cit., pp. 11-17.

The Russian coal sector has showed a remarkably positive development after privatisation and modernisation. New technologies will be implemented (clean coal technologies) in order to improve efficiency and to reduce ecological damage.

	2000	2020	Increase (2000-2020)
Europe-30 net imports (million tonnes)	428	more than 600	ca. 180
Imports from Russia (million tonnes)	128	160	ca. 30
Share of Russian oil (%)	30	27	17

Table 8: Share of Russian Oil in Europe-30 imports[93]

	2000	2020	Increase (2000-2020)
Europe-30 net imports (bcm)	200	500	ca. 300
Imports from Russia (bcm)	134	165	ca. 30
Share of Russian natural gas (%)	67	33	10

Table 9: Share of Russian natural gas in Europe-30 imports[94]

For the power sector, the strategy envisages an increase of electricity generation of about 56% through 2020 over 2000. Although the share of all fossil fuels is planned to be reduced from 66% in 2000 to 62% in 2020, total use of fossil fuels for electricity generation would increase by 47%, mainly due to a planned increase of the share of coal. This would, of course, lead to additional CO_2 emissions compared to the present level. The share of nuclear power in total electricity generation is planned to be increased from 15% in 2000 up to 22% in 2020. In nuclear power, 5.8 GW of installed capacity is to be shut down, and about 17 GW of new capacity are planned to be built[95]. This strategy aims at increasing the export capability of the Russian energy sector.

[93] Source: Ibid., p. 12.
[94] Source: Ibid., p. 17.
[95] Ibid., p.21.

Renewable Energies

Russia has a strong potential for use of renewable energy resources. The economic potential is estimated to reach 30% of TPES[96]. In 2000, 2.3% of TPES were derived from hydropower[97] and only one percent from other sources[98].

Most conservative estimates concerning small hydropower state that it could contribute to about 10% of overall Russian electric power generation[99]. In 2000, 18.7 % of electricity was already generated from big hydropower plants[100].

Other resources of renewable energy are scarcely used at present compared to the technical potential. A recent IEA[101] study estimated the economic potential of wood waste (biomass) at about 24.6 Mtoe. Wind power is especially appealing for remote areas which are not connected to the power grid. Transportation cost of fossil fuel (mainly heavy oil or diesel) to these regions are extremely high, thus wind energy could help to reduce energy costs.

The best regions for exploiting solar power are located below or near 50 degrees N. The economic potential is estimated at 8.4 Mtoe. Geothermal resources can be found in Kamchatka and the Kurile Islands, the Northern Caucasus, Daghestan, Central Chukotka und Sakhalin, with an economic potential of 80 Mtoe. Currently it is only exploited in Kamchatka[102].

The World Bank has recently launched a renewable energies programme for Russia.

2.3.2. The Kaliningrad Region

Kaliningrad belongs to the Russian Federation, but is surrounded by EU member states. This special geographical location causes several challenges and makes the region a testing ground of future EU-Russia relations.

After the collapse of the Soviet Union, industrial production declined by 80%. Trade and transportation links to Russia weakened. Shortages of energy supply occurred. In order to improve the framework for economic development of the region, the Russian government declared Kaliningrad a Special Economic Zone. Even if many legal issues remained unsolved, since 1999 economic growth in the region has been higher than in Russia[103]. This and the special geographical location seem to make the region attractive for many people from central

[96] Douraeva, E., *Opportunities for Renewables in Russia, IEA,* 2003, p.4.
[97] IEA, *Energy Balances of Non-OECD Countries 1999-2000,* 2002.
[98] Douraeva, E., op. cit., p. 4.
[99] Ibid., p.5.
[100] IEA, *Energy Balances of Non-OECD Countries 1999-2000,* 2002.
[101] See Abbreviations (p. 41)
[102] Douraeva, E., op. cit., pp. 4-8.
[103] The average growth rate until 2003 was about 8.9% whereas the respective rate for the whole Russia was about 6.1%. Source: S. Wagstyl, Financial Times Deutschland, 24 Dec. 2003.

Russia. The region's population has increased slightly from 846,700 in 1990 to about 943,200 in 2001, while the overall population of Russia has decreased by 2.5% since 1992. However, the overall legal situation is very weak and foreign investment remains low.
Although Russia is richly endowed with energy resources and has overcapacities in electricity generation, the Kaliningrad exclave has an energy shortage.

The Energy Situation of the Russian Exclave

More than 90% of TPES and 95% of electricity consumed has to be imported. During the last 10 years, natural gas has become the main energy source of the Kaliningrad region (53% of TPES). It has partially replaced the consumption of heavy fuel oil (52% in 1991) and coal (23% in 1995). The consumption of natural gas has doubled since 1991 and is expected to double again by 2015[(104)].
Kaliningrad's own energy resources are limited to lignite, peat and some small deposits of oil, which are of poor quality because of its high sulphur content.
Oil production declined slightly during recent years, from 749,000 t (2000) to 650,000 t in 2002[(105)].
One of the oil fields, the so called D-6 field, causes serious environmental problems because it is close to the environmentally sensitive Curonian Spit, which was placed on the Unesco[(106)] World Heritage Center's list of protected areas in 2001[(107)]. The expected size of the field is about 25 million tonnes. Although exploration was stopped during Soviet times, its exploitation seems to be attractive for LUkoil, which has been the new owner of the regional oil company Kaliningradmorneftegas since 1995. Exploitation of this field caused a conflicting political debate between Russia/Kaliningrad and Lithuania. In order to mediate the communication UNESCO experts in November 2003 participated in a trilateral discussion with Russian and Lithuanian officials.
Due to the economic decline after the collapse of the Soviet Union, total electricity consumption dropped from 3.23 TWh in 1990 to 2.85 TWh in 2000. In 2000, only about one third of the electricity was generated in the region, by small CHP plants[(108)]. The region is not self-sufficient because it was developed as an integrated part of the former Soviet supply

[104] Krug, M., Mez, L., 'Aktuelle Probleme der Stromversorgung Kaliningrads', *Osteuropa*, 53.2-3, Berlin, 2003, p 287.
[105] Goskomstat (*Regiony Rossii: Osnovnye harakteristiki sub'ektov Rossijskoj Federacii 2002*, Goskomstat Rossii, Moscow, 2002) for 2000 and Krug, Mez for 2002.
[106] See Abbreviations (p. 41)
[107] Radio Free Europe/ Radio Liberty (2003), *Baltic States Report*, 4.7, 28.02.03, http://www.rferl.org/balticreport/2003/02/7-280203.html
[108] Krug, Mez, op. cit., p. 288.

system UPS. The needed electricity is imported from either St. Petersburg or Lithuania via three 330 kV voltage lines, which have linked the Kaliningrad region with Lithuania since the 1960s. Direct imports from Lithuania increased from 0.8 TWh in 2001 to 2.3 TWh in 2002. Thus, at present Lithuania plays the most important role for the Kaliningrad region's electricity supply, both as transit country and as a generator of electricity.

The current debate on future electricity supply

There is a debate on possible future electricity shortages in the Kaliningrad region, which is based on at least the following assumptions:

- The three Baltic States might disconnect from IPS/UPS and become members of the UCTE, which is a controversial political issue in these countries.
- The future shortage of power export capacity in Lithuania due to the closure of the first block of Ingnalina in 2005 and the shortage of electricity generation in Lithuania after the closure of the second block in 2009.
- The potential attractiveness of electricity exports.

A more detailed discussion of these issues follows in Chapter 3.

Due to uncertainties about future developments, the plans of the Russian government to make the Kaliningrad region self-sufficient in power supply have been revived. The construction of a two-block gas fired power station was stopped in 1997, but its resumption is currently being discussed[109]. The Russian government has adopted a federal programme which includes the requirement to build an additional block so that planned total capacity would reach 900 MW in 2010[110]. However, this seems to be far more than the region itself would consume[111]. Such an assumed export strategy would also require that additional natural gas be supplied to the region.

Currently, natural gas is delivered from the North of Siberia (Urengoj-Region) via a junction of the Severnoe-Sijanie-Pipeline from Minsk to Vilnius, with a length of 600 km and only one compressor station in Minsk. The result is a very low pressure, especially in wintertime[112]. The need to reconstruct this pipeline is urgent; however the start of construction work has not yet been set.

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[109] An agreement was signed between Yantarenergo, RAO EES Rossii and the Kaliningrad administration in 2002. (Krug, Mez, op. cit., pp. 297-298.) Yantarenergo is Kaliningrad's electricity and heat supplier, 100% owned by RAO EES Rossii.

[110] "Chubais Unfreezes Kaliningrad Heating and Power Station Project" *Alexander's Gas & Oil Connection* (2002), 13.11.02.

[111] Even the most optimistic prognosis, which is considered to be unlikely, doesn't expect electricity demand to exceed 648 MW in 2010.

[112] Krug, Mez, op. cit., pp. 287-288.

All the pipeline projects are part of Gazprom's overall development strategy, which has an important focus on exports. As far as exports to the EU are concerned, several pipeline projects are in discussion. At least two projects are of prime importance: Construction of a second Yamal Pipeline via Belarus, Poland and Germany, and the so-called North Trans Gas pipeline (Baltic Sea Pipeline) from the Barents Sea via St. Petersburg and the Baltic Sea. Several studies have also been carried out on this issue. However, despite several rumours, no decision has been reached on this issue so far.

Other options are also being discussed. Gazprom is interested in securing the gas corridor via Lithuania, and is currently negotiating with the Lithuanian government over 34% of the shares of the Lithuanian gas company Lietuvos Dujos(113). Lithuania is benefiting from transit income and does not oppose plans to build a second pipeline through its territory.

Energy Efficiency and Environment

Concerning energy efficiency the situation in Kaliningrad is similar to the situation in overall Russia.

International organisations are trying to change this situation: The EU has assisted local heat and power utilities to adjust to modern market conditions by improving efficiency in energy distribution, restructuring and adapting tariffs. Furthermore, the money was ear-marked for numerous energy-saving initiatives. The EBRD(114) provided a loan of 12 million USD for the rehabilitation of the district heating network in the city of Kaliningrad. The key objectives of the project are to improve energy efficiency in the district heating network through reduced losses, and to ensure the commercial and financial sustainability of the Kaliningradteploset enterprise. This municipally-owned district heating company of Kaliningrad is to reach the target through the adoption of best commercial practices, sound prices and subsidy reform(115).

Renewable Energy

Renewable energy sources hardly contribute to the region's TPES today. However, plans for increased use of renewable energy sources exist.

Some of the fifty old small hydropower stations are currently reconstructed.

Twenty-one wind energy generators with a total capacity of about five MW were installed near Kulikova in 1998. The project was supported by a grant of the Danish government.

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113 Lietuvos Dujos: Only company (transport and distribution), owned by Ruhrgas Energie Beteiligungsaktien-gesellschaft /E.ON Energie AG 35.5% (together), 58% state owned, World Energy Council, op. cit., pp.23-24.

114 See Abbreviations (p. 41)

115 EBRD, *Project summary: Kaliningrad District Heating Renovation and Reform, 2003,* http://www.ebrd.com/projects/psd/psd2003/23109.htm

A Danish-Russian joint venture (SEAS-Yantarenergo[116]) has planned to build a 50 MW offshore wind park. If this offshore project is realised, total wind energy capacity would amount to about 55 MW or 5-6% of the total electricity consumption in the Kaliningrad region[117].

A certain potential of geothermal resources is estimated, which could be used for district heating in parts of the city of Kaliningrad.

[116] Triebel, Russland: "Alternative Energien benötigen Beachtung", in: *bfai-INFO* 12/2002, p. 16.
[117] Information from the Danish consultancy firm Ramboll.

3. Network Integration, Energy Transit and the Baltic Ring

The creation of a competitive energy market is closely related to efforts for further integration of the energy infrastructure in the BSR. One of the major plans – which is considered in the context of the EU-internal energy market – is the establishment of a common electricity market in the region. This is a challenging goal because of the special situation within this region. The power systems of the related countries belong to three different systems – UCTE (Germany, Poland and the southern mainland part of Denmark), NORDEL (Norway, Sweden, Finland and the remaining part of Denmark), and IPS/UPS (the three Baltic States and Russia). The systems are linked by DC cables, which makes power trading technically possible to a certain extend. The cables link Sweden and Germany (in operation since 1994), Denmark and Germany (1995) and Russia and Finland.

Encouraged by the idea that trade and co-operation would result in higher security of supply, initiatives to develop a common electricity market in this region started as early as the early 1990s. Several studies have been carried out which were supported by the TransEuropean Network Programme (TEN Energy Programme) of the EU Commission. The Baltic Ring Study, carried out by the power companies involved from the beginning of 1996 to early 1998, can be considered the basis of the present discussion. BALTREL[118] for the power sector as well as Baltic Gas for the gas sector were founded in 1998 in order to promote this development and to offer a discussion platform for energy companies from all countries of the region. BALTREL and Baltic Gas carried out an additional study, Gas and Electricity in the Baltic Region, which aimed to investigate the conditions and the perspectives of common electricity and gas markets[119]. The study was funded by Interreg [120]. A number of reports and position papers were published and several scenarios were developed.

Within BASREC the Working Group on Electricity and the Working Group on Oil & Gas have provided an additional forum, mainly for political decision makers of the BSR countries to further discuss this issue.

In the above mentioned study, eleven power connections were proposed, along with twelve projects for building new power generation plants, twenty-four projects for gas connections and six projects for gas storage[121].

The results to date can be summarised as follows:

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[118] See Abbreviations (p. 41)
[119] BASREC Workshop based on the joint study of BALTREL and Baltic Gas, Moscow, January 2002.
[120] Integrated Gas and Electricity Study, Final Report, Baltic Gas/BALTREL, October 2001.
[121] Ididem.

Electricity Market

In addition to the cables already mentioned, since 1995, a submarine DC cable has been laid between Poland and Sweden (2000), and a cable built between Norway and Germany. The other projects have not been realised. Still under discussion are cables within the NORDEL area (between Sweden and Norway) and a capacity expansion of the DC cable linking Finland (NORDEL) and the IPS/UPS. The projects linking Denmark and Norway as well as Norway and Russia have been cancelled. Also still under discussion are the following connection projects:

- NORDEL –IPS/UPS: linking Estonia and Finland (315 MW), and Finland with the Russian Kola Peninsula (500 MW)
- UCTE-IPS/UPS: several proposals for lines exist, Poland – Kaliningrad; Lithuania – Poland and Belarus – Poland. An interconnection between some of them has also been discussed.

As an overall result of the development in this area, trading across borders has increased significantly, as has internationalisation of power generating companies.

The Baltic Ring Study already stated that there is a surplus of production capacity in BSR, resulting in a very high security of power supply. Only a few countries, e.g. Latvia and Kaliningrad, are dependant on power imports. A potential lack of supply by domestic generating plants (e.g., Ignalina) could be overcome by additional imports from Russia within the present IPS/UPS. At present, price levels in IPS/UPS are lower than in the NORDEL and UCTE systems. However, due to the lack of alternatives, the monopoly position of Russia would increase after the closure of Ignalina. Inasmuch as EU membership does not imply membership of a country in UCTE, trade could be increased between NORDEL, UCTE and IPS/UPS. A DC connection between the Baltic States und UCTE and/or NORDEL could be a possible solution to the problem at lower cost preferable to disconnection from IPS/UPS. A study is being carried out by the EBRD concerning the feasibility of a (DC) interconnector between Lithuania and Poland.

Many investments in capacity will be driven by the need for environmental improvements. However, investment in transmission is closely linked to the development of the trading regime, the demand for trade (depending on price levels and export/import agreements) and return on investment.

Inasmuch as markets are liberalised, responsibility for investment lies with the companies involved in the BSR market. Public budgets are not expected to carry the burden.

Responsibility for decision-making and investment in transmission lines also lies with the system companies – UCTE, NORDEL and IPS/UPS.

The latest BALTREL Report of September 2002 stated that the fundamental harmonisation of the electricity markets of the BSR countries into a common market would require a longer time period. There are great differences as regards openness, legislation, environmental requirements and regulatory elements in the pricing. Thus, gradual development at different rates must be accepted(122). The study assumed that the countries involved would continue to make decisions concerning power supply at the national level, although there is a will to achieve harmonisation. It was stated that the Baltic Sea region electricity market would be realised within the framework of asynchronous systems(123). The fact, that synchronisation of the Baltic states with the UCTE grid would require a considerable amount of investment to ensure stability of the whole system as well as of the remaining UPS, and the construction of a new line from Russia to Kaliningrad was taken into consideration.

Important for further development in this field is the current negotiation between Russia and the UCTE on the regime of linking IPS/UPS with UCTE. Two main options are being discussed: synchronisation, and asynchronous connections. At present, an OECD study has been started to investigate all related questions.

The outcome of the study would be of great importance for the continued debate on alternatives in the electricity trade for the Baltic states, and on the Kaliningrad supply options.

Natural Gas

The BALTREL/Baltic Gas study hypothesis was that natural gas would be one of the most appropriate alternatives for the next generation of electricity generation. Terms of environmental safety and requirements of the Kyoto Protocol are considered as well. The study demonstrated that all financial institutions considering the opportunity of investing in the gas sector believe that liberalisation increases risks and raises interest rates(124). The liberalisation of the natural gas market and therefore the creation of a real competitive market is limited by structural constraints of supply, i.e. the very limited number of suppliers -- at present, only Russia and Norway. The differences in legislation of different countries with regard to energy policy, in particular with regard to relations between Russia and the EU,

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[122] *Towards a Common Electricity Market in the Baltic Sea region, Baltic Ring Electricity Co-operation Committee*, Stockholm, 2002, p. 8.

[123] Ibid.

[124] BASREC Workshop on Gas and Electricity in the Baltic Sea Region, Moscow, January 2002.

concerning the EU Gas Directive and the Energy Charter Treaty issues, and aspects of land allotment for gas pipelines, were stated as key problems[125].

Of the regional gas projects which had been proposed by the Baltic Gas/BALTREL in the Final Report on the "Integrated Gas and Electricity Study" in 2001, only the project of the Danish pipeline Nybro-Dagor has been completed. The pipeline project to link Denmark with the UK was cancelled, and all other gas connection projects are still being discussed. As for the projects for building additional gas storage facilities, the situation is very different. Of the six projects mentioned in the study, two are under construction (expansion of Incukalns UGS[126], Lavtia and storage at Stelille in Denmark); the other projects are planned for future realisation.

In general, additional volumes of demanded gas would be needed in order to economically justify the planned natural gas pipeline projects from Russia to the EU. The upcoming modernisation of the electricity generating capacities during the next decades and the impact of the EU Emissions Trading will play a crucial role. In addition, the further development of LNG could have a major impact on the gas connection projects. Increasing economies of scale would lower costs, and competition would create a wider scope in this developing business field.

[125] BASREC Workshop on Gas and Electricity in the Baltic Sea Region, Moscow, January 2002
[126] See Abbreviations (p. 41)

4. Development of the Investment Climate in the Baltic Sea Region

Obviously, the investment climate in the Baltic Sea Region cannot be addressed in general due to widely deviating situations in the different countries. Once again however, groups with similar conditions can be identified, to permit a rough overview.

The new EU member states Estonia, Latvia, Lithuania and Poland share the same background of a former centrally planned economy with subsidised consumer prices in the energy sector. Though the current situation differs from country to country, some common developments can be identified.

The countries are implementing rules of competition and are phasing out cross-subsidisation in order to comply with the respective EU directives. With regard to low-income groups, transition periods have been accepted by the EU. Nevertheless, the process and the related future perspectives have already improved the investment climate in the energy sector considerably. Due to an energy intensity still fundamentally higher than in western European countries, huge investment potentials in the energy sector and in the demand side are still waiting to be tapped in the new EU member states.

To date however, the major energy sector investments have been made on the supply side, while the demand side is obviously still lacking in attraction for investors. The reasons can be found in such factors as the difficult ownership structure of classical demand-side energy efficiency objects such as buildings, the tariff structure, and the minimal importance attached to these measures in the political arena.

The rather unexploited potential for demand side-energy efficiency measures in the new EU member states holds enormous opportunities for reducing fossil-fuel consumption. This effect would be accompanied by decreasing CO_2 emissions and lower dependence on energy imports within the European Union – two aspects which are fully in line with the aims of European energy policy.

Therefore, it should be a strategic issue of the European Union to intensify measures for stimulating demand-side energy efficiency projects within the new EU member states. These measures have to address the political as well as the economic sphere. For political measures, it is important that conditions for increasing the significance of demand side energy efficiency projects be initiated in the respective countries' political agendas. Access by local ESCOs[127] to appropriate financing can be seen as an important aspect in the economic environment of demand-side energy efficiency projects. Respective schemes, e.g. via the EBRD, are already

[127] See Abbreviations (p. 41)

in place and should be further expanded in order to initiate a real breakthrough in this promising sector.

With a centrally planned economy coupled with high energy intensity, Russia had a similar starting position as the new EU member states of the Baltic Sea Region. However, in terms of the investment climate, Russia lags behind considerably. The reasons are the relatively hesitant realisation of market-economy-based reforms, the still weak legal basis for investment, and respective country and currency risks. However, the current recovery of the Russian economy might provide new perspectives for investments in the Russian energy sector as well. At present, private Russian investment in the supply side seems to be more successful than foreign investment, except for some unique cases such as the BP investment in the Russian oil sector.

The factors stated above regarding the disparity of supply and demand-side investments also apply to Russia to the same degree. However, energy efficiency, especially in the communal sector is getting higher political priority. Energy tariffs are planned to be steadily increased in the longer run, and a communal sector reform is under way. Further improvement of energy efficiency in Russia is also in the EU's interest, due to the related climate change mitigation potential. The framework of BASREC forms an important cornerstone for raising awareness for this issue in Russian politics.

Additional incentives for investments in energy efficiency projects in Russia and the new EU member states might be provided by the extended utilisation of the Joint Implementation (JI) mechanism. The related opportunities and threats were evaluated in the respective chapter of this study.

The western European countries Denmark, Finland, Sweden, Iceland, Germany and Norway provide a reliable investment climate regarding the general business environment. However, due to their relatively low energy intensity, the potential for economic viable investments in energy efficiency is limited. Nevertheless, the EU Emission Trading System (ETS) will provide incentives for the exploitation of still existing low cost energy efficiency measures.

4.1. Joint Implementation as a Possibility to Additional Financing of Investment – The Opportunities for the Baltic Sea Region

In the framework of BASREC the Baltic Sea Region is positioned as an early mover in testing and exploiting the benefits of the Joint-Implementation (JI) mechanism. With the *Regional*

Handbook on Procedures for Joint Implementation in the Baltic Sea Region[128] the experiences already gained along with guidelines for utilising the JI mechanism have now been published in order to initiate further development.

A milestone was set by BASREC's special Conference on the Testing Ground for the Development and Implementation of the Flexible Mechanisms of the Kyoto Protocol[129] which took place on 26 and 28 May 2002 in St. Petersburg. An important aspect of the conference was the discussion of a carbon fund concept to be implemented under the umbrella of the Nordic Environment Finance Corporation (NEFCO). Both in terms of investors and of the origin of the certificates, the potential NEFCO Carbon Fund would focus mainly on the Baltic Sea Region. The exploitation of the large potential for synergies present in the region due to the involvement of countries with future excess and need, respectively, of Assigned Amount Units (AAUs) and EU Allowances (EUAs) could be facilitated by the introduction of the fund.

Russia and the new EU member states Estonia, Latvia, Lithuania and Poland can be identified as potential host countries for JI projects, due to the already achieved compliance with their Kyoto targets[130]. Iceland is permitted to increase its CO_2-emissions within the framework of the Kyoto Protocol. As it has not reached the allowed level yet, it also might be considered as a host country for JI projects. However, compared to Russia and the new EU member states, Iceland's potential for JI projects is very limited.

On the other hand the western European countries Denmark, Finland, Sweden, Germany and Norway have to further reduce their CO_2-emissions and might therefore act as buyers on the JI market.

Since 1995, there has already been experience gained with so called Activities Implemented Jointly (AIJ) in the Baltic Sea Region. AIJ forms a type of forerunner for Joint Implementation projects. Several AIJ projects have been hosted in the new EU member states Estonia, Latvia, Lithuania and Poland as well as in Russia. The western European countries of the Baltic Sea Region have functioned as supporters, with Sweden showing especially high involvement. AIJ projects have been implemented in the fields of fuel switching, energy efficiency, replacement of outdated combustion technologies, cogeneration and renewable

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[128] *Regional Handbook on Procedures for Joint Implementation in the Baltic Sea Region*, BASREC, 2002, http://www.cbss.st/basrec/documents/climatechange/dbaFile1556.html

[129] *Minutes of the BASREC Conference on Testing Grounds for the Development and Implementation of the Flexible Mechanisms of the Kyoto Protocol,* BASREC, Saint Petersburg, Russia, 26-28 May 2002, http://www.cbss.st/basrec/documents/climatechange/dbaFile1468.html

[130] Ziesing, H.-J., op. cit.

energy sources. The experience gained forms a highly valuable background for the development and realisation of future JI projects in the Baltic Sea Region.

However, there are still significant barriers hindering the widespread use of JI. The uncertainty regarding Russia's ratification and therefore the coming into force of the Kyoto Protocol can be seen as a major obstacle. The expectations of the Kyoto Protocol's participants on Russia to use its climate conference in September 2003 as a platform for announcing ratification were disappointed. Moreover, the signals from the Russian government regarding this issue continued to be ambivalent during the autumn, leaving COP 9 [131] in December 2003 in a rather unclear situation[132]. Rumours about a potential change in President Putin's position on the Kyoto Protocol were reported by the Russian newspaper *Kommersant* on 21 Apr. 2004 in relation to a possible agreement with the European Commission on WTO issues[133]. However, no concrete signs for an imminent Russian ratification is in sight.

Nevertheless, the EU Emission Trading System (ETS) will come into force on 1 Jan. 2005, providing new incentives for the use of the flexible Kyoto mechanism in the Baltic Sea Region as well. On 20 Apr. 2004, the European Parliament approved the so called Linking Directive[134] concerning the regulation of the use of project-based mechanism in the framework of the ETS. The directive can enter into force once it is adopted by the EU Council and published in the EC Official Journal. As the version approved by the European Parliament was proposed by the EU Council, this procedure can be seen as a mere formality. Utilisation of certificates stemming from Joint Implementation (JI) and Clean Development Mechanism (CDM) will be possible independent of the Kyoto Protocol's coming into force. Certified Emission Reductions (CERs) will already be eligible from the start of the ETS by 2005, while Emission Reduction Units (ERUs) can be utilised with the beginning of the second ETS commitment period as of 2008.

Therefore, the uncertainty resulting from Kyoto Protocol's unclear future might partly be compensated by the framework of the ETS as forward contracted ERUs and CERs will hold real value for the first time.

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[131] 9th Conference of the Parties to the Kyoto Protocol

[132] *Financial Times Online*, "Russia Doubts Cloud Kyoto Pact", 15 Dec. 2003, http://news.ft.com/servlet/ContentServer?pagename=FT.com/StoryFT/FullStory&c=StoryFT&cid=1071251534038

[133] "Point Carbon, Putin to announce pro-Kyoto stance" *Kommersant*, 21 Apr. 2004, http://www.pointcarbon.com/article.php?articleID=3548&categoryID=147

[134] European Parliament, Documents approved on 20 Apr. 2004, http://www3.europarl.eu.int/omk/omnsapir.so/calendar?APP=PDF&TYPE=PV2&FILE=p0040420DE.pdf&LANGUE=DE

However, barriers resulting from the ETS also have to be taken into account. With the accession of Estonia, Latvia, Lithuania and Poland to the European Union in May 2004, the ETS will be enforced in these countries as of 1 Jan. 2005. Even though regulations have been defined in the adopted version of the Linking Directive allowing for the continued implementation of JI projects at installations affected directly or indirectly by the ETS, a reduction of JI potentials in these countries is to be expected.

Regarding indirectly affected projects, such as grid connected renewable energy schemes, a respective amount of EUAs has to be cancelled in the National Registry in order to avoid so called "double counting". The rationale is that these projects would contribute to the release of EUAs at conventional power stations by substituting fossil fuels. By cancelling EUAs at the national level, the national EUA reserve would decrease, which might lead to hesitant political support for this procedure resulting in decreased possibilities of using JI as a co-financing instrument for grid connected renewable energy projects.

At installations directly included in the ETS potential, JI projects might in the future rather be implemented on the basis of selling released EUAs due to a relatively higher price level and reduced administrative procedures.

A further impact is to be expected from the EU's *acquis communitaire* which refers to the body of EU legislation that countries joining the EU must adopt. Some directives will have an impact on greenhouse gas emissions, even though not aiming directly on this issue. As a result, the baseline level of JI projects will be decreased, resulting in a lower potential for ERUs[(135)].

However, the countries have the possibility of supporting the utilisation of JI by creating favourable framework conditions and by reserving EUAs for JI at the national level. The most important precondition for the implementation of a favourable business environment for the use of JI can be seen in a respective commitment of the political decision-makers involved. Currently this commitment seems to be lacking in some of the new EU member states. E.g. Poland focuses strongly on the exploitation of future benefits from emissions trading, while disregarding the potential for JI projects. Resentments have already emerged due to this procedure on the part of JI project developers worried about the future of their projects.

In order to identify potential rationales for this focus, the requirements and the main beneficiaries of the two mechanisms have to be taken into account. Emissions trading might be easier to handle and could lead to direct income on the state level, whereas JI projects require further regulations and would be implemented mainly at the corporate level.

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[135] "Point Carbon", *Carbon Market News* 15 Apr. 2004, http://www.pointcarbon.com/category.php?categoryID=150&collapse=150

However, the countries neglecting JI would miss opportunities to attract foreign investment and therefore impulses for economic growth. Moreover, environmentally sound project possibilities might not be implemented due to the lack of the necessary JI framework conditions, resulting in lost chances for sustainable development.
Russia is not affected by the described impacts of the ETS on the potential for JI projects. As Russian JI projects will probably be eligible for generating ERUs for the ETS independent of Russia's ratification of the Kyoto Protocol, an increase in JI project activities can be expected. The Russian potential for JI projects can be considered as huge; however, the lack of institutional framework conditions and general country and investment risks might still hinder its exploitation. Nevertheless, the experience of JI benefits might also have a positive effect on Russia's position on the Kyoto Protocol.

5. Conclusions

Major energy projects such as pipelines always involve a high investment risk. Liberalisation leads to a much stronger influence of market rules and entrepreneurs on power and gas supply. Responsibility for decision making and investment in power transmission lines and gas pipelines lies with the system companies – UCTE, NORDEL and IPS/UPS and the respective gas transportation companies. Future development of market demand for electricity and natural gas is the key criterion for respective decision making. Which of the projects discussed are viable and useful, particularly against the background of energy efficiency measures, should be thoroughly assessed.

Most energy forecasts predict that gas demand will increase. On the other hand this basic assumption has not been verified by recent developments: Gas consumption has stagnated throughout the past three years. However, when the emissions trading system finally comes into force, gas demand could increase dramatically, since CO_2 emissions will then have a price-tag. Coal and oil prices will go up, whereas natural gas – a carbon-poor energy source – will benefit.

As a result, Russia will export large amounts of gas to the European Union. In order to meet its internal energy demands, Russia is leaning toward expansion of its nuclear sector, including by prolonging the life-span of its overage installations, and toward boosting coal based power generation. The European Union should be aware of this correlation and try to press for installation security standards within the strategic partnership, as well as for improvements in the institutional framework for energy efficiency in Russia.

As far as the Baltic Sea Region is concerned, the European Union/ European Commission has so far concentrated on the supply side in the security of supply question. It has relied primarily on the expansion of energy networks and the enhancement of energy partnerships. It has not yet focused enough on the demand side, which has a huge potential for energy savings. A comprehensive study should be carried out in order to investigate opportunities for and identify barriers to a considerable increase in energy efficiency on the demand side. This is especially important as the number of actors on the demand side is much higher than on the supply side, and their common action is less self-initiated.

The impressive share of CHP and district heating in the Baltic States, Poland and the northern region of Russia might play an important role for increasing energy efficiency. In order not to lose this potential, a reliable, transparent and predictable regulatory framework is necessary to guide this industry in the respective countries through reconstruction and decentralisation towards business-like operation. Expansion of cooperation in this area would be crucial in the short term.

A large potential for JI projects in the Baltic Region can be identified. Their exploitation is supported by the mutual closeness of countries which in the future will have an excess of, or need for, respectively, AAUs and EUAs, and by the early actions already undertaken in the region. Further developments supporting a favourable business environment in the new EU member states and in Russia are necessary in order to access the benefits related to the widespread use of the JI mechanism. Therefore, it should be seen as a strategic issue of the European Union to support the respective countries in creating favourable business environments and increase capacity building for the use of the JI-mechanism and therefore to counteract the danger that it will be neglected. The BASREC network could ideally be used as a basis for this intensified capacity building due to already existing experiences in the framework of the Testing Ground and the involvement of countries from Eastern and Western Europe.

The potential for renewable energies, especially for on- and off-shore wind energy, is not well exploited yet. For example Poland and Lithuania would offer good conditions for new projects in this field.

Abbreviations

AAU:	Assigned Amount Unit
AC:	Alternation Current (elec.)
AIJ:	Activities Implemented Jointly
BALTREL:	Baltic Ring Electricity Co-operation Committee
BASREC:	Baltic Sea Region Energy Co-operation
BEAC:	Barents Euro Arctic Council
BSR:	Baltic Sea Region
CBSS:	Council of the Baltic Sea states
CDM:	Clean Development Mechanism
CER:	Certified Emission Reduction
CHP:	Combined Heat and Power (production)
CIS:	Commonwealth of Independent States (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan)
Comecon:	Council for Mutual Economic Assistance
COP 9:	UN Framework Convention on Climate Change: 9th Conference of the Parties
ct:	Cent
DC:	Direct Current (elec.)
EBRD:	European Bank for Reconstruction and Development
EEA:	European Economic Area
EnEV:	Energieeinsparverordnung – Energy Efficiency Ordinance for Buildings
ERU:	Emission Reduction Unit
ESCO:	Energy Service Company
ETS:	Emission Trading System
EU:	European Union
EUA:	EU Allowance
GDP:	Gross Domestic Product
GHG:	Greenhouse Gas
GW:	Gigawatt
GWh/a:	Gigawatt hour per year
GWh:	Gigawatt hour
IEA:	International Energy Agency

Interreg:	EU interregional co-operation
IPS/UPS:	Interconnected Power System/Unified Power System
ISPA:	Instrument for Structural Policies for pre-Accession
JI:	Joint Implementation
kV:	Kilovolt
kWh	kilowatt hour
LNG:	Liquid Natural Gas
Mtoe:	Million tonnes of oil equivalent
MW:	megawatt
NEFCO:	Nordic Environment Finance Corporation
Nordel:	An organisation for Nordic power co-operation
OECD:	Organisation for Economic Co-operation and Development
PGNiG	Polskie Górnictwo Naftowe i Gazownictwo S.A. – Polish Oil and Gas Company plc.
PHARE:	(Poland and Hungary: Aid for economic Restructuring), Main channel for the EU's financial and technical co-operation with CEE countries
PPP:	Purchasing power parity
RAO EES Rossii:	Russian Joint Stock Company "Unified Energy System of Russia"
Sapard:	Special Accession Programme for Agriculture and Rural Development
Synergy:	EU support for international energy co-operation projects with third countries
TACIS:	Technical Assistance to the Commonwealth of Independent States
TEN:	Trans-European Networks
toe:	tonne of oil equivalent = 10^7 kcal
TPES:	Total Primary Energy Supply
TWh:	terawatt hour
UCTE:	Union for the Co-ordination of Transmission of Electricity
UES:	Unified Energy System
UGS:	Underground Gas Storage
UK	United Kingdom
Unesco:	United Nations Educational, Scientific and Cultural Organization
US:	United States (of America)
USD:	US-Dollar
USSR:	Union of Soviet Socialist Republics
WTO:	World Trade Organization

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