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CoMeth

Coal Mine methane - New Solutions for Use of CMM - reduction of GHG emissions

Collaborative Project
Thematic priority: EN

Basics on country situation

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1 Introduction

1.1 CMM Definition and Origin

Coalbed methane or CBM is methane contained in coal seams, and is often referred to as virgin coalbed methane, or coal seam gas.” (EPA Climate Change Glossary of climate change terms) It refers to the methane (CH4) gas found in coal deposits.

CMM is the subset of CBM that is released from the coal seams during the process of coal mining, an acronym for Coal Mine Methane. The CMM described and discussed here is an anthropogenic (man-made) emission.

The origin of the gas is organic; it was formed during the compression process that slowly transformed plants, wood and other organic substances into coal.

The gas is mainly methane (90-95 %) plus Nitrogen, Carbon Dioxide and more complex Hydrocarbons [1-1]. Methane is combustible and forms an explosive gas when mixed with air or oxygen, reducing CMM removes a potential hazard for the mining operation.

Coal mine methane is emitted from six sources [1-2]:

Degasification systems at underground coal mines (also commonly referred to as drainage systems). These systems may employ vertical and/or horizontal wells to recover methane in advance of mining (known as “pre-mine drainage”) or after mining (called “gob” or “goaf” wells)

Ventilation air from underground mines, which contains dilute concentrations of methane

Abandoned or closed mines, from which methane may seep out through vent holes or through fissures or cracks in the ground

Surface mines, from which methane in the coal seams is directly exposed to the atmosphere

Fugitive emissions from post-mining operations, in which coal continues to emit methane as it is stored in piles and transported

The main source of CMM is ventilation emissions; the estimate of magnitude for other sources in the US is given as an example in the figure below.
Methane content varies from case to case, how much gas is in the coal and the surrounding strata and how much of it escapes or can be captured depends on various factors such as the depth, type of coal and permeability and porosity of the rock, extraction method and others.

**Tab. 1-1 Estimates for the methane content in the coal alone [1-4]**

<table>
<thead>
<tr>
<th>Depth Interval (Meters)</th>
<th>Mean methane content (cubic meters per ton of coal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0.02</td>
</tr>
<tr>
<td>500</td>
<td>0.99</td>
</tr>
<tr>
<td>1000</td>
<td>3.73</td>
</tr>
<tr>
<td>1500</td>
<td>4.89</td>
</tr>
<tr>
<td>2000</td>
<td>7.09</td>
</tr>
</tbody>
</table>

Most of the gas in the strata and nearly all the gas in the coal seam is released during mining and processing of the coal, some of the methane is trapped in the micro porosity and it is burned with the coal. Methane is combustible and forms a potentially explosive gas mix with air in concentrations of 5 - 13 vol %. Coal mining is estimated to contribute about 8 % of the total anthropogenic (man-made) emissions of this gas. Global CMM emissions in 2000 were estimated to be 120 MMTCE, out of which the following countries emitted approximately the following percentage:
Basics on country situation

Fig. 1-2 Global CMM emissions (2000) [1-5]

The core business of coal mines is coal production; money from CDM (Clean Development Mechanism) projects is regarded as a minor revenue stream at best. Coal mine methane originally was an unwanted by-product which endangers mine safety and could lead to hazardous explosions, for that reason it usually is vented into the atmosphere unburned. Historically, Methane has been a major problem in coal mining, mine safety and avoiding methane-related accidents was the biggest concern since the start of industrial coal mining. Reducing CH4 is necessary to improve safety.

1.2 Potential for CMM

CMM emissions are closely linked to coal mining. Coal has by far the largest worldwide reserves and resources when compared to other sources of fossil energy.

After the OECD glossary of statistical terms [1-6]

Reserves are natural resources (natural assets (raw materials)) occurring in nature that can be used for economic production or consumption.

Resources are Reserves which are known to exist but where some doubt exists over whether they are technically or economically viable

Reserves are never static, price, other economic and technical factors will change them. For instance a price increase for the material will increase reserves if the cost to extract them remains the same.

Based on the current static consumption Coal reserves outlast natural gas, crude oil and even uranium at least by a factor of ten[1-7].

Reserves of natural fuel [1-8]:

- Hard Coal 120 years
Today coal still contributes about 30% to the worldwide primary energy supply and it will remain a major source of energy for decades to come, even if governments push the development of renewable energy. Therefore, to evaluate the potential for CMM and CMM related projects, coal reserves and resources need to be looked at, and the country’s plans to develop coal.

Source of data: www.eia.doe.gov/oiaf/ieo/world.html

**Fig. 1-3** World Electricity Generation by Fuel Type (%) [1-9]
Compared to other fossil fuels the specific CO2 intensity of coal is highest, even if the methane released during coal mining, processing and post mining degasification is ignored.

Table 1-2: Table CO2 intensity of mayor fossil resources:

<table>
<thead>
<tr>
<th></th>
<th>Carbon Content in kg/MJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>24.5</td>
</tr>
<tr>
<td>Oil</td>
<td>20.3</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Coal combustion emits almost twice as much carbon dioxide per unit of energy as does the combustion of natural gas, whereas the amount from crude oil combustion falls between coal and natural gas, according to Energy Information Administration, [1-10]. Taking this into consideration it is of greatest importance to minimize the methane output into the atmosphere at the source, during the pre mining process as well as the mining and post mining activities. It also becomes necessary to develop and enhance technology and intensify research for the utilisation of methane in low concentrations and in concentrations that are explosive.
1.3 CMM Hazards and Disposal

According to the Global Warming Theory methane has an impact on the greenhouse effect 21 times higher than CO2, meaning it is 21 times more harmful to the global atmosphere. It probably heats up the atmosphere or global temperature 21 times faster than CO2. The factor is called GWP or Global Warming Potential.

There is no scientific consensus on the amount of natural and anthropomorphic methane released into the atmosphere. But, basically, there is a consensus that it is harmful to the atmosphere and should be avoided or minimized whenever possible.

IPCC recently estimates man-made emissions to be in the range of 60 % of the total CH4 emissions worldwide. (According to:) in 1996 the estimate was the following:

<table>
<thead>
<tr>
<th>Source</th>
<th>Methane (million tonnes per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural (oceans, wetlands, soils etc)</td>
<td>110-210</td>
</tr>
<tr>
<td>Anthropogenic:</td>
<td></td>
</tr>
<tr>
<td>Fossil fuel related</td>
<td>70-120</td>
</tr>
<tr>
<td>Biosphere related</td>
<td>200-350</td>
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On a smaller scale, methane is a hazard to coal mining since it can form an explosive gas when mixed with air. Many coal mine accidents are caused by methane gas explosions or coal dust/methane explosions. Methane is lighter than air and will escape into the atmosphere, but it can accumulate in closed cavities (tunnels, other man-made structures).

Known methods of disposal are

- Releasing the gas into the atmosphere
- Feeding it into gas pipelines
- Processing it to LNG
- Burning it without using it as an energy source (flares)
- Burning it and using it a source for energy
1.4 Use of methane from CMM projects

Initially the focus was on getting rid of the gas and not using it, efforts were only made during the working lifetime of the mine and only if they could not be avoided; methane emissions from abandoned mines were largely ignored. The potential energy source was left untapped, and the impact of methane on the atmosphere and global warming were either unknown or not taken seriously. Today we know that continued release and escape of the powerful greenhouse gas methane, which has a global warming potential (GWP) factor of 21-23 compared to carbon dioxide, accelerates global warming.

Possibilities of utilisation are by now probably known but for most mine operators they still do not constitute a priority.

The driving force for CMM will in most cases still be safety, then energy production, but increasingly the potential for reducing atmospheric emissions will also come into the picture. Apart from Carbon credits, fuel (LNG or gas), heat and/or electricity can be produced.

CMM can be used to produce energy, directly by burning it to heat boilers or driving gas motors and turbines. This need for heating might however be seasonal, reducing the benefit.

As a rule High-quality gas with methane content of 90 % and above can be fed into natural gas pipelines or processed to Liquid Natural Gas (LNG) as vehicle fuel. Medium-quality Gas with a methane concentration of 50-80 % methane can be used for power generation, combined heat and power generation plants (CHP), coal drying, boiler fuel, various industrial applications, heating and cooling and fuel cells. If the concentration is 30-50 %, it can still be utilized in CHP (Combined Heat and Power Plants).

Low-Quality gas with a methane content of less than 30 % may be used for combustion, boilers and Lean Burn Turbines.

As shown in the figure below the quality of CMM varies depending on the source.
Fig. 1-5 Quality of CMM by sources

The possibilities of earning extra revenues from emission reduction projects are also known to some mines, but only in a very few cases they know how to handle this complicated process properly, because it is far outside their core business.

There are some project developers, who are specialised in coal mine methane projects and their aim is to convince the mining companies that an emission reduction project could also be an attractive alternative or additional revenue for their coal mines. The potential benefits are not only creating additional income; enhanced methods of coal mine methane utilisation will also have the described strong impact on mine safety and in many cases could help to increase coal production. In gassy mines, coal mine methane volume frequently creates a bottleneck in coal production, since the volume of gas emitted grows with the amount of coal produced and the amount of air circulating the shafts and tunnels is limited.
1.5 Kyoto Protocol

Status of implementation and impact of the Kyoto protocol will be investigated for each country later, at this point the mechanism is explained.

The Kyoto Protocol has the target to reduce the output of gases, which are identified as a main source of the global warming effect. Besides CO\textsubscript{2} other gases are identified and their global warming effect was defined in relation to CO\textsubscript{2} measured in a factor called GWP (Global Warming Potential).

The idea of the Kyoto Protocol is to achieve these reductions on a market based approach by giving GHG (Greenhouse Gas) reduction a market value like any other commodity. To reduce GHG investments are necessary, which could be financed by the value of the reduction. This market orientated approach should lead the capital investment to these reduction options that achieve the highest reduction with a given amount of money.

Based on this the Kyoto Protocol the mechanisms are composed of three main components:

The Kyoto Protocol created new and flexible mechanisms known as the Clean Development Mechanism (CDM) and Joint Implementation (JI), which allow industrialised (Annex 1) countries to finance emission reduction projects in developing countries (CDM projects) or other Annex 1 countries (JI), in exchange for carbon credits called Certified Emission Reductions (CERs) or Emission Reduction Units (ERUs). These credits can help project participants to meet their GHG reduction targets. For coal mine methane project developers, these credits represent a means of acquiring additional revenue. Methane emissions reductions created by CMM projects can be sold as Carbon credits.

Emissions Trading of fixed quotas of so called AAUs (Assigned Amount Units). All Annex 1 countries that have ratified the Kyoto protocol are obliged to reduce their GHG output to an individually defined amount, commonly based on their GHG output in 1990. This defines an absolute cap of the emission output of every country. Countries which are below their limit could sell their surplus to countries which are above their limits. These types of credits formerly could only be used by governments.

Countries not listed in Annex 1 - mainly developing countries - have no cap in GHG output and therefore did not contribute in any AAUs issued by the UNFCCC.

CDM is a project based approach for the countries not listed in annex 1, this is strictly controlled by the UNFCCC. This mechanism is designed to implement GHG reduction projects in developing countries, which have no cap obligation according to the Kyoto protocol. The resulting emission reduction credits are called CERs (Certified Emission Reduction) and will be issued only by the UNFCCC.
JI (Joint Implementation) is also a project based mechanism, similar to CDM but specially designed for Annex 1 countries. In general the same project types are eligible as in the CDM process. There is a Track 1 procedure, which allows bilateral agreements between the investor and the host country to approve projects and to issue the resulting emission reduction credits called ERUs (Emission Reduction Units), as well as a Track 2 procedure with a very similar process as the CDM process which is administrated by the UNFCCC.

All main coal producing countries which will be reviewed in this report belong to the group of Annex 1 countries and therefore the possible projects will have to be included in the JI project mechanism.

The scope of this work is to build a good basis for the evaluation of the feasibility of CMM projects in the countries listed: PL, CZ, RU, UA, RO, and KZ, UK. The countries were chosen because of their huge coal reserves and potential for CMM projects. The main goal of WP1 is to analyse and compare the current situation in these countries regarding relevant factors to the use of CMM such as the economical situation, licensing requirements helping to accelerate or constrain development or whether the existing energy and mine law is favourable, reliable or handicapping such a project. Typically the conditions vary between different countries and are crucial for the identification of universal statements. Therefore this WP establishes the fundament for the development of the universal guidelines in WP8.

The objective of the specific country reports is to describe all major factors that could have an impact on implementing a coal mine methane reduction project. To achieve this, specific country information independent from technical project feasibility has to be delivered. The accumulated information and the current conditions will be summarized in a country scoring table to compare the individual country conditions.

Strength and weaknesses, opportunities and threats will be analyzed.

1.6 Economic aspects for JI/CDM

To implement a JI project a wide range of parameters have to be checked and compared which are far beyond the technical feasibility and economical viability of a project.

JI projects are normally financed or at least co-financed by different groups of investors and their core business is commonly not identical with the typical project type of a certain JI project activity.

This is typically so in coal mine methane projects. The investors in the early state of the JI process were governments issuing public tenders to purchase credits with the aim of covering parts of their Kyoto obligations. International institutions who purchased credits on behalf of governments or other investors and specialized investment funds or private entities acquired credits to cover their own obligations under the EU-ETS (European Emissions Trading Scheme).
To judge the probability of success for CMM projects it will be helpful to look at the following aspects, which are detailed described in the country reports:

Finance
Implementation status of Kyoto Protocol
Energy politics (preferences for sources of primary energy) and energy laws
Mining and mine safety laws
Energy law
Environmental law
Additional requirements

Compared to other types of JI-projects coal mine methane projects are technically very complex and always interfere with the actual and planned production scheme of the mines. Especially project types which need a high methane concentration are carrying inherent
volume risks regarding the quantity of delivered gas in the required minimum methane concentration.

Financial institutions specialized in financing emission reduction projects know that this type of project carries a lot of risks, often without the possibility to quantify them in advance. Therefore they are discounting the future value and possible number of credits in a very conservative manner. The result is a low incentive to invest in these project types or in a relatively high share of the future added value calculation.

In addition to the technical risks investors have a very close look at the general situation in a specific country regarding political stability, country ratings and economical outlook, particularly in the current world economic situation.

Other benefits include safety, employment and the overall rating of a company: a coal mine active in reducing environmental hazards and contributing to the worldwide effort to reduce Global warming has a better image. This is a soft fact which becomes increasingly more important for investors.

The most important parties who have a stake in CMM projects are
- Mining companies
- Investors
- Mining authorities
- Gas producers
- Power suppliers
- Banks and financial institutions
- External project partners
- The local government
- UNFCCC
- Independent Operational Entities (for project validation and verification)

1.7 Country Reports

Investors require a stable economy for the long-term planning of projects. Political stability, financial country rating and outlook as well as exchange rate fluctuations/inflation are crucial factors, as are the state of the local banking system and the availability of credit to finance the projects.
1.7.1 Finance

1.7.1.1 Financial Country Rating and outlook

According to Moody, Standard and Poor or Fitch in Moody type classification a rating is shown by using alphabetic big letters like: AAA to D. Per definition an individual company cannot have a higher rating than the government in the specific country. As every planned project has a lead time of at least one or two years and it will remain several years after the project implementation to reach a payback, the future outlook is also very important.

Financial country rating according to Standard and Poor’s and Moody’s is, despite the limited value of this information during the current crisis, still a standard factor considered by potential investors and will be listed. Political stability and reliability of decisions, however, cannot be judged in the scope of our country reports.

1.7.1.2 Local currency situation

Fluctuation in exchange rates between local currencies and euro/dollar rates could have an enormous impact on project viability. While revenues of carbon credits usually will be paid in Euro or US-dollars other products like heat, power or fuel will be paid in local currencies. Investment items ordered abroad often have to be paid on euro or US-dollar basis. Project loan financing often also has to be made in foreign currencies. A devaluation of local currency against dept currency could have strong negative impact on planned project economic viability. Future currency movements are difficult to predict, but to show the possible impact historical exchange rate charts between local currency and euro/US-dollar over the past three year should be added and possible future scenario’s will be discussed.

Historical exchange rate fluctuations also will only give a limited amount of information and indications about future development. At best, volatility may be judged. Some currencies and local interest rates are influenced more by economic changes than others.

The exchange rate of some of the currencies versus the Euro in some of the countries characterized has been fluctuating widely and at different levels. This can easily be seen in Chart 1 (US Dollar for reference only)
In the countries tax rates and credit terms are part of the profitability calculation. Other questions will arise: can the profit be transferred outside the country and what terms and conditions apply? A thorough and complete evaluation of all financial aspects might be too complex for the country reports, but the most important will be evaluated. These are:

- Taxes
- Exchange rates
- Credit cost and availability
- Subsidies
- Prices
- Inflation

### 1.7.1.3 Ability to raise project financing for the specific country

Equity financing or high percentage of equity financing will always be first choice. So the involved companies have to check their financial resources and the fitting of the specific project to their overall future strategic planning. Is the partner able to raise domestic or foreign project financing to conditions which let the project be still economically viable, even if the project
is delayed and produces less than expected? Project partners should be aware that financial grants, subsidies or other parts of governmental/ internal institution finance add could hurt the “Additionalty” of the project.

1.7.1.4 Price situation and outlook for competing products

As mentioned above CMM projects can deliver four products:
Carbon credits
Process heat
Power
Fuel (compressed gas /LNG)

The market prices for the above products were highly volatile in the past and it is likely that they will also be highly volatile in the future. The price for carbon credits, for instance, ranged between less than 10 euros/unit to more than 25 euros/unit in less than 12 months.

The price of crude oil, a leading benchmark for all primary energy sources, fluctuated between 40 and 150 US-Dollar per barrel on world markets within a year. In some countries the prices for primary energy fuels are still regulated and below world market prices. Different taxes may be implied on different sources of primary energy or subsidies might be given to some sources like renewable energies or power/fuels based on CMM.

An estimate of own production cost prices for process heat, based on utilisation of coal and expected production cost of power and fuel (compressed gas/LNG) should be made by using a straight depreciation of 10 years.

1.7.1.5 Tax situation

The local tax situation has to be explained, especially percentage of corporate profit tax, percentage of VAT, and can VAT be recovered by law and in reality, other taxes and customs duties, particularly tax exemptions applicable to CMM projects.

1.7.2 Implementation status of Kyoto Protocol

Although all countries have signed and ratified the Kyoto Protocol, the implementation speed has not been the same everywhere. Priorities vary from country to country and the allocation of resources naturally varies as well. A good indicator will be a count of how many CMM projects have actually been realized successfully.

However, more important, than these official dates is the fact how Joint Implementation projects are actually handled by the local governments.

How many JI – projects got a final approval in the specific country
Which project types got an approval

Are there CMM related projects, which got a letter of approval (LoA)

Which types of CMM projects got a LoA

Are there special types of CMM projects being excluded by local governments

Did some types of CMM projects get a letter of endorsement (LoE)

Are there other reasons that the country is (temporary) excluded from UNFCCC procedures like failure to pay fees etc. If, when the problems are expected to be solved

Are there other regulations in place or in the pipeline that could hinder a JI-approval especially regarding “Additionaly” like guarantied tariffs for power supply, mandatory methane destruction or penalties, taxes to release CMM into the atmosphere?

### 1.7.3 Energy politics (preferences for sources of primary energy) and energy laws

Overview about countries primary energy mix, actual situation and outlook

Are there general preference for future primary energy sources

Will the portion of hard coal be stable or is it planned to reduce this energy source

What is actual amount of renewable energy and the target for the future

Is the power/ fuel production from CMM handled similar to renewable energy

Is the access to the public grid regulated

What are the conditions to get access to the grid

How power production for own consumption is regulated

As already mentioned above, methane can be a valuable source for energy generation. But when used for this purpose it will have to compete with other energy sources. If energy is widely available and cheap, the margin and the probability of success decrease. The volume of coal mined determines the volume of CMM produced, CMM can be independent of mining but in many cases it will not, hence the long-term energy politics have a major impact on CMM projects.

### 1.7.4 Mining and mine safety laws

The local mining and safety laws will have to be observed to evaluate the feasibility of each project.

Capturing and extracting methane can be made difficult or supported depending on legislation, concessions and royalties will have a strong influence on cost and profitability. Licensing is required in all cases and can be costly, time-consuming or relatively easy to obtain. If the local
mining law, for instance, does not permit the use of methane in low concentrations for energy and power generation, some options simply disappear.

Who is the owner of the CMM, in most cases it is the mining company holding the licence to dig the coal, but for abundant mines or abundant part of mines it could be different?

Mine safety laws and regulations: Describe the regulation, which are important for any kind of CMM Utilisation

What are the safety regulations for CMM-Utilisation for methane concentrations close or in the explosive range? Are there prohibited concentration ranges for utilisation? If so, are there possibilities to avoid these restrictions by installing especial additional safety measurements and equipments?

1.7.4.1 Environmental laws

This subject is closely related with the implementation of the Kyoto Protocol. Which type of project gets support varies widely. Some countries favour wind, others water or solar energy projects. In theory the environmental laws in all countries should also be promoting CMM projects as well as all other environmentally advantageous projects, but these projects continuously compete with each other for feasibility, financing and other resources.

Which environmental laws and regulations has to be considered regarding any kind of CMM-Utilisation

For which kind of CMM-Utilisation project an environmental impact assessment is needed

Which authorities other than mine authorities are involved for a CMM project

What is the expected time to get all approvals

Are there any special regulation to protect groundwater, soil and air for CMM activities

Requirements to transport and distribute fuels (compressed gas/LNG)

1.7.4.2 Energy Laws

Actual laws and regulation for energy production, especially connection to public grid

Tariffs for power from CMM

Tax deduction for fuels produced from CMM

1.7.4.3 Additional requirements

These include infrastructure, particularly the availability and price of transport, pipelines, power lines, roads and trained staff.
1.7.5  Ranking

For later comparison of individual country conditions and a quick overview a scoring matrix will be developed for each CMM project type: Destruction, heat-, power- and fuel production.

The scores will range from zero to three points, where zero in certain categories, will be a no go breaking point, until conditions has changed. One point is meaning fair condition, two points good conditions and 3 points excellent conditions.

1.7.6  Conclusion

The result will be a guideline how to approach these high potential reduction possibilities and to illustrate factors that still need to be improved before specific projects can be implemented.

1.8 References


[1-2]  EPA/climate change/cmop/sources of CMM http://epa.gov/coalbed/basic.html 14.08.09


[1-7]  www.bp.com

[1-8]  IAEA Top Stories: Global Uranium Resources to Meet Projected Demand)


2 Poland

2.1 Economic Situation

The major fact about Poland are given in the table below.

Tab. 2-1 Characteristics of Poland [2-1]

<table>
<thead>
<tr>
<th>Full name:</th>
<th>Republic of Poland</th>
</tr>
</thead>
<tbody>
<tr>
<td>population</td>
<td>38 million (UN 2008)</td>
</tr>
<tr>
<td>Capital city</td>
<td>Warsaw</td>
</tr>
<tr>
<td>area</td>
<td>312,685 sq km</td>
</tr>
<tr>
<td>Monetary unit:</td>
<td>1 zloty = 100 groszy</td>
</tr>
<tr>
<td>Main exports</td>
<td>Machinery and transport equipment, foodstuffs, chemicals</td>
</tr>
<tr>
<td>GNI per capita</td>
<td>US $9,840 (World Bank, 2007)</td>
</tr>
<tr>
<td>GDP (billion 2000 US$)</td>
<td>211.60</td>
</tr>
<tr>
<td>Energy Production (Mtoe)</td>
<td>77.88</td>
</tr>
<tr>
<td>Net Imports (Mtoe)</td>
<td>19.63</td>
</tr>
<tr>
<td>TPES (Mtoe)</td>
<td>97.72</td>
</tr>
<tr>
<td>Electricity Consumption* (TWh)</td>
<td>136.74</td>
</tr>
<tr>
<td>CO₂ Emissions **(Mt of CO₂)</td>
<td>305.96</td>
</tr>
</tbody>
</table>

Poland has pursued a policy of economic liberalization since 1990 and today stands out as a success story among transition economies. In 2008, GDP grew an estimated 4.8%, based on rising private consumption, a jump in corporate investment, and EU funds inflows. GDP per capita is still much below the EU average, but is similar to that of the three Baltic states. Since 2004, EU membership and access to EU structural funds have provided a major boost to the economy. Unemployment is falling rapidly, though at roughly 9.7% in 2008, it remains above the EU average. In 2008 inflation reached 4.3%, more than the upper limit of the National Bank of Poland's target range, but has been falling due to global economic slowdown. Poland's economic performance could improve further if the country addresses some of the remaining deficiencies in its business environment. An inefficient commercial court system, a rigid labor code, bureaucratic red tape, and persistent low-level corruption keep the private
sector from performing up to its full potential. Rising demands to fund health care, education, and the state pension system present a challenge to the Polish Government’s effort to hold the consolidated public sector budget deficit under 3.0% of GDP, a target which was achieved in 2007-08. The PO/PSL coalition government which came to power in November 2007 plans to further reduce the budget deficit with the aim of eventually adopting the euro by 2012. The new government has also announced its intention to enact business-friendly reforms, reduce public sector spending growth, lower taxes, and accelerate privatization. The government, however, has moved slowly on major reforms. Pension and health-care bills passed through the legislature, but the legislature failed to overturn a presidential veto. [2-2] [2-3]

Since the beginning of the year an economic slowdown was visible, but the impact of the crisis was less severe in Poland than in other east European and EU countries, and in the second quarter the drop already became less severe than in the first three month period. Actually Construction and assembly production in the first two quarters reached a slightly higher level than in the previous year. During the first half year 2009 sold industry production was 8.3% lower than the year before.

The drop in production caused a 4.6% lower employment, the biggest loss in jobs was in in manufacturing. Unemployment was influenced by a drop occurring in manufacturing (by 5.8%), in energy supplies only (by 0.3%). In most remaining sections, an increase in employment was recorded. In June of this year, the rate of unemployment reached the level of 10.7%, it was still higher than a year before.

The country has estimated hard coal reserves of 51 to 65 billion tonnes, with 12–14 billion tonnes considered as proven. Additionally, reserves of Lignite or brown coal are estimated at between 37 and 45 billion tonnes, 13–14 billion tones being considered as proven.

Poland is the EU's largest coal producer (69 Mtoe) and the world's 7th largest. It is followed by Germany (53 Mtoe), the Czech Republic (23.5 Mtoe) and the UK (12.5 Mtoe) [2-4]

In several important areas, the situation was better or stopped deteriorating in the second quarter and in July compared with the first quarter of 2009. As a result, the year-on-year growth rate was higher in the second quarter than in the first one. According to Central Statistical Office (GUS) statistics, in the second quarter Poland was the only EU country with a positive GDP growth rate year on year.

In the first half-year a drop was recorded in sales in the industrial, retail and transport sectors but in the second quarter the scale of the decrease was smaller than in the first three months of the year. In July growth in retail sales was positive. In the first half-year construction output was at a slightly higher level than a year before, despite a drop in the first quarter. Data for July confirmed the acceleration of construction and assembly output growth; According to initial estimates, harvests of the main agricultural products will be slightly higher than last year;
CPI inflation was slightly higher in July than in June; in June the year-on-year drop in imports was again sharper than a drop in exports. As a result, Poland recorded a surplus on its current account just like in previous months. This helped Poland to a large extent to avoid a drop in GDP in the second quarter of 2009. With consumer prices and services on the increase and slowing nominal wages, the purchasing power of average gross monthly wages in the corporate sector was growing at a slower pace than in January-July last year;

In the first half year and in July average employment in the corporate sector was lower than a year before; the decrease in successive months was increasingly large. From April to June there was a slight seasonal improvement in unemployment but in July the unemployment rate started to grow again. As economic growth was slowing, public revenue was down and the general government deficit was on the rise. Work on the 2010 budget bill is aimed to stabilise the economy in the short and medium term. Anti-crisis measures and programmes pursued by the government and other institutions should also have a similar effect.

NBP: The acceleration of retail sales and a rise in most outlook indices signal an improvement in economic conditions.

The recent data, including data on GDP in the second quarter of 2009, indicate that the pace of recession has slowed in the United States and most European Union countries. At the same time, most outlook indices improved again and GDP growth forecasts for the United States and the euro zone for 2010 were slightly revised upwards. But global economic activity is still at a low level and it is difficult now to assess whether the slowdown in the pace of recession will last, especially considering the continued problems of the financial sector. Recently, economic activity has been at a low level in Poland, as indicated by the continued fall in industrial production. At the same time, a slight acceleration in retail sales and a rise in most outlook indices signal an improvement in the economic situation in the next months. Reduced lending activity, especially in the corporate sector, still has an adverse effect on economic growth. [2-5]

Central Statistical Office (GUS): The effects of the global economic crisis are less painful in Poland than in most EU countries.

In July, growth in some sectors of the economy was faster than in previous months. Construction and assembly output increased more than before, retail sales accelerated, and a drop in transport services was slightly lower. The scale of decrease in industrial sales was similar to that recorded in June. In July the situation on the labour market was still worse than a year before but compared to the previous month the drop in employment in the corporate sector and the rise in registered unemployment rate were slight. With the year-on-year increase in average gross monthly wages being higher in nominal terms than in June and growth in prices of consumer goods and services remaining unchanged, the purchasing power of average gross wages increased slightly compared to July last year. In August business
sentiment was better than a month before. The effects of the global economic crisis were less painful in Poland than in most EU countries. [2-6]

In the second quarter Poland’s non-seasonally adjusted GDP was by 1.1% higher than in the second quarter of 2008.

GDP rose by 1.1% year on year in the second quarter and by 1.0% in the first half year. Net exports and consumption were the main factors behind GDP growth. In the second quarter gross fixed capital formation dropped year on year for the first time since 2003. The investment rate fell from 20.4% a year before to 19.3%. [2-6]

### 2.1.1 Financial Country Rating

The Polish economy is expected to shrink by 1.4% this year (2009), but GDP is forecast to grow by 0.8% in 2010, according to Moody’s Rating Agency. Moody’s rates Poland A2 and stable, Standard and Poors A/stable/A-1

#### 2.1.2 Local currency situation

The Polish Zloty has been a going strong till mid-2008 when it took a deep dive with the beginning of the global financial crisis. Since the first quarter 2009 a recovery of the value versus the Euro is clearly on the way and the currency is stabilizing.

![Fig. 2-1 Exchange rate of PLN versus Euro](2-7)
2.2 Ability to raise project financing for Poland

2.2.1 European funds

Accession to the EU made many resources available for business in Poland. It made it possible for companies to obtain support in order to realize projects on different levels – small projects in regional programmes and bigger projects in nationwide programmes.

**Regional Operation Programmes** for each voivodship are the main tools of regional authorities’ policies in 2007-2013. These programmes support dynamic development along with social and economic integration. Each voivodship has such a programme, where goals to be achieved are divided into several priorities and individual tasks. For example in Silesia’s programme, there are 10 priorities, with health, education, science, transport, environment, tourism and economy development among others. Depending on the planned project, an entity (a company, NGO or scientific entity) may apply for support. This programme is specifically designed for small scale projects and it promotes small and medium enterprises [SMEs]. Applicants must submit detailed description of their project, both from technical and financial perspective, legal documents confirming their business activities, etc. A company wanting to realize energy-related projects could apply in this programme in several tasks and priorities, e.g. promotion of micro, small and medium entrepreneurship, or promotion of innovativeness. The programme allows for 50 or 60% support which additionally cannot exceed 750 000 PLN. These two tasks rather promote development of SMEs and innovativeness in general, without any focus on energy industry.

**Innovative Economy Programme** makes available around 9,7 billion EUR of EU support. This programme allows for support of bigger, nationwide projects related to research and new technologies, diffusion of innovation. Projects may be realized by enterprises within the following priorities:

- Priority 1 that covers research and development of new technologies and Priority 4 that allows for implementation of results obtained during research and development. These priorities require cooperation of business and science sectors, thus a company has to cooperate with a scientific entity. Here the upper support limits depend of the company’s legal status (SME or not) and type of works to be supported (industrial or development) and voivodship, and are between 30% to 70% of the project costs. Within particular tasks, specific minimum and maximum budget limits are determined.

- task 4.3 – Technological Credit managed by BGK Bank. It is a form of support for SMEs which implement innovative technologies. It is granted in the form of technological bonus for paying back a portion of capital of taken technological loan from a commercial bank. The company must ensure 25% of qualified investment costs. The amount of support depends on the voivodship and for example for Silesia it is 50% for medium and 60% for small enterprises.
task 4.4 covers new investments with high innovation potential. This priority may be used for
projects that use innovative technology being used around the world not longer than 3 years
or being distributed around the world in a given branch up to 15%. What is important, projects
that have a positive environmental effect are promoted here. Support may reach from 30% to
70% depending on the voivodship, but the whole project costs may not exceed 50 MM EUR
and qualified costs must be between 8 MM PLN and 160 MM PLN. Additionally minimum
support is 2,4 MM PLN, and maximum support for one company for investment— 40 MM PLN,
advisory services – 1 MM PLN.

- Priority 5 – Diffusion of innovation - supports cooperation that facilitates knowledge and
innovation transfer.

**Infrastructure and Environment** is another programme which aims at making Poland more
attractive to potential investors. It supports energy, transport, environment projects among
others, however this program is tailored to bigger projects with total budget exceeding 5 MM
PLN. There are three priorities dedicated to business – P IV – Projects that include adaptation
of company to environmental requirements, P IX – Environment-friendly energy infrastructure
and efficiency, P X – Energy safety and energy sources diversification.

Priority IV - adaptation of company to environmental requirements - allows for realization of
projects which result in reduction of the amount of pollution introduced into the environment,
including gas introduced to the air, waste introduced to waters, reduction of the amount of
produced waste and increase the amount of recycled waste, or reduction the noise levels.
SMEs’ projects are promoted. The support may reach 30% or 50%, but may not exceed 20
MM PLN for a company. The priority is further divided into several tasks, specifically designed
for various types of projects.

Priority IX - Environment-friendly energy infrastructure and efficiency - makes it possible to
obtain support for activities which increase the efficiency of energy production and/or
decrease losses during the process of energy transmission and distribution. Preferred projects
that lower energy-consumption of public sector and increase the level of energy production
from renewable sources, including biofuels. There are 6 specific tasks within this priority (e.g.
energy production in CHP systems or on the basis of renewable sources), depending on the
technology or source used. The amount of support and minimum or maximum costs
thresholds differ depending on the type of task.

Priority X – Energy safety and energy sources diversification – allows for support to projects
that include development of electricity, natural gas and crude oil transmission and distribution
systems and construction and development of underground natural gas depositories, projects
which consist in development of natural gas distribution within non-gasified areas and
production of devices used in fuels and energy production on the basis of renewable sources.
There are 3 specific tasks within this priority and the amount of support and minimum or
maximum costs limits differ depending on the character of task.
2.2.2 Other sources

2.2.2.1 American e.g. EPA, OPIC loan

There are certain funding programmes which support projects developed in Poland. One of them is Methane-to-Markets Partnership launched by Environmental Protection Agency in the USA. It is an international initiative that advances cost-effective, near-term methane recovery and use as a clean energy source. The goal of the Partnership is to reduce global methane emissions in order to enhance economic growth, strengthen energy security, improve air quality, improve industrial safety, and reduce emissions of greenhouse gases. The partnership is working to reduce methane emissions in four key sectors: agriculture (animal waste management), coal mines, landfills, and oil and gas systems. Partner Governments from 29 countries and private and non-government participants work collaboratively to implement projects around the globe. Public and private sector organizations around the world are now working together with government agencies to facilitate methane reduction projects in agriculture, coal mines, landfills and oil and gas systems. This collaboration is yielding important benefits, including enhanced economic growth and energy security, improved air quality and industrial safety, and reduced greenhouse gas (GHG) emissions.

EPA’s Methane to Markets Partnership issues requests for proposals to fund projects and activities that advance methane recovery and use as a clean energy source. Proposals are accepted from States, local governments, territories, Indian Tribes, and possessions of the U.S., including the District of Columbia, foreign governments, international organizations, public and private universities and colleges, hospitals, laboratories, other public or private non-profit institutions. Enterprises may not be beneficiaries; however they may act as project partners to NGOs. Eligible projects focus on technology transfer and/or deployment of technology, technical reports, feasibility and pre-feasibility studies, databases of methane emissions or potential sites for projects, information clearinghouse, training and/or capacity building, study tours, conferences, project expositions, workshops, improved methane emissions estimates, country-wide methane reduction programs.

http://www.methanetomarkets.org/

Another American mechanism which supports investments in developing countries (e.g. in Poland) is a preferential loan given by Overseas Private Investment Corporation [OPIC]. OPIC is a U.S. governmental agency which fosters economic development in new and emerging markets, complements the private sector in managing risks associated with foreign direct investment, and supports U.S. foreign policy. OPIC supports, insures and finances investment projects with substantial U.S. participation that are financially sound, promise significant benefits to the social and economic development of the host country, and foster private initiative and competition. OPIC programs are available in more than 150 countries (including Poland). All projects or transactions considered for OPIC financing must be commercially and financially sound. They must be within the demonstrated competence of the proposed management, which must have a proven record of success in the same, or a closely-related business, as well as a significant continuing financial risk in the enterprise. OPIC provides loan guaranties, which are typically used for larger projects, and direct loans, which are reserved for projects sponsored by or significantly involving U.S. small businesses and cooperatives. OPIC can normally guarantee or lend from $100,000 up to $250 million per project, although projects in the oil and gas sector with offshore, hard-currency revenues may
be approved for up to $400 million under certain conditions. In general, OPIC looks to fund projects with the following characteristics:

Cash flow positive: Sponsors must be able to demonstrate that the project is profitable and that all principal and interest payments will be covered by EBITDA throughout the life of the loan.

Positive developmental effects: The project should have positive effects for the local economy and infrastructure. The sponsors should also be able to demonstrate that the project will not have detrimental effects to the environment.

Positive effects to the US economy: The project company must be at least 25% owned by United States citizens or corporations. Additionally, the project should not replace any goods or services created in the United States, i.e., it should not increase imports to or decrease exports from the United States.

### 2.2.2.2 Swiss – Polish Cooperation Programme

The aim of Swiss-Polish Cooperation Programme is to reduce economic and social disparities within the enlarged European Union. Switzerland has made available CHF 1 billion for the countries that joined the European Union on 1 May 2004. The contribution to Poland amounts to CHF 489,02 million (approx. 310 million EUR).

Grant rate may not exceed:

- 60% of the total eligible costs of the project/programme;
- 85% of the total eligible costs in the case of projects/programme receiving additional financing in the form of budget allocations from national, regional or local authorities;
- 90% of the total eligible costs in the case of projects implemented by non-governmental organizations
- 100% of the total eligible costs for institution-building and technical assistance Projects,

The Swiss-Polish Cooperation Programme pursues two objectives:

To contribute to the reduction of economic and social disparities between the Republic of Poland and the more advanced countries of the enlarged EU;

To contribute within the Republic of Poland to the reduction of economic and social disparities between the dynamic urban centres and the structurally weak peripheral regions.

Thematic focus related to energy and environmental sector of the programme are among others e.g.:

a) Environment and Infrastructure - Restoration and modernization of basic environment infrastructure and improvement of the environment condition:

Objective 1: To enhance municipal infrastructure services in order to increase living standards and promote economic development (projects of minimum value of 15 Mio Swiss francs);
1) Creating networks for collection of hazardous waste (including hospital waste) and constructing, renovating and/or modernizing installations for their thermal neutralization (with devices for cleaning fumes) or for physicochemical neutralization (pressure automatic machines, steam disinfection, chemical disinfection).

2) Disassembly of products containing asbestos and depositing them on stockpiles, which are created for this purpose or separation of locations, adjusted to asbestos deposition, on already existing stockpiles.

Objective 2: To increase energy efficiency and to reduce emissions, in particular greenhouse gases and hazardous substances (projects of minimum value of 10 Mio Swiss francs);

1. Improvement of energy efficiency by introducing renewable energy systems (including inter alia pilot projects with demonstration effect), e.g. it is possible to implement the following activities:

   - The installation of solar collectors of over 100 m² or the construction of photovoltaic systems for public utility buildings and residential buildings
   - The construction of a wind power plant of up to 2MW;
   - The construction of a small hydropower plant with power ranging from 50kW to 5MW on the existing water fall (in the areas not covered by migratory fish restitution programmes) with safe fish ladders and automation systems limiting the draw of water by turbines in the case of low water levels in the river;
   - The creation of geothermal energy use systems;
   - The construction of a biomass boiler house with power ranging from 1 MW to 10 MW, using local fuel resources;
   - The production and obtaining of biogas for energetic purposes.

2. Rehabilitation, renovation and/or modernization of municipal heating systems in city areas (densely developed with apartment blocks) heated by small local boiler houses and stoves in which the permissible and target air pollution levels are exceeded, e.g. it is possible to implement the following activities:

   - Analysis of energy demand scenarios;
   - Rehabilitation, renovation and/or modernization of central heating sources and networks of municipal heating systems;
   - Rehabilitation / renovation/modernization or replacement of heat exchange devices;

3. Rehabilitation / renovation and/or modernization of energy sources and heating installations in public healthcare units, which provide hospitalization services and public schools e.g. it is possible to implement the following activities:

   - Replacement of coal - powered boilers with preference given to combined heat and power systems;
   - Renovation and/or modernization of heating installations.
Objective 3: To improve the management, the safety, the efficiency and the reliability of communal/regional public transportation systems (projects of minimum value of 3 Mio Swiss francs (non-investment projects) and minimum value of 10 Mio Swiss francs (projects including investment elements)).

Preparation of documentation (such as e.g.: feasibility studies, environmental impact assessments, transport concepts, master plans) for projects combining at least one branch of transport and/or connections between different branches of transport;

Projects in the field of traffic management systems (steering systems) for railway and roads and monitoring systems (including electronic system of toll collection) – eligible only as study projects (soft measures such as documentation) or study projects with small investment components;

Construction, renovation and/or modernization of railway infrastructure, including particularly projects ensuring efficient railway connections between city centres and airports – study projects, study projects with investment components, investment projects.

The purchase of rolling stock.

b) Biodiversity, protection of ecosystems and support of cross-border environmental initiatives.

Objective: To protect nature and the functioning of eco-systems in a sustainable manner in the geographic focus areas.

Minimum value of co-financing the project - 1 MM Swiss francs

### 2.2.2.3 Norwegian Financial Mechanism

Until 2008 Polish business entities could apply for support from Norwegian Financial Mechanism and European Economic Area Financial Mechanism in Poland. [2-8]

### 2.2.2.4 Research and development support

There are some funds available in various support programs aiming at knowledge and technology transfer, science and business cooperation. These funds support research and development projects. Examples of such funds are iniTECH – a programme initiated by the Ministry of Science and Higher Education, or Marie Curie Industry-Academia Partnership and Pathways Programme within 7th Framework Programme which includes inter-sectoral secondment of personnel.

### 2.2.3 Governmental incentive mechanism-Energy Origin Certificates

Projects which include energy production from renewable sources or in CHP systems are promoted in Poland and thus may generate additional income coming from Energy Origin Certificates. Polish Energy Law of 10 April 1997 and two Decrees of the Minister of Economy: of 14th August 2008 referring to Energy Origin Certificates for power produced from renewable sources (OZE) and of 26th September 2007 referring to Energy Origin Certificates
for power produced in CHP systems specifies this issue. It is important to note, that Certificates may be obtained by producers who hold concession for power production. According to Art.9l of Energy Law there are three types of Energy Origin Certificates:

Energy Origin Certificates for power produced from renewable sources (so called Green Certificates)

Energy Origin Certificates for power produced in CHP systems fuelled with fossil fuels (so called Red Certificates)

Energy Origin Certificates for power produced in CHP systems fuelled with gassy fuel* (so called Yellow Certificates)

*Gassy fuel according to Energy Law, Art 3 a, is “natural gas rich in methane or nitrogenised, including liquefied natural gas and propan-butane or other types of flammable gas, supplied via gas network, independently from its appropriation.” Methane does not belong to gassy fuels, but is qualified to fossil fuels, thus power produced in CHP systems fuelled with CMM may generate Red Certificates.

These Certificates are issued by the President of the Energy Regulatory Office [URE] on power producer’s demand and after submitting proper application. Application must be submitted to the Power System Operator where the producer’s power plant is connected. Power System Operator verifies if the amount of produced power stated in the application is correct and later transfers the application to URE within 14 days of submitting. The President of URE issues Energy Origin Certificates within 14 days of receipt and informs the Polish Power Exchange about this fact. Polish Power Exchange issues the Property Rights to these Certificates on the basis of information received from URE and allocates them into the producer’s account in proper Energy Origin Certificates Registers. One Property Right equals 1 kWh of produced energy. There are 3 Registers, one for each Certificate type. Certificates are either amortized (A) or traded (B).

A. Amortization

Particular power producers are legally obliged to submit certain amounts of Energy Origin Certificates. This obligation refers to those power producers who sell power to final customers connected to polish national grid (Art. 9a item 1 of Energy Law). This obligation is met if the producer proves – by submitting Energy Origin Certificates – that the total amount of power produced in previous year exceeds the following thresholds relating to the type of source:

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<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green Certificates (energy from renewable sources)</td>
<td>7%</td>
<td>8,7%</td>
<td>10,4%</td>
<td>10,4%</td>
<td>10,4%</td>
<td>11,9%</td>
<td>11,4%</td>
<td>11,9%</td>
<td>12,4%</td>
<td>12,9%</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
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<td>-------</td>
</tr>
<tr>
<td>Red Certificates (energy produced in CHP systems fuelled with fossil fuels)</td>
<td>19%</td>
<td>20,6%</td>
<td>21,3%</td>
<td>22,2%</td>
<td>23,2%</td>
<td>not specified</td>
<td>not specified</td>
<td>not specified</td>
<td>not specified</td>
<td>not specified</td>
</tr>
<tr>
<td>Yellow Certificates (energy produced in CHP systems fuelled with gassy fuels)</td>
<td>2,7%</td>
<td>2,9%</td>
<td>3,1%</td>
<td>3,3%</td>
<td>3,5%</td>
<td>not specified</td>
<td>not specified</td>
<td>not specified</td>
<td>not specified</td>
<td>not specified</td>
</tr>
</tbody>
</table>

If such a producer does not meet these thresholds for previous year he/she is obliged to pay substitution fee. These fees are fixed by the President of URE and published annually for the following year together with average power market price. Substitution fees are affected by the average market price. For example, substitution fees for 2009 are as following:

- 258,89 PLN / MWh for power produced from renewable sources (green energy)
- 128,80 PLN / MWh for power produced in CHP systems fuelled with gassy fuel (yellow energy)
- 19,32 PLN / MWh for power produced in CHP systems fuelled with other fuels (red energy)

Method of calculating the amount of power produced in CHP

The method of calculating the amount of power produced in highly efficient CHP is specified in the Decree of Minister of Economy of 26th September 2007. Energy origin certificates may be...
issued in the so called “highly effective” CHP system which means that not always all amount of power produced in CHP system may be directly calculated into certificates.

The main condition which must be met in order to classify the system as “highly effective” CHP system and in order to enable it to generate energy origin certificate is the so called Primary Energy Saving [PES] factor. PES consists of several values and is calculated according to the formula (1):

\[
PES = \left(1 - \frac{1}{\frac{\eta_{qc}}{\eta_{refc}} + \frac{\eta_{qe}}{\eta_{refe}}}\right) \times 100\%
\]

\(\eta_{qc}\) – efficiency of heat production in CHP system,

\(\eta_{qe}\) – efficiency of power production in CHP system,

\(\eta_{refe}\) – referential value of power production efficiency (published annually by the Energy Regulatory Office)

\(\eta_{refc}\) – referential value of heat production efficiency (published annually by the Energy Regulatory Office)

For systems with less than 1 MW, PES must be more than zero, whereas for other systems, PES must be over or equal 10% in order to generate certificates.

The value, which determines the amount of energy qualified as produced in “highly effective” CHP system is a threshold efficiency, which depending on the type of CHP system, may reach 80% for pass-out and condensing turbine and, gas and steam systems while 75% for other technologies including back-pressure turbine units.

Table below presents the calculation method for amounts of energy produced in CHP systems.

<table>
<thead>
<tr>
<th>POWER</th>
<th>System Power P ≤ 1 MW</th>
<th>System Power P &gt; 1 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>PES</td>
<td>PES &gt; 0</td>
<td>PES ≥ 10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PES &lt; 10%</td>
</tr>
<tr>
<td>(\eta_{gr})</td>
<td>efficiency equals the threshold efficiency (80% or 75%)</td>
<td>no energy origin certificate</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>
\[ E_{sk} = EE \]

\[ E_{sk} = C \times \frac{Q_{uq}}{3.6} \]

\[ E_{sk} = EE \]

\[ E_{sk} = C \times \frac{Q_{uq}}{3.6} \]

\[ \eta_{gr} \] – threshold efficiency,

\[ E_{sk} \] – amount of energy produced in CHP system [MWh],

\[ EE \] – total amount of energy produced [MWh],

\[ C \] – Value which determines the proportion between power produced in CHP system and heat produced in CHP system [GJ/GJ],

\[ Q_{uq} \] – amount of heat produced in CHP system [GJ].

B. Trade

---

Fig. 2-2 Energy Origin Certificates Property Rights Prices for 2008 [PLN/MWh] (renewable sources – green certificates) [2-12]
Fig. 2-3 Energy Origin Certificate Property Rights Prices for 2008 (CHP fuelled with fossil fuels) [PLN/MWh] [2-12]
Basing on the above presented formulas of calculating power and heat produced in “highly efficient” CHP systems and historical prices of Property Rights of Energy Origin Certificates it is possible to make a rough calculation of potential additional income for methane project involving power generation in CHP systems.

For example, a CHP system with a gas engine fuelled with gas from demethaning station at a coal mine with 2MW power and thermal power 2,1MW, operating 8000 hours per year may generate the following annual amounts of energy:

- power: 16 000 MWh,
- heat: 60 480 GJ

The system may thus theoretically generate the following income:

**CASE 1**

Note: CMM is not included in the category of “gassy fuels”, thus may generate the so called “red certificates”. When total amount of heat is sold and each 1 kWh of power generates 1 Energy Origin Certificate:
### Tab. 2-4 Calculation of possible income from energy and red certificates sale with 100% heat sale – CASE1

<table>
<thead>
<tr>
<th>Energy Origin Certificate type and price</th>
<th>Electricity</th>
<th>Heat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>200 PLN/MWh</td>
<td>25 PLN/GJ</td>
</tr>
<tr>
<td></td>
<td>17,59 PLN/MWh</td>
<td>(30th December 2008 price)</td>
</tr>
<tr>
<td>production</td>
<td>16 000 MWh</td>
<td>60 480 GJ</td>
</tr>
<tr>
<td>income</td>
<td>3 200 000 PLN</td>
<td>1 512 000 PLN</td>
</tr>
<tr>
<td>income</td>
<td>281 440 PLN</td>
<td></td>
</tr>
</tbody>
</table>

In this case income from energy origin certificates constitutes about 6% of income from power and heat sale.

When 50% of heat is sold and Energy Origin Certificates must be calculated acc. to the formula (1):

### Tab. 2-5 Calculation of possible income from energy and red certificates sale with 50% heat sale – CASE1

<table>
<thead>
<tr>
<th>Energy Origin Certificate type and price</th>
<th>Electricity</th>
<th>Heat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>200 PLN/MWh</td>
<td>25 PLN/GJ</td>
</tr>
<tr>
<td></td>
<td>17,59 PLN/MWh</td>
<td>(30th December 2008 price)</td>
</tr>
<tr>
<td>production</td>
<td>16 000 MWh</td>
<td>30 240 GJ</td>
</tr>
<tr>
<td>income</td>
<td>3 200 000 PLN</td>
<td>756 000 PLN</td>
</tr>
<tr>
<td>income</td>
<td>193 296 PLN</td>
<td></td>
</tr>
</tbody>
</table>

In this case income from energy origin certificates constitutes about 4,8% of income from power and heat sale.

### CASE 2

Nowadays the Energy Law says that there are 2 types of origin certificates for energy produced in CHP systems:

“Art 9L, item 1. The proof for producing power in “highly efficient” CHP system is an Energy Origin Certificate. It is issued separately for power produced in CHP systems:

1) Fuelled with gassy fuels* or with total installed power less than 1 MW,
1a) fuelled with methane released and captured during mining works in active coal mines, mines being liquidated or fuelled with gas obtained during biomass processing according to Art 2, paragraph 1, item 2 of Act on 25th August 2006 on bio components and liquid fuels;

2) other that the abovementioned (1)"

"Gassy fuel according to Energy Law, Art 3 a, is “natural gas rich in methane or nitrogenised, including liquefied natural gas and propan-butan or other types of flammable gas, supplied via gas network, independently from its appropriation.”

This results in a situation in which power generated in CHP systems fuelled with CMM would generate energy origin certificates (violet) with value is not yet set.

### 2.3 Price situation and outlook for competing products

Power

Fundamental rules of energy trade in Poland are specified in the Energy Law. Currently the market is divided into three segments: contract market, exchange market and balancing market. Furthermore, energy may be purchased and sold at online trading platforms. Trading on contract market takes place on the basis of bilateral contracts concluded between energy producers, trading companies and end users.

Power prices has been always regulated by the Energy Regulatory Office (URE), however a great change took place in 2008 when power market was partly liberated. Since 2008 power prices regulation refers only to power sold to households.

Average energy sale prices at contract market are presented in the table below:

**Tab. 2-6 Average power prices at contract market within 2006 to 2008 [2-13]**

<table>
<thead>
<tr>
<th></th>
<th>Average sale prices of power [PLN / MWh]</th>
<th>Change [in %]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average price</td>
<td>138,46</td>
<td>142,79</td>
</tr>
<tr>
<td>In long-term contracts</td>
<td>170,69</td>
<td>176,63</td>
</tr>
<tr>
<td>Apart from long-term contracts</td>
<td>119,20</td>
<td>127,20</td>
</tr>
</tbody>
</table>

**Tab. 2-7 Power sale prices in 2006, 2007 and 2008 [2-13]**

<table>
<thead>
<tr>
<th></th>
<th>Average manufacturers’ sale price for power [in PLN/MWh]</th>
<th>Change [in %]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average price:</td>
<td>138.46</td>
<td>142.79</td>
</tr>
</tbody>
</table>
Average price in long-term contracts: 170.69 176.63 190.18 7.7%
Average price apart from long-term contracts: 119.2 127.2 153.36 20.6%

Polish Power Exchange allows for energy trade at the so called Day-Ahead Market. The history of average prices for 2006-2008 is shown below:

As may be observed, prices of energy at Polish energy market significantly increased in 2008. The average price in 2008 at the Day-Ahead Market was 194.73 PLN/MWh, while in 2007 it was 115.25 PLN/MWh, so the price increased by 69%.

Factors that influenced energy prices:
- in 2008 partial de-regulation of retail prices started. Tariffs for industrial customers do not have to be approved by the URE since then, only tariffs for households must be approved. The market stopped being totally regulated, and prices were no longer artificially understated.
- coal prices increased and supplies were limited;

Source: Polish Power Exchange - Archives

Fig. 2-5 Weekly Average Power Prices on Spot Market in 2006, 2007 and 2008 [PLN / MWh] [2-13]
in 2007 energy sector was consolidated, new entities were formed, market structure changed; 2nd stage of the European CO2 emission allowance trading began. In Q1 of 2008, an allowance price was about 22 EUR / t, while in Q1 of 2009 the price fell to 10 EUR/t; coal produced

In 2008, coal prices rapidly increased and this tendency is maintained in 2009.

CNG

Originally CNG traders used to be obliged to submit their tariffs to the Energy Regulatory office and used to be dependent on its President who issued decision whether to approve their price proposition or not. In March 2008 this obligation was relieved thus making CNG market in Poland competitive. Therefore, in April 2008 Polish Oil and Gas Company (PGNiG) established their CNG tariff basing on new rules and since May the tariff is 1.72 PLN/m³ (net).

![Fig. 2-6 Gasoline average weekly prices in 2006-2008 [PLN/m³] Source [2-16]](image-url)
Diesel

Fig. 2-7 Diesel average weekly prices in 2006-2008 [PLN/m3] [2-16]
light heating oil

Fig. 2-8 Light heating oil weekly average prices in 2006 - 2008 [PLN/m³] [2-16]

2.4 Tax situation

Tax system in Poland includes:

- income taxes – on individual persons and corporate entities
- obligatory insurance and health fees paid for employees
- goods and services taxes – VAT, excise tax
- local taxes – vehicle tax and property tax
- tax on civil law transactions

General rules of paying taxes in Poland are described below.
2.4.1 Income taxes

Companies are obliged to pay corporate income tax which is regulated by the Act of 15th February 1992 on corporate income taxes (Journal of Law of 2000, No 54, item 654 with later changes). These taxes do not include farming, forestry or ship operating activities. The Act mentions entities which are not covered by this obligation, e.g. National Polish Bank. If a company has its seat or Board within Poland, it is covered by the obligation to pay corporate income tax on all income, regardless where it is earned. If the company does not have its seat or Board within Poland, they pay corporate income tax on income generated in Poland. Corporate income tax rate is 19% of tax base. The tax base is calculated as the difference between taxable incomes and taxable costs. Usually, tax payers calculate their due payments and cover them each month. Companies are obliged to submit yearly tax statement until 1st of April of the following year fro the previous year.

2.4.2 Obligatory insurance and health fees paid for employees

Companies which employ people in Poland are obliged to pay obligatory insurance and health fees to National Insurance Company. These fees differ depending on the type of employment and they are calculated on the basis of base salary, however for most typical full time employment these fees reach: retirement fee – 9,7%, pension fee – 4,5%, accident fee between 0,67% and 3,33%. Optionally the company may establish the Work Fund and pay 2,45% fee and Social Work Fund and pay 0,1% fee.

Farming or land tax is paid by owners of land classified in land and building register as arable land or wooded land except from land used for business activity other than farming, while forest owners need to pay forest tax.

2.4.3 VAT

Value added tax rates in Poland differ in relation to type of goods or services. Turnover is the basis for VAT calculation. Basic rate is 22%, however for some goods, e.g. farming the rate is lowered to 7%, while for some, (e.g. medicines, books, toys, food, etc) it is lowered to 3%. Exporting goods outside Poland and exchange of goods within EU has VAT rate 0%.

Moreover some business activities are not taxed. Different rules apply to services provided in trade and gastronomy, where tax is calculated on the basis of gross prices.

Tax-payers who have traded goods or provided services with VAT rate lower than 22% have the right to obtain tax refund up to the amount of 22% of turnover taxed with lower tax rates and tax resulting from purchasing goods and services. Tax-payers who have traded goods or provided services only with VAT rate 22%, where calculated tax exceeds tax due, have the right to obtain the difference between these amounts in the amount exceeding the tax resulting from purchasing goods and services. Specific procedures apply to farmers, tourist agents and small businessmen. The latter ones are not obliged to pay VAT when all the goods
sold in previous year did not exceed 50 000 PLN (until 2008 the amount was 10 000 EUR calculated into Polish zloty). This amount may not contain the tax. VAT payers are obliged to submit VAT statements each month, until 25th day of the following month for the previous month.

2.4.4 Excise tax

Excise tax in Poland is based on Act on Excise tax of 6th December 2008 and Decree of 24th February 2009. According to these regulations, the excise covers production, purchase and sale, import and usage of specified goods. For the purpose of CMM-related products the following clauses may be of interest:

- electricity produced on the basis of renewable sources is not covered by excise tax, however, due to the fact that methane is not considered in Poland as renewable source of energy – fuel produced from methane is covered by excise tax (Art 30 item 1, Act of 6th Dec 2009);
- the excise for natural gas and other gassy hydrocarbons (CN 2711) used for fuelling engines is 695,00 PLN/ 1000 kg in case of liquefied form, 100,00 PLN/ 1000 l in case of gassy form (Art 89 item 1, 12a, Act of 6th Dec 2009), however due to transitory provisions, until 31st October 2013, the excise for the latter is 0 PLN (Art 164, Act of 6th Dec 2009).
- the excise on liquefied natural gas used for heating purposes, both in gassy or liquefied form, and for other gassy hydrocarbons (CN 2711 29 00) is suspended until 31st October 2013 or until the moment when natural gas share in energy consumption in Poland reaches 25%. If on 31st October 2013 this share reaches 20%, the excise tariff of 50% of 1,18 PLN for 1 GJ applies (Art 163, item 2 and 3, Act of 6th Dec 2009);
- energy usage in the process of energy production or to sustain these processes is not covered by excise tax. (Art. 30, item 6, Act of 6th Dec 2009);
- the usage of power in the process of power and heat production in CHP technology in heat and power generating plants is not covered by excise tax (Art. 30, item 7, Act of 6th Dec 2009);
- electricity is not covered by excise tax if produced by a genset with total power not exceeding 1MW on the condition that that electricity is not transmitted to linked and cooperating systems which are used for power transmission and on the condition that the excise tax on energy materials used for its production was paid in due amount (Art. 9, Decree of 24th Feb 2009);
- the excise on electricity is 20,00 PLN / MWh (Art 89 item 3, Act of 6th Dec 2009);
- the excise for natural gas and other gassy hydrocarbons (CN 2711) for heating purposes is 1,18 PLN/ GJ (Art 89 item 1, 13, Act of 6th Dec 2009);

2.4.5 Local taxes – property and vehicle tax

Property tax is a local tax levied on persons or entities that own or use land, buildings or their parts or structures or their part in for business activities. Tax obligation starts on the first day of the month following the time of purchase or obtaining legal title to the property. If the building is in construction, the obligation to pay tax starts with 1st January of the year following the
year when the construction is finished or when the building or its part starts to be used before it is finally finished. Property tax is regulated by the Act of 12th January 1991 on Local taxes and fees. Property tax payers – persons - are obliged to submit information on properties on special forms to a local tax agency, depending on the property location within 14 days from the moment when the tax obligation starts, ceases or the tax amount changes. Property tax payers – legal entities - are obliged to submit tax declaration on special forms to a local tax agency, depending on the property location until 1st January, and if the tax obligation starts after that day, within 14 days from the moment when the tax obligation starts, ceases or the tax amount changes. If the property or building is owned by both a legal entity and a person or organizational unit without legal status, this person submits property tax declaration and pays tax on the basis of rules that apply to legal entities. In such case, no decision on tax amount is given to a person. Some communes pass an act which allows tax-payers to submit these documents via the Internet.

Tax-payers are obliged to submit an identification form in the local commune or town tax agency which handles property agency. Tax-payers who were given NIP [tax identification] number by Tax Office or those tax-payers who submitted identification form as income tax, VAT or excise tax or other taxes payers. Property tax must be paid by persons in 4 instalments – until 15th March, 15th May, 15th September and 15th November of the fiscal year. Entities must pay the tax on monthly basis until 15th day of each month.

Tax rates are determined depending on type of activity and location by Town / Commune Council, but there are upper limits established by the Ministry of Finance that cannot be exceeded, which however are changed every year. The following annual upper limits for are in force in 2009:
Tab. 2-8 Property tax rates' upper limits fixed for 2009

<table>
<thead>
<tr>
<th>TYPE OF PROPERTY</th>
<th>RATE UPPER LIMIT</th>
<th>MEASUREMENT UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LAND</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>land used for business activity</td>
<td>0.74 PLN</td>
<td>1 m²</td>
</tr>
<tr>
<td>used for water reservoirs or water-power-plants</td>
<td>3.90 PLN</td>
<td>1 ha</td>
</tr>
<tr>
<td>others including land used by Non-Governmental Organisations for their statutes' based activities</td>
<td>0.37 PLN</td>
<td>1 m²</td>
</tr>
<tr>
<td><strong>BUILDINGS AND THEIR PARTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>habitable</td>
<td>0.62 PLN</td>
<td>1 m² of usable area</td>
</tr>
<tr>
<td>used for business activity and habitable buildings or their parts used for business activity</td>
<td>19.81 PLN</td>
<td>1 m² of usable area</td>
</tr>
<tr>
<td>used for trading qualified sowable material</td>
<td>9.24 PLN</td>
<td>1 m² of usable area</td>
</tr>
<tr>
<td>used for providing medical services</td>
<td>3.46 PLN</td>
<td>1 m² of usable area</td>
</tr>
<tr>
<td>others including land used by Non-Governmental Organisations for their statutes' based activities</td>
<td>6.64 PLN</td>
<td>1 m² of usable area</td>
</tr>
<tr>
<td><strong>CONSTRUCTIONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all</td>
<td>2% of their value</td>
<td></td>
</tr>
</tbody>
</table>

Some entities are exempted from the property tax. Exemption rules are regulated by the Act on Local taxes and fees. Exemptions depend on the type of activity and tax-payer. Companies
which employ disabled persons and those which have the status of research and development centre status obtained on the basis of Act 29th July 2005 on some forms of supporting innovative activity (Journal of Law no. 179 item 1484). Town/ Commune Council has the right to introduce other exemptions.

Vehicle tax is levied on persons and legal entities, organizational units, who own or have registered motor trucks equal to or heavier than 3.5 tons, truck tractors and ballast tractors adopted to use with a semi trailer or trailer, in total equal to or heavier than 3.5 tons, semi trailers and trailers equal to or heavier than 7 tons, buses. Even if the vehicle is owned by a foreign entity, but let to a Polish entity or person and thus registered in Poland, the obligation applies. Tax exemptions include antique vehicles, diplomatic services and foreign missions, special vehicles. Town / Commune Council may introduce more exemptions. Vehicle tax rates are fixed by Town/ Commune Council within the limits given by the Ministry of Finances. In 2009 the upper limits are as following:

**Tab. 2-9 Vehicle tax rates' upper limits for 2009**

<table>
<thead>
<tr>
<th>TYPE OF VEHICLE</th>
<th>RATE UPPER LIMIT in PLN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor trucks with weight between 3.5 tons and 12 tons</td>
<td></td>
</tr>
<tr>
<td>between 3.5 tons and 5.5 tons</td>
<td>704.61</td>
</tr>
<tr>
<td>between 5.5 tons to 9 tons</td>
<td>1.175.49</td>
</tr>
<tr>
<td>more than 9 tons</td>
<td>1.410.58</td>
</tr>
<tr>
<td>Motor trucks with weight equal or exceeding 12 tons</td>
<td>2.691.81</td>
</tr>
<tr>
<td>Truck tractors and ballast tractors adopted to use with a semi trailer or trailer, with total weight between 3.5 tons and 12 tons</td>
<td>1.645.67</td>
</tr>
<tr>
<td>Truck tractors and ballast tractors adopted to use with a semi trailer or trailer, with total weight exceeding 12 tons</td>
<td></td>
</tr>
<tr>
<td>between 7 tons to 12 tons, excluding those related to farming activity run by an entity that pays farming tax.</td>
<td>1.410.58</td>
</tr>
<tr>
<td>up to 36 tons, excluding those related to farming activity run by an entity that pays farming tax.</td>
<td>2.080.58</td>
</tr>
<tr>
<td>Semi trailers, whose total weight including motor vehicle is equal or greater than 12 tons, excluding those related to farming activity run by an entity that pays farming tax.</td>
<td>2.691.81</td>
</tr>
</tbody>
</table>
Town / Commune Council may differentiate these rates depending on environmental impact, production year or number of seats. Vehicle tax-payers need to submit vehicle tax declaration form until 15th February of each year, and if the obligation started after that date, within 14 days. The tax is usually payable in two instalments proportionally, until 15th February and 15th September.

### 2.4.6 Tax on civil law transactions

Tax on civil law transactions is regulated by the Act of 9 September 2000 on tax on civil law transactions (with later changes and related decrees).

Civil law transactions, subjects of taxation include entering into and introducing modifications to:
- sale and exchange contracts;
- loan agreements;
- donation agreements – the portion related to the beneficiary taking debt or liabilities of the donator;
- agreements related to inheritance, mortgage, usufruct; articles of association, etc

Tax payers include natural persons, legal entities, and organizational entities without legal status, however, depending on the type of actions, tax is paid by the beneficiary of a given agreement e.g. purchaser in case of sale contract, beneficiary in case of donation. In case of articles of civil association – shareholders are tax payers. Tax is paid by taxpayers to the notary who prepares authenticated deed for the sake of the agreement.

Tax rates are specified separately for each type of civil law transactions, but maximum rate is 2%. Tax statement must be submitted within 14 days from the transaction. Form (PCC-3) is specified in the Decree of the Minister of Finances of 16th December 2008 on the method of civil law transaction tax collection (JoL 234, item 1577).

Tax is paid by the notary to appropriate Revenue Office within 14 days from the transaction.
2.4.7 Tax reliefs and exemptions
The only tax reliefs, related to CMM projects, apply to fuels and energy producers and refer to excise tax. Reliefs include electricity produced from renewable sources (methane not included), energy usage in electricity production in CHP systems, electricity produced in a genset with total power ≤ 1MW, and until 31st Oct 2013 the excise for LNG used for fuelling vehicles and CNG is 0 PLN and the excise for LNG used for heating is 0 PLN.

There are no other tax reductions that apply. CMM-project developer is obliged to meet fiscal obligations as any other business entity.

2.4.8 Special Economic Zones
There are 14 Special Economic Zones in Poland. Companies located within such zones have certain privileges. For example they pay lower income taxes, as they have the right to 40% tax relief on capital investment or even 50% for medium companies and 60% for small enterprises. They may also benefit from lower cost of employing new workers for 2 years. This cost reduction may reach 40%, or 50% for medium and 60% for small enterprises. It is important to mention that enterprises within Zones need to apply for these tax reliefs and there are certain requirements that they have to meet.

2.5 Implementation status of Kyoto Protocol
The actual status of each country in the Kyoto process can be tracked on UNFCCCs website. Important dates for Poland are:

<table>
<thead>
<tr>
<th>Date of signature:</th>
<th>15 July 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of ratification:</td>
<td>13 December 2002</td>
</tr>
<tr>
<td>Date of entry into force:</td>
<td>16 February 2005</td>
</tr>
</tbody>
</table>

However, more important, than these official dates is the fact how Joint Implementation projects are actually handled by the local governments.

Tab. 2-10 JI– projects in Poland [2-17]

<p>| JI projects | PL1000053 | N2O abatement project at nitric acid plant of Zakłady Azotowe in Tarnów Mościce, Poland |</p>
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL1000054</td>
<td>N2O emissions reduction project at Zakłady Azotowe Anwil S.A.</td>
</tr>
<tr>
<td>PL1000055</td>
<td>Catalytic Reduction of N2O inside the Ammonia Burners of the Nitric Acid Plant in Pulawy, Poland</td>
</tr>
<tr>
<td>PL1000056</td>
<td>Methane capture and utilization from treatment of swine manure, biomass and organic waste, Zachodnio Pomorskie, Poland and Pomorskie, Poland</td>
</tr>
<tr>
<td>PL1000057</td>
<td>Łubna, SoSonomowic, Legajny Landfill Gas, Poland</td>
</tr>
<tr>
<td>PL1000058</td>
<td>Utilisation of wood chips for heating purposes in urban areas plant in the town of Jelenia Gora</td>
</tr>
<tr>
<td>PL1000059</td>
<td>Stargard Geothermal District Heating Project</td>
</tr>
<tr>
<td>PL1000060</td>
<td>Mazurskie Landfill Gas Package</td>
</tr>
<tr>
<td>PL1000061</td>
<td>Small Hydro-Power Plant on Bobr River, location Leszno Gorne, municipality Szprotawa</td>
</tr>
<tr>
<td>PL1000062</td>
<td>Landfill gas recovery on the Radiowo landfill in Warsaw, Poland</td>
</tr>
<tr>
<td>PL1000063</td>
<td>Lake Ostrowo Wind Farm</td>
</tr>
<tr>
<td>PL1000064</td>
<td>Utilization of methane gas from Landfill and Sludge, Zakopane</td>
</tr>
<tr>
<td>PL1000065</td>
<td>Zagorze Wind Farm</td>
</tr>
<tr>
<td>PL1000071</td>
<td>Landfill gas extraction and utilisation in Konin, Poland</td>
</tr>
</tbody>
</table>

CMM related projects, which got a letter of approval (LoA) are not yet given by the unfccc. There is a large potential in Poland:

Annual methane capturing from coal mines (2008) **Fehler! Verweisquelle konnte nicht gefunden werden.**:

Total amount of 879 million m³ methane is being released, which includes:

- 610 million m³ methane through ventilation systems,
- 269 million m³ methane through degasification systems, which covers:
103 million m³ methane released to atmosphere,
- 166 million m³ methane utilized.

[ 2-14] Central Mining Institute of Katowice

2.6 Energy Politics (preferences for sources of primary energy)

In Poland the structure of energy sources is dominated by coal, the chart below shows proportions of different energy sources in 2007.

In total, coal constituted 90.16% in the structure of energy sources used for power production, while gas was below 3% and renewable sources below 4%.

For Poland, coal is the dominant fuel, accounting for 60.5% of primary energy demand (PED), followed by oil at 25.7%, gas at 13.1% and hydro with a 0.7% share of PED. Regional energy demand is forecast to reach 1,553mn tonnes of oil equivalent (toe) by 2013, representing 11.0% growth over the period. Poland’s 2008 market share of an estimated 6.96% is set to ease to 6.88% by 2013. Poland has no operational nuclear generating capacity and is not expected to build a new plant during the forecast period. It makes no contribution to regional nuclear energy consumption. (source Poland Report, Business Monitor International)

Polish power output fell 3.7 % during the first half 2009 [ 2-18]

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**Fig. 2-9 different energy sources in 2007 in Poland [ 2-15]**

In total, coal constituted 90.16% in the structure of energy sources used for power production, while gas was below 3% and renewable sources below 4%.

For Poland, coal is the dominant fuel, accounting for 60.5% of primary energy demand (PED), followed by oil at 25.7%, gas at 13.1% and hydro with a 0.7% share of PED. Regional energy demand is forecast to reach 1,553mn tonnes of oil equivalent (toe) by 2013, representing 11.0% growth over the period. Poland’s 2008 market share of an estimated 6.96% is set to ease to 6.88% by 2013. Poland has no operational nuclear generating capacity and is not expected to build a new plant during the forecast period. It makes no contribution to regional nuclear energy consumption. (source Poland Report, Business Monitor International)

Polish power output fell 3.7 % during the first half 2009 [ 2-18]
2.6.1 Overview about countries primary energy mix, actual situation and outlook

Fig. 2-10 Poland energy mix: 2004 consumption [2-19]
Fig. 2-11 Poland 2004 domestic energy production [2-19]
If the current trend continues local production will be reduced and the amount of imported coal will increase. As wages will rise and in the long run will reach EU level coal locally produced coal will not be able to compete with imported coal from Australia and South Africa. France, Germany and the UK have already gone through this development in the past.

„Polish Energy Policy until 2030“ published in March 2009 specifies main strategic goals of energy policy, i.e. to improve efficiency and safety of fuels and energy supplies, to diversify the structure of producing electricity by introducing nuclear energetic, to develop exploitation of renewable sources of energy including bio-fuels, develop competing markets of fuels and energies, to reduce energetic’ negative influence on the environment. These strategic directions are interrelated.

Until 2020 Poland aims at reducing power consumption by 20%, in order to do that, certain policies and programs were planned.

Efficiency improvement is a priority in the Policy and it will be achieved by e.g. aiming at zero-energy economic development, i.e. economy development taking place without the increase in primary energy demand and lowering energy consumption in Poland in 2030 to the level of EU-15 from 2005.
Safety of fuels and energy supplies is to be achieved by the use of efficient and low-emission technologies, securing sufficient amount of coal, implementing modern technologies improving safety and efficiency in coal mines and maximum exploitation of methane released with coal mining, securing alternative sources of gas to Poland, capturing methane through boreholes and putting methane to market.

Renewable sources' exploitation improvement will be realized by the following targets: increase in the share of renewable sources usage up to 15% in 2020 and 20% to 2030, reaching 10% of bio-fuels share at vehicle fuels market and increase in the use of 2nd generation bio-fuels, protection of forests due to overexploitation for biomass production.

Competing markets will be developed by increasing diversification of natural gas, crude oil and fuels' supplies' sources and directions, its transmission and transport routes, regulating energy market in such a way to balance interests of all participants, enabling international exchange of electricity, etc.

Negative impact of energetic on the environment is aimed to be reduced, and the target is to reduce CO2 emission as much as technically possible without disturbing energetic safety, to reduce SO2 and Nox and fumes to the level specified by existing and projected EU regulations, change of energy production structure and turn to low-emission technologies.

The Policy assumes that in 2030 the demand for coal falls down from 135.9 [MM t] in 2006 to 109.7 [MM t], gas demand will grow from 14.5 [billion m3] in 2006 to 20.0 [billion m3], renewable energy demand grows from 5.0 [Mtoe] in 2006 to 14.7 [Mtoe] and electric power demand grows from 5.0 [Mtoe] in 2006 to 14.7 [Mtoe].

Attachment number 3 to the Policy - “Action Program for 2009-2012” specifies methods of realization goals established in the Policy. The following actions are planned within particular categories:

Improve energy efficiency
establishing a national target level of energy efficiency -2009
introducing a support mechanism for actions aiming at improving energy efficiency – 2010
stimulation of power production in CHP systems development by support mechanisms
introducing the systems of obligatory energy characteristics certificates for buildings and flats being traded or rented
marking the level of energy consumption on products and devices, introduction of standards for products
energy saving
supporting investments related to energy saving by granting preferential loans and grants from national and European funds
support for research and scientific projects on new solutions and technology development which decrease energy consumption
implementation of energy Demand Side Management
informational and educational campaigns promoting rational energy consumption
Increase in the safety of energy and fuels supplies
introduction of legal regulations implementing goals proposed in the Policy
removing legal barriers in making new hard and brown coal deposits available
identification of national coal deposits and their protection and marking these deposits at local development plans
intensification of geological research with the use of new technologies
support for exploitation of methane released with coal extraction in coal mines
introduction of technological solutions making it possible to use methane from ventilation air off coal mines
fundraising for mining industry development by the process of privatisation of state-owned coal companies
supporting research and development projects that refer to technologies of coal exploitation for fuels production

Gas
proper pricing/ tariff policy motivating to investments into national gas deposits and transmission and distribution infrastructure
development of LNG terminal
concluding contracts for diversified gas supplies for the terminal
preparing the policy for balanced management of national gas deposits
realization of investments making it possible to increase gas extraction in Poland
diversification of supplies by development of transmission line
making it possible for Polish companies to access gas deposits abroad
support of infrastructural investments with the use of European funds
investment incentive for developing storage capacities
removing legislation barriers for infrastructural projects development
starting pilot works in making CMM available

Crude oil and liquid fuels
development of infrastructure for oil transport from Caspian Sea
Support for search and exploitation projects
development of storage, logistics and trans-shipment infrastructure
removing legal barriers in developing infrastructural projects

Power and heat
making network operators obliged to prepare transmission and distribution network development plans
removing legal barriers in developing infrastructural projects
development of new and modernisation of existing power lines
introduction of a system for issuing conditions for making a connection to national grid for the time not exceeding 2 years with an obligation to pay a deposit and development of network
performing an analysis of possibilities to use new technologies for power production
Nuclear energy
defining legal regulations needed for the development of nuclear energy industry in Poland
educational and informational campaigns
staff training for work in nuclear industry
performing analyses for locations for power plants
development of scientific and research base
Development of renewable sources including biofuels
defining the roadmap for achieving 15% share of renewable sources
maintaining support for power production from renewable sources
introducing new ways of support for promoting heat and cool production from renewable sources
implementation of the program for developing farm biogas plants in each commune
making it possible to built wind farms offshore
direct support for development of new power plants producing power from renewable sources
stimulation for industry producing equipment for renewable industry
Development of competitive energy and fuels markets
making it easier for customers to change power supplier
change of the mechanisms for price formation by introducing new methods for heat price formation
protecting the impoverished customers from results of increase in power prices
change of regulatory mechanisms supporting competition at gas market and introduction of market-based methods of price formation
Reduction of negative impact of the energy sector into the environment
forming a system for management of national limits of GHG and other substances emissions
introduction of acceptable levels of emissions in power and heat production as a tool to reduce So2 and Nox emissions
Introduction of emission standards reducing CO2 emission
preference of CHP power production for new power plants

taking actions to develop demonstration plants within the technology of CO2 capture and storage (CCS)

usage of CCS technology to support extraction of crude oil and natural gas

exploitation of coal production wastes

2.7 Mining and mine safety laws

2.7.1 Coal mines

There are 32 coal mines in Poland. Some of them operate within Coal Groups and some are independent.

**Drawing 1 Coal Basins and coal groups in Poland**

Kompania Węglowa S.A. [Coal Company]

Kompania Węglowa S.A. is the biggest mining group in Europe. It employs 65,2 thousand of people. It manages 16 coal mines combined into 4 mining centres: Mining Centre – West, Mining Centre – North, Mining Centre – East, Mining Centre – South and 5 plants. They include the following mines:

Piekary Coal Mine, Bielszowice Coal Mine, Bolesław Śmiały Coal Mine, Szczurowice Coal Mine, Piast Coal Mine, Rydułtowy Coal Mine, Chwałowice Coal Mine, Halemba-Wirek Coal Mine, Bobrek Coal Mine, Knurów Coal Mine, Sośnica-Makoszowy Coal Mine, Pokój Coal
Mine, Brzeszcze Silesia Coal Mine, Ziemowit Coal Mine, Marcel Coal Mine, Jankowice Coal Mine.

The Company’s annual output is 46,8 MM tons of coal.

Jastrzębie Coal Company Inc.

JSW S.A. was established on 1 April 1993 by a fusion of seven coal mines as a result of structural transformations. At present the Company comprises of six coal mines: Borynia, Jas-Mos, Pniówek, Zofiówka, Krupiński and Budryk and the Material Logistics Plant. These plants act on the administration area of the following town districts of Silesian Voivodship: Jastrzębie Zdrój and Żory as well as the communes: Swierklany, Suszec, Pawłowice, Mszana, Godów, Ormontowice and the town of Orzesze. 75,8% of the whole Company’s output is 35-type ortho-cooking coal, 6,9% was34-type gas and coking coal. The remaining 17,3% is power coal.

The Company basic data according to the 2007 Report:

<table>
<thead>
<tr>
<th>Winning area of the mines</th>
<th>122 km2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficient coal resources</td>
<td>197,7 MM tons</td>
</tr>
<tr>
<td>Average working depth</td>
<td>830 metres</td>
</tr>
<tr>
<td>Employment</td>
<td>19 586 employees</td>
</tr>
<tr>
<td>Coal output volume</td>
<td>11,8 MM tons (13,5% of the total hard coal output in Poland)</td>
</tr>
</tbody>
</table>

The table below shows data for 2007 for specific plants of JSW S.A. :

<table>
<thead>
<tr>
<th>Tab. 2-11 JSW plants and related data on employment, production and coal type [ 2-20]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Putting into operation</td>
</tr>
<tr>
<td>KWK Borynia</td>
</tr>
<tr>
<td>KWK Jas-Mos</td>
</tr>
<tr>
<td>KWK Pniówek</td>
</tr>
<tr>
<td>KWK Zofiówka</td>
</tr>
<tr>
<td>KWK Krupinski</td>
</tr>
<tr>
<td>Biuro Zarządu Board Office</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>ZLM</td>
</tr>
<tr>
<td>JSW SA JCC Inc.</td>
</tr>
</tbody>
</table>

Katowicki Holding Węglowy [Coal Holding]

Południowy Koncern Węglowy S.A.
The Company manages 2 coal mines Janina Coal Mine (2800 employees in 2007) and Sobieski Coal Mine (3000 employees in 2007).

Lubelski Węgiel “Bogdanka” Coal Mine S.A. – Independent mine
The mine’s mining area is 57 km². Production reached 5,4 tons in 2005, 5 MM tons in 2006, 5,1 MM tons in 2007).

Kazimierz – Juliusz Coal Mine – independent mine
Mining area exceeds 23m² and is located in the north-east part of Upper Silesian Coal Basin. In 2006 total production reached 775 100 tons, i.e. 3100 tons per day.

Siltech, Zabrze – private mine
The mine was started-up in 2002 on the basis of Jadwiga Coal Mine. It employs 235 employees and the production in 2008 reached 250 thousand tons.

2.7.2 CBM and CAM in Poland
Coal Bed Methane is present mainly on Upper Silesia Coal Basin Deposits. According to survey performed in 2005 potential deposits of CBM were calculated to about 254 bln m³, of which recoverable is 150 bln m³. There are 45 documented deposits within Upper Silesia Coal Basin containing 85,86 bln m³ of methane. 29 of these deposits with 25,89 bln m³ are within coal deposits being under exploitation. Methane extraction in 2005 was conducted from 16 deposits and reached 272, 7 MM m³, while 170 MM m³ was released to the atmosphere. As for 1st September 2009, there are 14 coal bed methane prospecting and exploration concession holders and 2 coal bed methane extraction concession holders. The holders are:
Methane prospecting and exploration concession holders:
Cetus - Energetyka Gazowa Sp. z o.o. – 5 concessions
Composite Energy (Poland) Sp. z o.o. – 2 concessions
EurEnergy Resources Poland Sp. z o.o. – 3 concessions
European Diversified Resources Sp. z o.o. – 1 concession
Lublin Energy Resources Sp. z o.o. – 1 concession
Pol-Tex Methane Sp. z o.o. – 2 concessions including (1 joint concession)

Methane extraction concession holders:
Karbonia PL Sp. z o.o. – 1 joint concession (for prospecting, exploration and extraction – extraction phase)
Metanel S.A. – 1 concession

The Ministry of Environment regularly publishes maps of concessions.
Fig. 2-13 Map of concessions within Upper Silesia Coal Basin (September 2009) [2-21]

Yellow areas – hard coal prospecting and exploration concessions areas
Blue areas - methane prospection and exploration concessions areas
Green areas – CMM and coal prospection and exploration concessions areas
Grey areas – planned hard coal and methane prospection and exploration concessions areas
White areas – hard coal extraction concession areas
2.7.3 Concessions

Concessions must be obtained for the following activities:

- prospection and exploration of minerals deposits
- extraction of minerals from deposits
- storage of substances (without the use of containers) and waste storage in a rock mass including mining workings;

The issue of concessions is regulated by Geological and Mining Law of 4th February 1994, Art 15 to 30. Prospection and exploration or extraction concessions are granted by the Starost, i.e. the poviat (county) authorities, if the concerned area is smaller than 2 ha, the annual extraction will not exceed 20,000 m³ and the extracting will not include the use of explosives. If these requirements are not met the concession must be issued by the Minister of Environment. Additionally the concession for mineral prospection and exploration must be consulted by the local authorities, i.e. a mayor or a president. This consultation is on the basis of local development plan, or the study of development conditions and directions. Mineral extraction concession must be approved by the Minister of Economy.

Concession is granted for a defined period of time, not shorter than 5 years and not longer than 50 years, however an entity may apply for a shorter period of time. The area being subject of an application for concession may not exceed 1200km².

The concession application for prospection and exploration concession should include:

- name of the applicant, its base and address;
- number in the business entities’ register or business activities’ register;
- specification of the type and scope of business activity as a basis for the licence;
- specification of applicant right to the area, within which the activity is to be run, or the right that is the subject of application;
- period of time for the concession with the date of starting the activities;
- specification of funds for the activities at the applicant disposal;

Data provided in the application must be proved by attaching related documents e.g the authority may require that the applicant presents data specifying legal status of real estate that may be affected by the planned actions. It may be also demanded to provide a copy of the application with all attachments. Additionally, the application must have the following attachments:

- plan of geological works;
- environmental permit if required acc. to Environment Protection Law;

The Plan of Geological Works must be prepared according to a Decree of the Minister of Environment of 19th December 2001 on geological works plans (JoL No. 153, item 1777). The plan must be composed of text and drawings.
The text should include the following components:

- information on location, where works will take place;
- information on conducted geological works and geophysical research, their results and their presentation on a geological map;
- description of geological structure and hydrological conditions within the location of planned works;
- presentation of the aim of works and possibility to achieve them including:
  - description and justification of number, location and type of mine workings, drawings of drills or other workings construction, characteristics of aquifer, method and time of workings liquidation, characteristics and justification for the range and methods of projected geophysical and geochemical tests and their location, determination of works order, description of workings sampling, range of monitoring and site research, specification of necessary geodetic works, range of laboratory test, information on waters and water removal, specification of samples to be submitted to proper geological agency with the method and time of submittance, schedule of planned works including time of commencing and terminating.

Drawings should include:

- topographic map in at least 1 : 100 000 scale with the site of works marked and its location;
- geologic, hydrological and geologic and engineering, geophysical map and geologic section – depending on works type;
- location of the area and spots of planned geologic works at the map in proper 1 : 50 000 scale at least.

The application for mine extraction concession should contain all documents as in search and exploration application, and additionally should specify the following things:

- the deposit or its part, that is subject extraction;
- amount to be extracted and methods of extraction;
- degree of planned deposit exploitation and means that will enable that;
- location of mining area and its boundaries;
- a proof that confirms the applicant right to use geological documentation as the basis for licence;
- deposit development plan, with appropriate mining supervision authority’s opinion (Regional Mining Office)
- a proof that confirms the applicant’s right to use the land, where the extraction will take place, or a proof of a promise of obtaining such right;
- hydrological documentation that specifies conditions of forcing the waters into a rock mass if that applies;
- environmental permit if required acc. to Environmental Protection Law

The granted concession should specify the type and method of activities covered, the area concerned, concession duration, other requirements related to activities covered by the concession, especially related to public safety and environmental protection. Search and
investigation concession should also specify the purpose, scope and schedule of geological works, required accuracy of geological investigation. Extraction concession should also specify the boundaries of mining area, the balance of available resources and minimum level of their usage.

If there are any social or ecological issues related to the application for a concession, it may happen that granting the concession is conditioned by securing claims – especially financial claims - that may arise in connection to this concession. The form and amount of this guarantee is specified in the concession and depends on the type of activity, related area, time and level of potential damage. For example in case of concessions for waste storage in mining workings, this guarantee must be obligatorily established.

Concessions for methane extraction may be divided into 2 categories depending whether methane is to be extracted with coal or as the only mineral. Due to the fact that coal extraction is not possible without methane release, coal mines must hold concessions for methane extraction, as methane is the so called “accompanying mineral” in that case. Entities willing to extract methane as the only mineral must apply for concessions, first for methane prospecting and exploration, and later for extraction.

Ownership and mining usage

This issue is regulated by Geological and Mining Law of 4th February 1994, Art 7 to 14. The Treasury is the owner of mineral deposits which are not components of land property. Land property is a part of land which constitutes a separate property (Art 4, item 1 of Property Management). Within certain boundaries, the Treasury may manage deposits and grant rights to use them by granting “mining use”.

Mining use is granted by the same agency, which grants concessions i.e. the Minister of Environment. The right of mining use allows an entity to search, explore and extract a given mineral. Mining use is granted on the basis of an agreement on the condition that the entity obtains concession. This agreement defines payments for mining use.

According to Art.11, item 1, the mining use for natural gas, crude oil and its natural derivatives and coal mine methane prospecting and exploration or extraction is granted in the process of a tender, however there are certain exceptions to this rule:

the area is included in the list of areas excluded from the tender procedure obligation; the map of such areas is presented below. Areas marked white do not require a tender procedure in granting mining use.

the area was once a subject of a tender, but the tender was not concluded and the mining use was not granted to anyone

the deposit is already searched and explored by an entity, and geological documentation is made according to guidelines for documentation preparation in order to obtain concession. In such a situation this entity may demand the mining use and has priority over others.

mining use for search and exploration of CMM deposits within whole Poland is granted without tender procedure.

Fig. 2-14 Areas which require tender procedure in granting mining use. [ 2-21]
Rules of tender procedure are specified in the Decree of 21st June 2005 on tender for granting mining use (JoL No. 135, item 1131 of 22nd July 2005).

2.7.4 CMM in Polish coal mines

Methane is a serious problem issue in Polish coal mines. There have been many accidents in recent years. The table below shows statistics of methane-related accidents at the Polish coal mines from 2002 to 2007:

Table 1 Methane-related accidents in Polish coal mines within 2002 to 2007 [2-22]
The chart shows that more than 80% of coal is extracted out of coal beds containing methane. Many coal mines work within the areas of the highest level of methane threats.

The Ministry of Economy issues official instructions and laws on the safety and working conditions in mining industry which specify safety measures that need to be taken as far as methane threats are concerned. These regulations are detailed and refer to personnel and equipment at a mine and establish certain procedures that should be followed. Methane threat is the main problem that mines have to cope with, as it always accompanies extraction of coal. Personnel needs to be skilled and must know all the procedures related to natural threats in order to apply specific procedures in given situations. Equipment installed in the mine must meet specific technical requirements. Coal mine are obliged to constantly monitor the concentration of methane inside mines.

Methane is classified as dangerous substance acc. to the Minister of Health’s Decree of 28th September 2005 on the list of dangerous substances with their classification and marking.

In Poland there are no specific regulations concerning exclusively methane utilization, but there are many different regulations from various fields, which refer to methane handling. Building Law specifies what limits and requirements must be met if any gas-fuelled system is built. There are several authorities or agencies authorized to inspect and supervise the plant, i.e. Office of Technical Inspection, authorised fireman, etc. Explosive zones need to be specified, as different work safety regulations must be applied in different explosive zones. Each substance has its information sheet, where information is provided on substance composition, chemical and physical qualities, first aid and threats when handling it, steps to take when the substance is released, safety measures, methods of waste removal, transport information and all regulations to be taken into consideration.

The following regulations and acts refer to methane handling:
Decree of the Minister of Health of 28th September 2005 on the specification of dangerous situation and their classification and marking (JoL of 2005 no.201 item 1674)

Decree of the Ministry of Labour and Social Policy of 29th November 2002 on the highest acceptable concentrations and intensity of agents detrimental for health contained in the environment (JoL 2002, no. 217, item 1833) with later changes

Decree of the Minister of Health of 20th April 2005 on examinations and measurements of agents detrimental to health contained in the working environment (JoL 2005, no.73, item 645)

Decree of the Ministry of Labour and Social Policy of 26th September 1997 on general conditions for safety and work hygiene regulations (JoL 2003, no.169, item 1650) with later changes

Decree of the Minister of Health of 30th December 2004 on safety and work hygiene in relation to the presence of chemical agents in the workplace (JoL, 2005, no.11, item 86) with later changes

Notice of the President of Sejm of 1st February 2007 on announcing the uniform act on waste materials (JoL 2007, no 39, item 251) with later changes


Act of 11th January 2001 on chemical substances and preparations. (JoL 2001, no.11, item 84) with later changes

Decree of the Minister of Economy and Labour of 5th July 2004 on limitations, prohibitions or conditions for production, trade and use of dangerous substances and preparations and products containing them (JoL 2004, no.168, item 1762) with later changes

Decree of the Minister of Health of 2nd 2003 on the criteria and way of classification of chemical substances and preparations (JoL 2003, no.171, item 1666) with later changes

REACH Directive of 18th December 2006 – correction (JoL WE L136 of 29th May 2007)

Decree of the Minister of Health of 13th November 2007 on the substance information sheet (JoL 2007, no.215, item 1588)

Decree of the Minister of Health of 2nd September 2003 on the way of marking packagings of dangerous substances and preparations (JoL 2003, no.173, item 1679) with later changes

Governmental Notice of 23rd March 2007 on attachments A and B to European Agreement on international road transport of dangerous substances (ADR) prepared in Geneva on 30th September 1957 (JoL 2007, no.99, item 667)

Minister of Health’s Decree of 14th March 2003 on methods of marking places, piping and containers used for storage or containing dangerous substances or preparations;

2.8 Environmental laws

The main Act - Environment Protection Law of 27th April 2001 regulates the issues of environmental protection and environment usufruct. The Act regulates in particular:

conditions of protecting environmental wealth,

rules of introducing substances or energies into the environment,
costs of environment usufruct,
administration duties and responsibilities and sanctions.

Each person or entity’s activity which may have a negative influence into the environment is
obliged to prevent this influence. If the activity’s influence has not been identified yet, must
take all necessary prevention steps. The usufruct of environment with the use of any
installation or system may require obtaining environmental permit according to the Act.
Introducing any polluting agents to the environment makes an entity obliged to pay certain
fees.

Polish authorities prepare Environmental Policy every 4 years, which define ecology-related
targets, priorities, actions and resources needed. Regional and local authorities prepare their
own – voivodship, poviat and commune environmental protection programmes, which are
coherent with National Environmental Policy. Polish authorities monitor the environment by
testing air, waters, soil, noise, radiation, environmental resources, emissions and waste
management regularly. Data is gathered and published in environmental reports. Additionally
entities that use the environment and are obliged by law or legal decision, must also monitor
emissions, gather data and make it available to national authorities.

Land use planning and local development plan of communes ensure maintaining
environmental balance and rational management of resources, thus these documents regulate
land usage and minerals’ exploitation. They also specify areas with mineral resources and
future needs for their exploitation, manage water and sewage systems, regulate soil, water
and air protection means.

A newly built or rebuilt construction / system may be commissioned when the following
requirements are met:

- technical solutions protecting the environment required by regulations or specified in
  administrative decisions were implemented;
- appropriate technological solutions, resulting from acts or decisions were implemented;
- necessary decisions which specify scope and conditions of using the environment were
  obtained;
- all tests and checks which result from emission standards and emission conditions defined in
  the permit were performed.

### 2.8.1 Emission standards

Such a construction or system must not be used if it does not meet emission standards or
emission conditions specified in the permit for the period of time after start-up within 30 days
after the start-up. If such a system is considered as having significant environmental impact (in
accordance with Act of 3rd October 2008 on providing information about the environment and
its protection, society’s participation in environmental protection and environmental impact
assessment), investor is obliged to inform Environmental Protection Inspector of a given
Voivodship about the planned time of commissioning and finishing the start-up process in 30
days prior to commissioning.
The Minister of Environment in cooperation with the Minister of Health specifies acceptable levels of certain substances’ concentration levels in the air for certain locations, acceptable frequency and amounts violating these levels.

National authorities are obliged to monitor air pollution levels and if in certain area air pollution exceeds acceptable limits, plants and factories within this area, using systems classified as having significant impact on the environment, may become obliged by Voivode to measure air pollution regularly (Environment Protection Law of 27th April 2001 Art. 95).

Any device operation should not produce emissions exceeding emission standards, should not greatly harm the environment or pose threats to human life or health.

Emission during off-normal operating conditions should result from justifiable technical requirements and may not be present longer than necessary. Off-normal operating conditions are in particular start-up, failure and system or device removal.

The Minister of Environment in cooperation with the Minister of Farming specifies standards for soil quality in the Minister of Economy Decree of 9th September 2002 on soil and ground quality standards (JoL 2002 no 165 item 1359).

The Minister of Environment specified noise limits for different locations and building types in a Decree of 14th June 2007 on acceptable noise limits (JoL 2007 no. 12 item 826). If a system or plant produces noise exceeding acceptable limits, authorities issue an official decision on acceptable noise level that apply for certain noise sources in given time. The entity is then obliged to measure the noise and provide authorities with results.

2.8.2 Environmental Impact Assessment

According to Art.140 the entity that uses the environment is obliged to meet environmental protection requirements by proper organization of work, employing staff with proper qualifications to ensure environmental protection, informing the rest of staff about all restrictions related to environmental protection, taking actions to eliminate or reduce environmental damages resulting from not following the environmental rules by the staff and preventing such situations in the future. The Minister of Environment may specify types of actions, systems and devices, production or operation of which requires specific qualifications due to their possible impact on the environment.

Each investment that may significantly influence the environment needs to be assessed in the environmental impact assessment. This procedure is different depending on the type of investment.

First stage of the procedure is submitting application for a decision on environmental conditions to proper authorities. Depending on the type of investment, these are:

Voivode – for projects from group 1,

Starost – for projects which include land integration, separation or exchange,

Director of Regional Directorate of State Forests – for projects related to state owned forest change into arable lands,

village or town Mayor or President of the city – for other projects;
The application must include the following attachments:

- environmental impact report (for projects from group 1) or information on the project (for other projects) (3 hard copies and 1 electronic copy)

Council of Ministers’ Decree of 9th November 2004, on specification of project types that may have significant impact on the environment (...) with later changes, divides projects into 3 groups

1 group – projects that may always have significant impact on the environment. Such projects must have environmental impact report performed obligatorily. The applicant may submit a request for specification of report’s scope to the organ. This group includes, among others:

- conventional power stations, thermal electric power stations or other systems fuelled with fuels in order to produce power or heat with thermal power not lower than 300 MW (understood as amount of energy introduced in fuel into the system within time unit with their nominal load);
- electrical power stations or overhead electrical power lines, with voltage rating not lower than 220 kV, and at least 15 km long;
- systems for crude oil, oil products, chemicals or gas transmission with external diameter at least 800mm and at least 40km long, with presses and let-down stations;
- crude oil, oil products and chemicals storage systems with total capacity at least 10 000 m3 with reloading devices;
- extracting crude oil or natural gas from deposits if the amount of extracted mineral is at least 18 000 tons of oil or 70 000 000 m3 of gas per year;
- extracting minerals from a deposit – with cut-and-cover method within an area not smaller than 25 ha; with the underground method or related systems for minerals processing with the throughput of at least 100 000m3 of a mineral per year;

2 group – projects that may potentially have significant impact on the environment – obligation to prepare environmental report is determined by the authority. This decision will contain information on report’s scope.

3 group – projects that may have significant impact on Nature2000 areas - obligation to prepare environmental report is determined by the authority. This decision will contain information on report’s scope.

- a copy of site layout showing the site’s boundaries and the whole area which will be influenced by the project. The copy must be certified by proper organ.
- precise of the Local Development Plan if such Plan was passed.
- precise of the Land Register showing the site and the whole area which will be influenced by the project.
- information on possible trans-border impact and areas protected by Environmental Protection Law which may be influenced by the project.

Second stage of the procedure is consultation with proper authorities. Consultation applies both to projects with obligation to prepare the report and those without the obligation. Organs which are asked for consultation are:

- for 1 group projects – voivode and voivode sanitary inspector,
for 2 group projects – Starost and poviat sanitary inspector,
for projects connected with roads and railways belonging to group 1 – environmental minister and voivode sanitary inspector;
The next stage of the procedure is social consultation and afterwards the decision is issued.

**Permit for introducing substances and energies into the environment** is necessary for systems that introduce gases and fumes into the air, sewage into waters or soil or produce waste. This obligation is determined by the environmental protection organ.

Permits are divided into gas or fumes introduction to the air permit, sewages introduction to waters or soil permit, waste production permit. These permits are issued on applicant’s request. Application should include many details on the applicant, system, fuels and raw material used, emission sources and amounts, results of measurements, technological drawings, etc. The permit is issued for a specified period of time, not longer than 10 years and may always be terminated by the organ if permit’s clauses are violated.

Gas or fumes introduction to the air permit does not apply to systems specified by the Minister of the Environment (Decree of 22nd December 2004, Journal of Laws 283 item 2840):

systems where none of substance’s release to the air does not create a situation in which acceptable levels of this substance’s concentration in the air are exceeded by 10% or in which basic values of this substance’s concentration in the air are exceeded by 10%;


systems that release gases or fumes in an unorganised way, without the use of technical means, not covered by emission standards;

energy systems with nominal thermal power less than – 5 MW when fuelled with hard coal; 10 MW when fuelled with coke, wood, straw, heating oil, gasoline, diesel or fuelled with coke, wood, straw, heating oil, gasoline, diesel and hard coal, however if nominal thermal power introduced in hard coal does not exceed 5MW; 15 MW when fuelled with fuel gas or fuel gas and hard coal, coke, wood, straw, heating oil, gasoline, diesel and hard coal, however if nominal thermal power introduced in hard coal does not exceed 5MW and in the rest 10MW;

non-energy systems with nominal thermal power up to 1 MW fuelled with hard coal, coke, wood, straw, diesel, heating oil, gasoline, gas fuel where gases or fumes introduced to the air come only from burning these fuels, or where gases or fumes introduced to the air that come from processes other than fuel burning do not exceed 10% of acceptable levels of this substance’s concentration in the air or 10% of basic value;

systems for liquid fuels transmission, reloading or storage.

Entities introducing substances and energies to the environment are obliged to perform emission measurements regularly. Requirements related to such measurements are specified in the Minister of Environment’s Decree of 23rd June 2004 on performing air emission
mechanical measurements and in the Decree of 2nd July 2004 on conditions to be met when introducing sewage into waters or soil and on substances particularly harmful for water environment.

Certain emissions require paying special fees which are specified by the Minister of Environment for each year separately. Fees cover half of the year and are due within the following month. Each entity must calculate their fee themselves according to rates defined by the Minister. 2009 rates are specified in the Minister of Environment Decree of 14th October 2008 on fees for environment usufruct. For example each ton of methane released costs 0.24 PLN.

Obtaining the permit for introducing substances and energies into the environment may take from 1 month to 2 months and may be obtained in Regional Directorate of Environmental Protection. The whole environmental impact assessment may take about 6 months.

Issues related to waters protection are regulated by Water Law of 18th July 2001 (JoL of 2005 no. 239 item 2019), in particular Section 3 – Waters Protection.

### 2.8.3 Fuel transport regulations and requirements (CNG)

CNG is distributed in Poland via CNG refuelling stations, where vehicles are fuelled. LNG on the other hand is transported via road transport in tanks. LNG is categorized as a dangerous substance thus transport LNG is regulated by European ADR Directive which specifies how it should be transported, marked and handled. Additionally there are Polish regulations issued e.g. Act of 28th October 2002 on road transport of dangerous materials (with later amendments). These regulations refer also to the obligation to notify proper authorities about the transport, provide information on the material transported, the drivers’ training which authorizes them to transport dangerous materials. Additionally these laws issue special codes of conduct for drivers so that they are trained how to handle dangerous materials during transport and what safety measures should be taken in certain conditions. The vehicles used for transport of dangerous materials should also meet the requirements stated in these Acts. In Poland there are several agencies supervising road transport of dangerous materials:

- Transportation Technical Supervision, which supervises vehicles used for transport of dangerous materials, issues authorizations for these vehicles, prepares training programmes for drivers and authorizes them to transport dangerous materials, prepares training programmes for persons who do O&M services of technical devices, certifies quality systems of technical devices etc.

- Main Inspectorate of Road Transport, which supervises if road transport regulations are followed relating to technical condition of vehicles, documents of transported material, drivers working time, method of transporting dangerous materials;

### 2.9 Energy laws

Power is produced in Poland in power plants, heat and power generating plants and from renewable sources. Power distributors deal with both power trading and distribution via distribution network.

Power is transmitted to end users through two networks owned by two separate entities: transmission network and distribution network. Power may be traded within three different market segments:
contract market,
exchange market,
balancing market.

Clients may be divided into two groups: households and others, buying power for industrial or business activities.

Power and its transmission are separate products / services. In 2007 trading and distribution services were differentiated. Since then each client buys power and transmission service from two separate entities. The client may choose the power provider, but transmission service is always provided by the company which manages transmission within the region, where the customer is located. Prices for purchasing power and its delivery are specified in tariffs which on the other hand must be approved by the Energy Regulatory Office [URE]. Client may choose to buy power from the local provider or from an alternative provider. Household’s purchasing power from local provider pay only for consumed power, and other clients pay additionally for fixed level of power, and if they exceed this level, they are obliged to pay for that. When purchasing from any alternative provider, i.e. from a producer, trader, at the exchange market or via an online trade platform the prices are individually formed between a client and a seller, or result from the rules of purchasing process. Generally, if a client decides to purchase power from alternative providers, he / she usually chooses to buy power from trading companies. Most active trading companies include: Vattenfall Sales Poland, PKE, Everen and Polenergia.

2.9.1 TPA rule
Power purchase from any provider is possible thanks to Third Party Access [TPA] rule. Third Party Access rule enables a client to use local distribution network for the purpose of power supply from any provider.

2.9.2 Operators
Power System Operators [OSP] and [OSD] are responsible for efficient operation of technical infrastructure in order to realize contracts between particular power market actors (manufacturers, consumers, traders, clients). All activities enabling power trade are realized by Trade Operators and Trade and Technical Operators.

Measuring and calculating power sold and purchased by particular market participants is possible due to the fact that operators have information on planned and actual power consumption by customers and production data from the manufacturer. This information is passed via WIRE [Power Market Information Exchange] software.

2.9.3 Energy Law
According to art. 32 of Energy Law of 10th April 1997 fuels or electricity production, storage, transmission, distribution and trade require obtaining a concession, however there are some exceptions from this obligation. The diagram below shows when concession is required.

Table 2 The obligation for obtaining concession (Acc to Art 32)
<table>
<thead>
<tr>
<th>Category name</th>
<th>Concession required</th>
<th>Concession not required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FUEL / ENERGY PRODUCTION</strong></td>
<td>- production of fuels or energies;</td>
<td>- production of solid or gassy fuels*;</td>
</tr>
<tr>
<td></td>
<td>- production of electricity from sources with total power ≤ 50MW not included into</td>
<td>- production of electricity from sources with total power ≤ 50MW not included into</td>
</tr>
<tr>
<td></td>
<td>renewable group or to sources producing energy in CHP systems;</td>
<td>renewable group or to sources producing energy in CHP systems;</td>
</tr>
<tr>
<td></td>
<td>- heat production from sources with total installed power ≤ 5MW;</td>
<td>- heat production from sources with total installed power ≤ 5MW;</td>
</tr>
<tr>
<td><strong>FUEL / ENERGY STORAGE</strong></td>
<td>- storing gassy fuels* in storage systems;</td>
<td>- local storage of liquid fuels in systems with the throughput &lt; 1MJ/s;</td>
</tr>
<tr>
<td></td>
<td>- liquefaction of natural gas and regasification of liquefied natural gas in LNG</td>
<td>- liquid fuels storage in retail trade;</td>
</tr>
<tr>
<td></td>
<td>systems;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- storing liquid fuels;</td>
<td></td>
</tr>
<tr>
<td>**FUEL / ENERGY TRANSMISSION,</td>
<td>- transmission or distribution of fuels or energies;</td>
<td>- gassy fuels* distribution via pipeline with the throughput &lt; 1MJ/s;</td>
</tr>
<tr>
<td>DISTRIBUTION**</td>
<td></td>
<td>- heat transmission or distribution if the thermal power ordered by receivers ≤ 5MW;</td>
</tr>
<tr>
<td><strong>FUEL / ENERGY TRADE</strong></td>
<td>- fuels or energies trade;</td>
<td>- trade in solid fuels;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- trade in electricity with the use of system with &lt; 1kV owned by a receiver;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- trade in gassy fuels* if annual turnover ≤ 100 000 EUR;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- trade in liquid gas if annual turnover ≤ 10 000 EUR;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- trade in gassy fuels or electricity on commodity exchanges by commodity brokerage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>houses that trade in commodities (acc. to Act of 26th October 2000 on commodity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>exchanges) and heat, if the thermal power ordered by receivers ≤ 5MW.</td>
</tr>
</tbody>
</table>

*Gassy fuel according to Energy Law, Art 3 a, is natural gas rich in methane or nitrogenised, including liquefied natural gas and propan-butane or other types of flammable gas, supplied via gas network, independently from its appropriation;

The Energy Regulatory Office grants licences to applicants whose business is based in the European Union, Switzerland or one of EFTA countries and have financial and technical resources to properly realize the project, will ensure that properly skilled personnel is hired,
have obtained a decision on conditions for land and building development. Entities that are being liquidated or had lost previous concessions due to violation of regulations in past 3 years or are convicted with a legally valid sentence for a crime related to this business activity, cannot obtain a concession.

Application for a concession must include applicant name and base address, commercial numbers, type of activity being the subject of application, plan of development for meeting the present and future energy and fuel demands, information on applicant’s business activities up to date, concession time with starting-up date (between 10 and 50 years), specification of resources being at the applicant’s disposal to properly realize the investment.

Granting the concession may require making a financial security by the applicant if there is a need to secure claims from third parties that may arise in relation to the project. The President of the Energy Regulatory Office may change the conditions of the concession if the applicant applies for it and may withdraw the concession if the applicant validates any of its regulations.

Producers who obtained concessions are obliged to pay annual fees, specified in Cabinet’s Decree of 5th May 1998 on the annual fees for energy companies which obtained concession. The first fee is due within 30 days after obtaining concession and next fees are due until 31 March of the year. The fee may not be lower than 200 PLN nor higher that 1 000 000 PLN and is calculated by the energy company itself on the basis of the following formula:

for electricity and gassy fuels production, storage, transmission distribution and trade:
income from activity covered by the concession from the previous year x 0,0006
or other fuels production, storage, transmission distribution and trade:

    income from activity covered by the concession from the previous year x 0,0004

However, producers of electricity from renewable sources with power \( \leq 5 \) MW are not obliged to pay the concession fee for power production from renewable sources.

An enterprise wanting to deal with fuels and energy production, storage, transmission, distribution and trade, thus obliged to obtain concession, may apply for concession promise. Energy Regulatory Office issues such promises for at least 6 months and within that time the application for concession may not be rejected provided that all information in the promise is still valid.

According to the Energy Law, Art 9a, item 1, an electricity producer or trader that sells this energy to end-users, connected to the grid within Poland, is obliged to obtain and submit to the President of Energy Regulatory Office the so called Energy Origin Certificates. For more details see “Energy Origin Certificates” fragment - pages 8 - 16.

2.9.4 Prices formation system

Prices of power, when power is sold to end-users connected to the grid, are regulated by the Energy Regulatory Office. According to Energy Law, Energy companies establish tariffs in consideration with own costs and receiver’s interest protection. These tariffs must be calculated on the basis of the Minister of Economy’s Decrees of 2nd July 2009 on specific rules of tariffs calculation in electricity trade, of 6th February 2008 on specific rules of tariffs calculation in gassy fuels trade and of 9th October 2006 on specific rules of tariffs calculation in heat supply. Tariffs must be submitted to the Energy Regulatory Office which approves
them so that they can be introduced. However the President of Energy Regulatory Office released certain entities of energy market from the obligation to submit tariffs for approval. Therefore, the following entities are released from this obligation:

- producers of electricity in CHP systems;
- energy producers selling to industrial sector;
- CNG traders;
- electricity traders acting on energy exchange;
- heat production

According to art. 47 of Energy Law, a heat producer who holds concession for heat production must calculate tariffs and submit them to the President of URE for approval. However, when heat is produced in sources (e.g. CHP systems) with total thermal power not exceeding 5 MW, the producer is not obliged to obtain the concession and thus is not obliged to submit tariffs for approval. For sources that exceed 5MW, the obligation to obtain concession applies and tariff approval obligation is regulated by the Decree of 9th October 2006 on detailed rules of heat tariff calculation.

2.9.5 Access to power grid

In order to access the grid for power purchase one needs to apply for it in local Power Distributing Company, for Silesian voivodship its is Vattenfall Distribution Poland SA.

The procedure includes:

- filling application form „Application for Technical Conditions of Connection“ and provide information on desired parameters and what maximum power is needed from the grid;
- attachments to this application include: parcel and neighbourhood map and title deed, company registration documents, technical diagram of power connection, an expert opinion on the influence on the national power system (if it is required), proxy letters (if applies)

afterwards the Company provides conditions for connection and attaches a proposal of Connection Contract

the applicant must submit a declaration on the condition of the system (prepared by an electrician)

the contract must be signed and sent to the Company, and advance must be paid

the Company will commission the system and make the connection to the grid.

In order to sell power to the grid the entity must enter into sale agreement with a distribution operator. The operator is obliged to give priority for transmission or distribution of power produced from renewable sources and in CHP systems. Within their regions, operators are also obliged to purchase power produced from renewable sources or in CHP systems by Polish manufacturers directly connected to the operators’ networks.
2.9.6 Energy production for own needs

According to Energy Law if power is produced from sources not exceeding 50 MW, the concession is not required unless the source belongs to renewable sources or it is produced in CHP systems, so if the power is used for own consumption no concession is required. However if the producer wants to generate income from energy origin certificates sale, the concession must be obtained; otherwise the certificates may not be issued. If the source exceeds 50MW or if the power is produced in CHP systems, concession must always be obtained.

Due to the fact that the new Excise Tax Law of 6th December 2008 is considered to be incomplete, there is still a dispute on the excise tax for energy used for own needs, and experts advise, that each entity that considers power production – even for own consumption – should submit an official letter to Revenue Office and ask for individual interpretation for this specific case.

2.10 References

[2-1] IEA 2006
[2-9] Decree of the Minister of Economy of 14th August 2008, Art 3
[2-10] Decree of the Minister of Economy of 26th September 2007, Art 9 item 2
[2-11] Decree of the Minister of Economy of 26th September 2007, Art 9 item 1
[2-12] polish energy exchange www.tge.pl
[2-13] 2008 report of the President of the Energy Regulatory Office
[2-14] Central Mining Institute of Katowice
[2-16] Source: PKN ORLEN SA archives
[2-18] (EU ETS) www.businessmonitor.com/power/poland.htmlwww.methanetomarkets.org/m2m2009/./partners_poland_coal_update.pdf,
3 Czech Republic

3.1 Economic situation

The major fact about Czech Republic are given in the table above.

**Tab. 3-1 Characteristics of Czech Republic [3-1]**

<table>
<thead>
<tr>
<th>Population</th>
<th>10.27 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>72.50 (billion 2000 US$)</td>
</tr>
<tr>
<td>GDP (PPP)</td>
<td>196.69 (billion 2000 US$)</td>
</tr>
<tr>
<td>Energy Production</td>
<td>33.42 (Mtoe)</td>
</tr>
<tr>
<td>Net Imports</td>
<td>12.76 (Mtoe)</td>
</tr>
<tr>
<td>TPES</td>
<td>46.05 (Mtoe)</td>
</tr>
<tr>
<td>Electricity Consumption*</td>
<td>66.85 (TWh)</td>
</tr>
<tr>
<td>CO₂ Emissions **</td>
<td>120.97 (Mt of CO₂)</td>
</tr>
</tbody>
</table>

Historically, the Czech economy development is a success story ever since the end of communist rule. The country, with a population of 10.2 Million, has an overall stable Democracy and attracted a lot of foreign investment in the last 20 years.

Economic stability and the membership of the country in the European Union attracted and grew investor’s confidence. Skilled and motivated labour was available, though during the last ten years the attractive low wage levels were becoming higher a little too quickly. People wanted to reach the European living standards fast and trained workers were becoming expensive, in the last three years some companies moved their production facilities back to Germany and Austria because of this development.

In 2008 the GDP reached 217 Billion US$. Export is strong, 85 % of all exports go the countries in the European Community and the majority of these exports are machines and transport equipment 53.5 % in 2008, followed by intermediate manufactured goods.

From 2004 to 2008 the average real GDP growth was a good 5.3 %, this year (2009) there will be a significant reduction to about 2 %.

The Czech Statistical office reports a downturn for the first half of 2009 and a reduction of more than 12 % in industrial production versus the previous year, sales from industrial activity dropped by 14 % and direct export sales decreased by 11 %. New order value also fell by 13 % and employment also fell by 13 %.

Based on falling consumer and business confidence the outlook for 2009 is rather negative, the Czech economy is expected to contract by about 3 %. The Prague Post just recently reported a double in Bankruptices in comparison to last year.
3.1.1 Financial Country Rating and outlook

S&P's affirms Czech Republic's sovereign credit ratings at 'A+/A-1' on economy

Due to the close ties with the European Union the Development in the Czech Republic will depend on the European Union speed of recovery in business and finance markets. Automotive and industrial machinery markets will have to pick up to improve the situation.

3.1.2 Local currency situation

The czech Korona took a deep dive from the middle of 2008, actually much earlier than other east European currencies, but recovered remarkably fast since. Ruble and Zloty dropped later and did not recover as early.

![Exchange rate of PLN versus Euro](image)
3.1.3 Ability to raise project financing for the Czech Republic

Czech Ministry of Industry and Trade supports energy savings and the use of renewable sources of energy in small and medium—sized enterprises through two programs that are part of the Operational Program - Industry and Enterprise.

The allocated support between 2004 and 2006 amounted to CZK 30 million. The amount of the granted support depended on project parameters.

Program ENERGY SAVINGS

The goal of the program is to support projects aimed at decreasing energy intensiveness in industrial plants through lowering energy intensiveness of processes associated with the generation, transformation and distribution of energy, new technologies of processing of energy raw materials.

Program RENEWABLE SOURCES OF ENERGY

The goal of the program is to support projects aiming at introduction of the generation of heat or electricity from renewable sources of energy, and projects aiming at cogeneration of heat and electricity using renewable sources of energy.

Operational Programme (OP) in Czech Republic in 2007-2013

OP Environment Cohesion Fund amounts to 4 215 mil. EUR, while ERDF: 702 mil. EUR. The Ministry of Environment is the Managing Authority and State Environmental Fund is the Implementing Authority.

Priority 3: Sustainable use of energy

Measure 3.1: Construction of the new installations and a reconstruction with the aim to increase the use of renewable energy sources for heat and electricity production and support for combined heat and power (CHP) production.

Actions supported (Co-financing from CF: 85%):

- Solar systems for the heat and hot water production and distribution.
- PV systems for electricity production.
- Heat pumps for the heat and hot water production and distribution.
- Biomass boilers for the heat and hot water production and distribution and electricity production.
- CHP units for production of heat and electricity from biomass, biogas.
- Geothermal systems.
- Wind farms.
- Small hydro power plants.

Eligible beneficiaries include public sector (municipalities, hospitals, schools, social houses, etc.), autonomous districts (municipalities, regions), foundations, charity and church organisations, public institutions, NGOs, landlords associations, companies owned by public sector institutions.

Priority 3: Sustainable use of energy
Measure 3.2.: Implementation of energy efficiency measures and use of waste heat.

Actions supported (Co-financing from CF: 85%)
Thermal insulation of buildings.
Replacement of windows.
Heat bridges minimisation.
Measuring and regulation.
Increase of efficiency of building energy systems.
Use of the waste heat for heat and electricity production.

Eligible beneficiaries include non-commercial sector (excluding family and panel houses).

Priority 3: Sustainable use of energy
Measure 3.3.: Environmentally friendly heating systems for physical persons.

Actions supported Co-financing (from CF): 85%
Installation of renewable energy systems for heat and hot water production (e.g. biomass, solar panels; heat pumps, waste heat use etc.).

Eligible beneficiaries include physical persons (support for family houses used for living).

OP Business and Innovation funds amount to 3 040 mil. EUR (ERDF).
The Ministry of Industry and Trade is the Managing Authority, and Czech Energy Agency is the Implementing Authority.

Priority 3: Efficient Energy
Operation 3.1.1: Energy savings and renewable energy sources.

Actions supported (Co-financing from ERDF: 85%).
Distribution of electricity and heat energy made of renewable energy sources.
Reconstruction of existing production equipment with the aim to utilize energy renewable sources.
Briquette and pellet production utilising energy renewable sources and alternative energy sources.
Modernisation of existing energy production devices to increase their efficiency.
Introduction and modernisation of measuring and regulation systems.
Modernisation, reconstruction and decrease of losses in energy and heat distribution systems.
Utilize waste energy in industrial processes.
 Improve thermal-technical properties of buildings, excluding family houses and residential buildings.
Increase energy efficiency via introduction of combined electricity and heat production.
Support for the entrepreneurship in Energy Performance Contracting and energy services.
Eligible beneficiaries include commercial subjects (small, medium, big sized companies 2) by course of law §2 Law No. 513/1991 Coll.2; support from this programme to large companies will be provided only if the company is not a multinational company or is not a part of such company and the number of company’s employees does not exceed 1250; physical persons; research institutes; universities.

Priority 3: National support for regional development

Measure 3.4.: Modernisation and development of urban planning systems.

Actions supported (Co-financing from ERDF: 85%):

Improvement of urban planning to increase attractiveness and quality of living in declining urban areas.

Sustainable use of energy sources.

Eligible beneficiaries include municipalities and the organisations managed by municipalities, regions and organisations managed by regions.

Support for transport from European and national funds

State support

State support is granted on the basis of the Czech Government Act of 4th June 2003 no 550. The Ministry of Transportation (Ministerstvo Dopravy) issues the rules of granting support from state funds annually. Funds are granted for for replacement of old buses by new ones, within the support program for modernization of local and regional transport fleets. Support is granted to those transport agents who provide transport services within a particular area. The support is granted as an investment subvention for purchasing new vehicle for local or regional transportation purposes.

Amount of support is specified in relation to the type of vehicle (e.g. bus) and may reach up to 30% of the net purchase price. Additionally 200 thousand CZK of support may be obtained for buses equipped with devices for the handicapped (platform for wheelchairs at entrances). About 900 thousand CZK of support may be obtained for buses fueled with CNG.

Voivodeships and communes’ support

Communes grant support for fleets modernization in the same amount as the state support, however support for 1 vehicle may not be accumulated, as the purpose is to give support for as many vehicles as possible. The support is given on the basis of expected and possible savings in exploitation of CNG vehicles in comparison to diesel fueled vehicles.

European support

After accession of Czech Republic to the European Union a new opportunity appeared – to use funds of European Regional Development Fund (ERDF) via Infrastructure Program within Priority 2 „Reduction of the negative impact of transport into the environment“, in particular item 2.3. Support for alternative fuels in transportation.

The program supports three project types: research projects related to the development of alternative drives, introduction of alternative fuels and implementation of technologies related to hydrogen manufacturing and storage for vehicles, and related to technologies of fuel cells for vehicles.
Reduction of the negative impact on the environment, especially reduction of GHG release, is the criterion for project selection. Project beneficiaries include applicants of research projects and legal entities dealing with transportation.

Tab. 3-2 Support from European Regional Development Fund, priority no 2 „Reduction of the negative impact of transport into the environment“ within years 2004 – 2006 (EUR) [ 3-4]

<table>
<thead>
<tr>
<th>Priority 2 Item 2.3</th>
<th>Public funds</th>
<th>National co-financing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>ERDF</td>
</tr>
<tr>
<td>2004</td>
<td>922 141</td>
<td>691 606</td>
</tr>
<tr>
<td>2005</td>
<td>1 320 800</td>
<td>990 600</td>
</tr>
<tr>
<td>2006</td>
<td>1 713 475</td>
<td>1 285 106</td>
</tr>
<tr>
<td>2004 – 2006</td>
<td>3 956 416</td>
<td>2 967 312</td>
</tr>
</tbody>
</table>

The condition for obtaining financial support is obeying the Decision of the Office of Competition Protection (Úřad pro ochranu hospodářské soutěže, ÚOHS) no. VP/S 78/04-160 of 29.04.2004, which specifies when public funding is not allowed.

Private funding
Private sector is interested in developing CNG fueling stations, however it is advised that the dense network of stations is built by gas industry sector. Financing of this development would constitute gas industry contribution in order to maintain the difference in prices of CNG and traditional fuels, i.e. petrol and diesel.

3.2 Price situation and outlook for competing products

Fig. 3-2 Average electricity prices for households from 2005 to 2009 in CZK/MWh

natural gas.

Fig. 3-3 Natural gas prices for industrial customers and households between 2006 and 2008, Note: in 2007 Q4 methodology of statistics changed in Eurostat [3-5]
PB95

![PB95 Price Chart]

Fig. 3-4 PB95 average prices within 2006-2007 [CZK/litre] [3-5]

Diesel
Fig. 3-5 Diesel average prices in CZK/litre within 2006-2007 [CZK/litre] [3-5]

LPG
The decrease of power production in thermal power stations reflected negatively into the level of extraction of fuels. Brown coal extraction decreased by 3.5%, including industrial coal decrease by 3.8%. Hard coal extraction decreased by 2.3%, including power coal by 2.5% (share 40.4%), and coking coal by 2.1%.

General economical slowdown and resulting decreased national and foreign demand affected power consumption. The scarcity of orders was compensated by production limits or even its termination (e.g. in Skoda Auto). As a result, total consumption decreased by 6% in 4Q of 2008.

Power production in 2008 decreased by 5.4% (in Q4 by 12.8%). As far as specific types of power plants are concerned: production decreased in plant fuelled with brown coal and hydro-electric power plants by 5.8%, while in nuclear power plants the production increased by 1.5%.

Wind plants doubled their production outcomes and solar plants increased the production six times, however these two are small power units and their share in total national power production is only 0.3%. Production of power from biomass firing increased by 26.9% in last 12 months, with total production share about 1.5%.

Total power export decreased by 24.2%, and import decreased by 16.5%.
Increase in mineral fuels import by 30.5% influenced their purchase prices, which rapidly increased until October 2008. Average raise in imported fuels prices during the year was 17.3%.

Brent crude oil purchase prices increased, and in June reached 135.01 USD/barrel, in June a rapid decrease started and in December 2008 it amounted to 41.50 USD/barrel; average price during the year was 98.55 USD/barrel which was 35.8% higher than in 2007.

Natural gas prices increased gradually until October when it reached 592.92/1000 Sm3, average price during the year was 478.28 USD/1000 Sm3, so the increase in last 12 months reached 55.3%.

Ministry of Industry and Trade published statistics on the volume of import shows that 10.8 MM tons of crude oil and oil products was imported which is worth 143.2 bln CZK, i.e. annual import volume increased by 3.8%, but annual import value by 19%. This import included 8.1 MM of crude oil (12.8% more than in previous year) and 2.7 MM tons of oil products (16.2% less than in previous year).

Total balance of power decreased by 10.8 billion CZK (to 5.5 billion CZK), which was caused by the increase of its import by 66% within last year. Power import increased by 18.4% to the level of 17.5 MM MWh, but due to the price raise, the value of imported power increased by 60.7%. Majority of power was bought from Germany (4.7 MM MWh), which is 66% more in amount and 108% higher in value than in previous year. 2.9 MM MWh was purchased from Slovakia, i.e. 3.6% more in amount and 38.8% in value than in the previous year. Power export decreased by 33% to the amount 14.7 MM MWh, but the value decreased by only 15%.
3.3 Tax situation

3.3.1 Income tax on legal entities

Legal acts regulating income tax in Czech Republic:

Act no 586/1992 on Income Tax
Act no 337/1992 on Tax Collection
Act no 563/1991 on Accountancy

Tax payers include legal persons and state-owned units according to specific regulations. Income from business activities is the subject of taxation.

Payers based in Czech Republic (CZR) are obliged to pay income tax on income earn within the area of Czech Republic and earned abroad. Tax-payers not based within Czech Republic are obliged to pay income tax on income earned in CZR (acc. to §17 Act no 586/1992 Journal of Law on Income Tax).

In case of income tax on income earned abroad one should take into consideration international agreements on avoiding double taxing. CZR entered into such agreements with Belarus, Bulgaria, China, Estonia, Croatia, Kazakhstan, Latvia, Lithuania, Moldavia, Mongolia, Russia, Ukraine, Vietnam, Poland, Slovakia, France, Germany, Great Britain, USA, etc.

Income tax exemptions refer only to non-governmental organisations and foundations, trade unions and political parties according to §19 of the Income Tax Act.

Income tax reliefs - according to §25 of the Act the following income components (or their parts) may be deducted from the tax base:

- 18 000 CZK for each employee with disability,
- 60 000 CZK for each employee with severe disability;
- ½ of tax in case of entity employing at least 25 employees, where the number of disabled employees exceeds 50% of personnel.

Income tax rate is 21% unless the Act states otherwise. The rate refers to the tax base with specific deducted (acc. §21 item 1 Income Tax Act). Special rates apply to entities not based in CZR but earning income in CZR and they are specified in §36 of Income Tax Act.

According to Act no 586/1992 income tax was lowered since the beginning of 2008 from 24% to 21%. The table below shows rates of income tax within last years and within next few years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>19%</td>
</tr>
<tr>
<td>2009</td>
<td>20%</td>
</tr>
<tr>
<td>2008</td>
<td>21%</td>
</tr>
<tr>
<td>2006-2007</td>
<td>24%</td>
</tr>
<tr>
<td>2005</td>
<td>26%</td>
</tr>
</tbody>
</table>
Advance payments for income tax are paid during „advance payments period” i.e. starting from first day after income tax statement deadline for previous accounting period and before the income tax statement deadline for next accounting period. Advance payment calculation should be based on last income tax statement. Tax payers whose last tax obligation did not exceed 30 000 CZK are not obliged to pay advance payments.

Legal entities are obliged to submit income tax statement for past accounting period or its part even if the tax base is 0 or negative (loss). The statement must be submitted within 3 months after the accounting period finishes, i.e. until 31st March of the following year.

If, on the basis of another Act, a tax payer is obliged to submit tax statement approved by an auditor, or is submitting the statement via tax advisor, then the statement may be submitted within 6 months after the accounting period finishes, i.e. until 30th June of the following year provided that they submit proper proxy before 31st March.

Tax statement forms are available in customer service of Revenue Office or at the Ministry of Finance web page www.mfcr.cz. The statement may be submitted to the Revenue Office personally or via the Internet.

Legal entity is obliged to pay the whole tax within 3 months after the accounting period (until 31st March of the following year). Tax must be paid in Czech currency and each time, the payer must indicate type of tax he/she is paying. The tax may be paid in cash or via wire transfer into Tax Revenue Office bank account.

Delay in tax payment results in obligation to pay punishment. The punishment consists of the payment plus 14% interest rates per each day of delay.

### 3.3.2 Value Added Tax

An entity becomes a Vat Payer optionally or obligatorily if:
- the entity’s annual turnover exceeds 1 MM CZK in the previous year, or
- the entity is a member of consortium, where one of members is a VAT payer, or
- obtains property during privatization process or company sale, or
- purchases goods exceeding 326 000 CZK, cars or goods with excise tax from another UE country (§94 VAT Act), or
- provides certain type services for foreign entity - VAT payer, which does not have offices in CZR or entity which is not a VAT payer and is not based and does not have offices in CZR.

Basic VAT rate is 19%, but in certain situations reduced VAT rate may be used. Until 2008 reduced VAT rate was 5%, but since 2008 it is 9%. Reduced VAT rate applies to most food products and goods of special importance for health care, social services, and similar activities. It is also applied to services, including wheelchair maintenance, water distribution,
public transportation, health and social care, the care of children, ill and elderly persons provided in hospices, and many cultural activities.

VAT exemptions are limited to the following:

- income from renting facilities and equipment,
- educational services and goods provided and used by registered schools, educational institutions, and universities, and by accredited vocational training facilities; exempt also are educational and free-time activities provided by state subsidized organizations and by not-for-profit NGOs of youth and children,
- health insurance, services and goods provided by licensed entities to patients and persons covered by public health insurance, with the exception of ophthalmologist's services and pharmacological products, but including transportation of patients by specialized transportation means,
- services and goods closely related to the protection and education of children and youth provided by public subjects or juridical persons that were not established for entrepreneurial purposes,
- rendering of working persons to churches and similar organizations to undertake activities related to tax exempt educational and social services,
- provision of sport and physical training related services by juridical persons that were not established for entrepreneurial purposes,
- provision of cultural services and related goods related by the regional government, by a community, or by a juridical person established by the Ministry of Culture or juridical persons that were not established for entrepreneurial purposes,
- provision of services and goods by persons whose activities are exempt for educational, health care and social purposes provided that such goods are sold and services provided exclusively during occasional actions organized to raise funds for support of activities for which the organizations have been established, unless such an exemption would jeopardize market competition.

VAT must be paid by anyone whose turnover exceeds 1 million CZK (about USD $67,000) within the preceding 12 month period of time. Goods imported by an NGO from other EU member states up to a total value of CZK 326000 (about USD $21,750) within a calendar year are not included in the VAT calculation, with the exception of new cars or goods subjected to the consumption tax. Also, any legal entity, including an NGO that accepts certain services from any VAT payer within the EU, must report receipt within 15 days to be identified as a VAT payer. Services include: consulting, providing legal advice, accounting, data processing and information rendering, translating and interpreting. Services related to the transport of goods from abroad are exempt. The penalty for non-compliance with this reporting requirement is calculated as 10 percent of the value of the goods acquired without paying the VAT. The penalty for a regular VAT payer for not registering is calculated as 10 percent of the total turnover starting from the beginning of the fiscal period.

Under certain conditions, it is possible to apply for a rebate of paid VAT. For example, if an NGO receives a donation or grant from abroad as a part of activities supported by an
international agreement, it can request a rebate of VAT paid. The exception does not include grants provided by the European Union through its regular structural funds programs.

### 3.3.3 Property tax

Real property tax is not imposed on property occupied in a building belonging to and serving a foundation, school, museum, art gallery, public library, health or social care institution, or an organization exclusively engaged in environmental protection. Undeveloped plots of land are also exempt from taxation if they belong to a foundation with an endowment or to a PBC and serve its purpose. Certain categories of buildings are also exempt from the property tax. These include buildings belonging to associations, PBCs, churches and foundations, if the buildings house schools, libraries, museums, galleries, archives, health or social services, foundations, associations of handicapped people, or are used exclusively to improve the environment or for religious activity.

### 3.3.4 Custom duties

Exemption from customs duties is tied to the nature and purpose of the goods rather than the type of organization importing them. Goods are exempted from customs duties only if: (i) they are donated; and (ii) there is no equivalent produced in the Czech Republic, or its importation would not jeopardize the interests of Czech producers. Goods eligible for exemption are those used for educational purposes, scientific work (such as equipment and tools), goods to be used to improve the cultural and living standards of handicapped people, goods to be distributed free of charge for charitable purposes, and items to be used by the blind.

Since May 1, 2004, the Czech Republic has been a member of European Union. Therefore, goods imported by an NGO from any other member state of the European Union, up to a total value of EUR10,000 during a fiscal year, are exempt from import taxation and custom duties.

### 3.3.5 CNG tax policy of Czech Republic

Excise tax for natural gas as a fuel (CNG) was changed many times. The tax rate was originally 2 CZK/m3 and increased to 4 CZK/m3. In 1992 the tax rate was again 2 CZK/m3 and starting from January 1994 the rate was lowered to 0 CZK/m3 until 31. 12. 2003.

Excise Tax Act no 353/2003 introduced in 01.01.2004 the rate 3355 CZK/t of natural gas for vehicles, which equals 2,35 CZK/m3 CNG. Although the tax rate for other fuels increased as well, however it was CNG competitiveness what worsened, as the rates of other fuels did not increased so rapidly. (Increase: CNG by 2, 35 CZK/m3, gasoline by 1 CZK/litre, diesel by 1, 80 CZK/litre, LPG by 1,083 CZK/kg).

European Directive 2003/96/UE established a minimum rate of the excise tax for CNG 125 €/ton (i.e. 3937 CZK acc. to exchange rate 31.50 CZK/€). The concept of pro-ecology tax reform assumes a gradual increase of excise tax rate. The program aims at stabilization of the tax rate for CNG and LPG at the level of the minimum required by UE until 2020. This means that currently the rate will be maintained at the level of 125 €/ton (the rate is updated annually in October). If the minimum rate is changed by the UE, the rate in Czech Republic will be adjusted.
Excise tax stabilization is aimed at supporting CNG development in automotive industry i.e. creating stable conditions by guaranteeing prices for investment planning.

Tab. 3-4: Excise tax for fuels in CZK – the concept of pro-ecology tax reform (EDR – ekologická daňová reforma)

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Unit</th>
<th>2004</th>
<th>increase in excise tax rate acc. to EDR tax reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>1000 l</td>
<td>11 840</td>
<td>11 840</td>
</tr>
<tr>
<td>ON</td>
<td>1000 l</td>
<td>9 950</td>
<td>9 950</td>
</tr>
<tr>
<td>Bio-diesel</td>
<td>1000 l</td>
<td>6 866</td>
<td>6 866</td>
</tr>
<tr>
<td>CNG</td>
<td>t</td>
<td>3 355</td>
<td>3 646</td>
</tr>
<tr>
<td>LPG</td>
<td>t</td>
<td>3 933</td>
<td>3 933</td>
</tr>
</tbody>
</table>

* not specified

More information about tax legislation can be found in [3-7]

3.4 Implementation status of Kyoto protocol

The actual status of each country in the Kyoto process can be tracked on UNFCCCs website. Important dates are:

- Date of signature: 23 November 1998
- Date of ratification: 15 November 2001
- Date of entry into force: 16 February 2005

There are more than 70 JI projects approved in Czech Republic approved after the the track 1 procedure. These are landfill, biogas, small hydro projects and one project mitigating the nitrous oxide. The Methodical Guideline for Submitting and Approving Joint Implementation Projects in the Czech Republic [3-8] gives following high-priority areas as specified for JI projects there:
Heating of buildings in public sector and residential buildings, in particular reconstruction of air pollution sources and central heating systems, insulation and regulation.

Utilization of waste industrial heat for existing facilities.

Utilization of renewable sources of energy.

Construction of collection systems for landfill gas for old landfills and energy use thereof.

Greening of public transport.

CMM are not listed as high priority projects and in the fact there was no information found about any CMM projects approved.

3.5 Energy politics (preferences for sources of primary energy)

![Energy consumption pie chart]

Fig. 3-8 Energy consumption in the Czech Republic in 2007 [3-9]
The Czech Republic has moderate coal and lignite reserves, but many of those are not suitable for mining expansion. Environmental and economic factors limit the expansion.

The Czech Republic has total recoverable reserves of approximately 5.2 billion tonnes. Approximately 1.7 billion tonnes is bituminous and approximately 3.5 billion tonnes is sub-bituminous or lignite (brown coal). According to the Czech Republic's State Energy Policy, 2004, coal, particularly lignite, will remain the country's primary energy source in coming decades, despite increased use of natural gas and nuclear energy. The government expects coal, including black (hard) and brown (lignite), to account for 30.5% of total consumption in 2030. Coal production has been steadily declining, but in 2002, 64 million tonnes were produced in the Czech Republic.\[3-10\]

The Czech Republic domestically provided for 1.135 Quad of its total energy consumption of 1.779 Quad in 2005 (EIA, 2008). Its limited domestic energy resources primarily comprise coal, supplying 43.6 percent of the country’s indigenous energy (IEA, 2007a). Producing 62 million tonnes of coal in 2005, the Czech Republic ranks twelfth globally in coal production, while its total recoverable coal reserves are estimated at approximately 5.6 billion tonnes (see Table 9-1).
The hard coal occurs mainly in the eastern Silesian region, the Ostrava-Karviná district in the Upper Silesian Coal Basin being the most important black coal field in the country. The brown coal is found mostly in the northwest Bohemian Basin (Fossil Energy, 2003). Other coal basins include the Lower Silesian coal basin (Zacler coal field) and the East Bohemian Coal Field (Kladno district) (Schwochow, 1997). The Republic is a net exporter of coal with mainly Slovakia, Austria, Hungary, and Poland as its customers for coking coal for iron and steel industries, and Germany, Austria, and Slovakia for steam coal (IEA, 2005).

There are some first steps in privatizing the formerly state-owned coal mines. The first major privatization will be two Czech coal-mining companies. The cabinet said that the deal, worth almost 5 billion crowns, will be used to improve the country's infrastructure, repairs of roads and railways be financed.

Also, the government will sell its majority stake in one of the smaller North Bohemian brown coal mining companies Sokolovska uhelna in a management buyout for 2.6 billion crowns to Sokolovska tezebni.

Sokolovska tezebni was original offer was around two billion crowns for the government's majority stake in the mines. The bid was then increased by 500 million.

The other mining company to undergo privatisation is the North Moravian OKD where the government holds a 46-percent stake. It will be sold to its majority owner Karbon Invest for 2.25 billion crowns. The company increased its original bid by 800 million crowns.

In both cases, the government negotiated exclusively with these two bidders, and as Finance Minister Bohuslav Sobotka points out, this is going to be the first ever regular privatisation of mining companies in this country.

Option: Fixed Feed-in Tariff or Green Bonus

Fixed annually, guaranteed payback period of 15 years
Fig. 3-10 Structure of the heat production in the Czech Republic

Drawing above shows the structure of heat production in Czech Republic from different energy sources.

The structure of power production in Czech Republic is shown in the Fig. 3-9.

In the group - 2,33% energy produced in water power plants - 0,57% comes from installations up to 1 MW, 0,55% for units from 1 to 10 MW and 1,21% for units of a power of more than 10 MW.

Forecasts of coal utilization

So far, there is no uniform plan of decreasing the share of coal in meeting the energy demands. It is possible to forecast some falling tendency in connection with the development of renewable energy sources.

Heat production from renewable resources – historical data
Fig. 3-11 History of heat production from renewable sources within 2003-2007

Each position on drawing above shows/denotes/means:

1. biomass except from households, 2. biomass in/from households, 3. total biogas, 4. bio-degradable part of solid communal wastes, 5. bio-degradable part of industrial wastes (PRO) and alternative fuels (ATP), 6. heat pumps (ambient heat), 7. solar heat collector, 8. liquid bio-fuels, 9. total

State energy goals

Tab. 3-5 shows state energy goals according to the Ministry of Environment. The forecasts are based on the assumption that average efficiency of energy production from primary sources is 52,2%, whereas from renewable sources [RES] – 85,0%.

Table 1. State energy goals according to the Ministry of Environment. Energy stated in peta joules (PJ). Where two numbers are presented, the one at the top is minimum, the one at the bottom is maximum.

**Tab. 3-5 state energy goals according to the Ministry of Environment**

According to UE methodology

<table>
<thead>
<tr>
<th>Kind of document:</th>
<th>Final energy consumption from RES</th>
<th></th>
<th>RES share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Other RES</td>
<td>Biomass</td>
<td>Total</td>
</tr>
<tr>
<td>Solutions proposed by EC</td>
<td>40,74</td>
<td>84,32</td>
<td>125,06</td>
</tr>
<tr>
<td></td>
<td>103,05</td>
<td>143,79</td>
<td>1106</td>
</tr>
</tbody>
</table>

According to Czech Republic methodology

<table>
<thead>
<tr>
<th>Kind of</th>
<th>Assumed RES potential</th>
<th>Primary</th>
<th>RES share</th>
</tr>
</thead>
</table>

---

Basics on country situation
Deliverable No. 1
Basics on country situation
Deliverable No. 1

<table>
<thead>
<tr>
<th>document:</th>
<th>Other RES</th>
<th>Biomass</th>
<th>Total</th>
<th>energy sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solutions proposed by CR</td>
<td>46,40</td>
<td>96,04</td>
<td>142,44</td>
<td>1850</td>
</tr>
<tr>
<td></td>
<td></td>
<td>117,37</td>
<td>163,77</td>
<td>2127</td>
</tr>
</tbody>
</table>

Potential approved by Czech Republic government (acc. to CR methodology)

<table>
<thead>
<tr>
<th>Kind of document:</th>
<th>Assumed RES potential</th>
<th>Primary energy sources</th>
<th>RES share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other RES</td>
<td>Biomass</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Government resolution</td>
<td>46,40</td>
<td>112,70</td>
<td>159,10</td>
</tr>
<tr>
<td></td>
<td>136,52</td>
<td>182,92</td>
<td>2127</td>
</tr>
</tbody>
</table>

Potential approved by Czech Republic government (acc. to EC methodology)

<table>
<thead>
<tr>
<th>Kind of document:</th>
<th>Final energy consumption from RES</th>
<th>Final energy consumption</th>
<th>RES share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other RES</td>
<td>Biomass</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Government resolution</td>
<td>40,74</td>
<td>98,95</td>
<td>139,68</td>
</tr>
<tr>
<td></td>
<td>119,86</td>
<td>160,60</td>
<td>1106</td>
</tr>
</tbody>
</table>

The calculation of the efficiency results from the consumption of primary and renewable energy sources diminished by the loses during energy transformation. Lower value of the efficiency than the one calculated by Trade and Industry Ministry results from the accepted lower average efficiency, especially in heat production, at individual and communal consumers. Loses at RES represent only loses for biomass and biogas utilization. In case of wind power plants as well as small water-power plant zero transformation loses are assumed.

Tab. 3-6 Development of RES in Czech Republic according to EU and the State Energy Policy. Source: Trade and Industry Ministry

<table>
<thead>
<tr>
<th>Goal for 2010 acc. to EU</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>goal 2010</th>
<th>SEP goal 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of RES power production in total gross production</td>
<td>3,9%</td>
<td>4,3%</td>
<td>4,9%</td>
<td>2,8%</td>
<td>4,0%</td>
<td>4,5%</td>
<td>4,9%</td>
<td>4,7%</td>
<td>8%</td>
<td>16–17%</td>
</tr>
<tr>
<td>Share of RES energy in total primary energy consumption</td>
<td>2,1%</td>
<td>2,2%</td>
<td>2,0%</td>
<td>2,7%</td>
<td>2,9%</td>
<td>3,99%</td>
<td>4,3%</td>
<td>4,8%</td>
<td>6%</td>
<td>15–16%</td>
</tr>
</tbody>
</table>
Goals for RES in Czech Republic for 2020 according to EU

Climate – energy package defines a draft of EU directive regarding reaching the goal in climate change and RES, as well as criteria for balanced development of bio-fuels.

Goal assigned to Czech by EU is 13% share of energy from RES in the total state final energy consumption in 2020.

Government of CR on 21.11.2007 approved a potential of renewable energy sources in Czech Republic in the amount of 8,6% of total consumption of primary energy in 2020.

### 3.6 Energy-consumption of industry

The indicator of industry energy-consumption shows with what efficiency the industry is able to transform the primal energy sources into usable economical effect. Currently, the energy-consumption of industry decreases. Probably this decrease is related to implementation of new technologies, innovations, savings activities, related to the change of production structure connected with transition from heavy industry to light industry, as well as to economic recession.

![Fig. 3-12 History of industry energy-consumption ([blue] gross added value acc. to prices in 2000, billions of CZK; [red] fuel and energy consumption in industry, [green] industry energy-consumption) [3-11]](image)

To calculate the energy-consumption of industry the annual data gathered since 1995 was used; data regarding fuels and energy consumption in industry for 2008 is the estimation of the Ministry of Trade and Industry. The graph shows falling tendency of industry energy-consumption. A clear decrease of energy-consumption was observed at the end of the decade (1991-2000), when the economical transformation proceeded with recession in heavy industry.
At the same time other industry branches with lower energy-consumption were developed. In 2008 the industry energy-consumption reached level of 0.445; energy-consumption of gross added value was at the same time on the level of 0.613.

According to estimated calculations of the Ministry of Trade and Industry, the share of fuels and energy consumption in the industry in the total final fuel and energy consumption utilized in national economy was 39.7% in 2008, which is 4.9 percentage points less than in 1996.

Gradual change of the structure of industrial production manifested not only in lower energy-consumption of the production but also in the change of the structure of energy utilization. Within last years the consumption of the so called “noble” kinds of energy increased to the disadvantage of solid fuels consumption.

In comparison with 2003 the share of solid fuels utilization decreased by 3.4 percentage points to the level of 46.8%, whereas gas fuels share decreased by 0.6 percentage points to the level of 18%. The opposite tendency was observed in case of liquid fuels (growth of 3.7 percentage points to the level of 22.2%) and in case of secondary energy (electrical and heat): growth of 0.4 percentage points to the level of 12.9%.

### 3.7 Support mechanisms for Energy from Renewable Sources

The system of purchase prices and green premiums

In Czech Republic it is possible to obtain support for energy production from renewable sources [RES] in 2 mechanisms i.e. green premiums or the so called purchase prices. Both forms consist in compensating the difference resulting from different costs of power production in various sources (renewable and non-renewable). The price of power produced from RES is usually higher in comparison with the one produced from conventional sources. The remaining difference is paid by the state in the form of green premiums or purchase price, and their price is annually fixed and published in price decision by URE [Energy Regulatory Office].

**Green premium** may be obtained by the producer of power from RES, if the power is used for own needs (e.g. in a house), and possible excess is sold to the power grid. If producers want to use this form of support, they must find customers for power by themselves.

However, if the RES power is not used for own needs, but only sold to distribution grid, it cannot obtain green bonus, and the price for this power is called **purchase price**. If the producer chooses this option of support, the operator of distribution system (or transmission system) is obliged to buy all power produced in a given renewable source.

Both mechanisms - green premiums and purchase prices - are paid by the operator of distribution system (or transmission system) depending where the installation is connected.

Purchase prices and green bonuses in 2009

Source: URE price decision no 8/2008 of 18th November 2008 specifying support for power production from renewable sources, produced in CHP systems and from non-conventional sources. VAT is not included in presented prices.

---

### Energy Source / Date of commissioning

<table>
<thead>
<tr>
<th>Energy Source / Date of commissioning</th>
<th>Purchase Prices CZK/MWh</th>
<th>Green Premiums CZK/MWh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AV</td>
<td>HT</td>
</tr>
<tr>
<td>Small hydroelectric power stations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>commissioned on new sites after 1 January 2008, inclusive</td>
<td>2 700</td>
<td>3 800</td>
</tr>
<tr>
<td>commissioned on new sites between 1 January 2006 and 31 December 2007</td>
<td>2 540</td>
<td>3 800</td>
</tr>
<tr>
<td>commissioned after 1 January 2005, inclusive, and refurnished small hydroelectric power stations</td>
<td>2 300</td>
<td>3 470</td>
</tr>
<tr>
<td>commissioned before 1 January 2005</td>
<td>1 790</td>
<td>2 700</td>
</tr>
</tbody>
</table>

### Biomass

<p>| Electricity generation by firing O1 category biomass only in new electricity generating plants or generating units after 1 January 2008, inclusive | 4490 | 2950 |
| Electricity generation by firing O2 category biomass only in new electricity generating plants or generating units after 1 January 2008, inclusive | 3460 | 1920 |
| Electricity generation by firing O3 category biomass only in new electricity generating plants or generating units after 1 January 2008, inclusive | 2570 | 1030 |
| Electricity generation by firing O1 category biomass only before 1 January 2008 | 3820 | 2280 |
| Electricity generation by firing O2 category biomass only before 1 January 2008 | 3130 | 1590 |
| Electricity generation by firing O3 category biomass only before 1 January 2008 | 2480 | 940 |
| Electricity generation by co-firing category S1 biomass fuel mixtures and fossil fuels | - | 1350 |</p>
<table>
<thead>
<tr>
<th>Description</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity generation by co-firing category S2 biomass fuel mixtures and fossil fuels</td>
<td>-</td>
<td>690</td>
</tr>
<tr>
<td>Electricity generation by co-firing category S3 biomass fuel mixtures and fossil fuels</td>
<td>-</td>
<td>40</td>
</tr>
<tr>
<td>Electricity generation by parallel firing of P1 category biomass and fossil fuels</td>
<td>-</td>
<td>1620</td>
</tr>
<tr>
<td>Electricity generation by parallel firing of P2 category biomass and fossil fuels</td>
<td>-</td>
<td>960</td>
</tr>
<tr>
<td>Electricity generation by parallel firing of P3 category biomass and fossil fuels</td>
<td>-</td>
<td>310</td>
</tr>
</tbody>
</table>

**Biogas, landfill gas, sludge gas, and mine gas from closed mines**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogas firing at AF1 category biogas stations</td>
<td>4 120</td>
<td>2 580</td>
</tr>
<tr>
<td>Biogas firing at AF2 category biogas stations</td>
<td>3 550</td>
<td>2 010</td>
</tr>
<tr>
<td>Firing of landfill gas and sludge gas from waste water treatment plants after 1 January 2006</td>
<td>2 420</td>
<td>880</td>
</tr>
<tr>
<td>Firing of landfill gas and sludge gas from waste water treatment plants between 1 January 2004 and 31 December 2005</td>
<td>2 730</td>
<td>1 190</td>
</tr>
<tr>
<td>Firing of landfill gas and sludge gas from waste water treatment plants before 1 January 2004</td>
<td>2 840</td>
<td>1 300</td>
</tr>
<tr>
<td>Firing of mine gas from closed mines</td>
<td>2 420</td>
<td>880</td>
</tr>
</tbody>
</table>

**Wind farms:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind power plants commissioned after 1 January 2009, inclusive</td>
<td>2 340</td>
<td>1 630</td>
</tr>
<tr>
<td>Wind power plants commissioned between 1 January 2008 and 31 December 2008</td>
<td>2 550</td>
<td>1 840</td>
</tr>
<tr>
<td>Wind power plants commissioned between 1 January 2007 and 31 December 2007</td>
<td>2 620</td>
<td>1 910</td>
</tr>
<tr>
<td>Wind power plants commissioned between 1 January 2006, inclusive</td>
<td>2 670</td>
<td>1 960</td>
</tr>
</tbody>
</table>
### Basics on country situation

#### Deliverable No. 1

<table>
<thead>
<tr>
<th>2006 and 31 December 2006</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind power plants commissioned between 1 January 2005 and 31 December 2005</td>
<td>2 930</td>
<td>2 220</td>
</tr>
<tr>
<td>Wind power plants commissioned between 1 January 2004 and 31 December 2004</td>
<td>3 070</td>
<td>2 360</td>
</tr>
<tr>
<td>Wind power plants commissioned before 1 January 2004</td>
<td>3 410</td>
<td>2 700</td>
</tr>
</tbody>
</table>

**Geothermal energy**

| Electricity generation using geothermal energy                                             | 4 500  | 3 140  |

**Solar radiation**

| Electricity generation using solar radiation after 1 January 2009, with an installed capacity of up to 30 kW, inclusive | 12 890 | 11 910 |
| Electricity generation using solar radiation after 1 January 2009, with an installed capacity of over 30 kW               | 12 790 | 11 810 |
| Electricity generation using solar radiation, for generating units commissioned between 1 January 2008 and 31 December 2008 | 13 730 | 12 750 |
| Electricity generation using solar radiation, for generating units commissioned between 1 January 2006 and 31 December 2007 | 14 080 | 13 100 |
| Electricity generation using solar radiation, for generating units commissioned before 1 January 2006                  | 6 710  | 5 730  |

Acts related to Renewable sources of energy

**180 ACT of 31 March 2005** on the promotion of electricity production from renewable energy sources and amending certain acts (Act on Promotion of Use of Renewable Sources)

The Office issued 3 Notices to this Act:

**Notice No. 475/2005 Coll. of 30 November 2005**, which implements certain provisions of the law on support for the use of renewable sources

The Notice specifies terms and details of the way power produced from OZE is supported, e.g. dates of publication of the intent to introduce power from OZE into the market to obligatory purchase and technical and economical parameters.
Notice No. 364/2007 amending the Notice no. 475/2005 to Act 180/2005 introducing some resolutions on OZE support

The Notice amends required technical parameters of OZE.

**Notice No. 502/2005 to Act 180/2005** specifying the method of measuring the amount of power produced in parallel firing of biomass and OZE

The Notice specifies the way of measuring the amount of power produced from OZE in parallel firing of biomass and conventional fuels. Furthermore, it defines the method of demonstrating the actual use of total purchased biomass for power production.

**458 Act of 28th November 2000** on Business Conditions and Public Administration in the Energy Sectors and on Amendment to Other Laws (the “Energy Act”)

The Office issued the following Notices to this Act:

**Notice No. 140/2009 to Act 458/2000** specifying the way of prices regulation in energy sector

**Notice [Ministry of the Environment] no. 482/2005** specifying the type of biomass, its parameters and the way of usage in case of support for power production from biomass


**The Energy Regulatory Office’s Price Decision No. 8/2008** of 18 November 2008, laying down support for electricity generation from renewable energy sources, combined heat & power, and secondary energy sources

### 3.8 Other information on tariffs for energy from renewable sources

Polak [3-12] elaborated on Czech strategic target of the share of RES power in total national usage. The author states that according to some information this share in 2008 was about 5,5% and the target for 2010 is 8%.

Sradecný [3-13] mentions that the prices for new plants producing RES power lowered as it was expected. In case of new purchase prices for photovoltaic and wind plants this fall was 5%. From January 2009 photovoltaic plants under and over 20kW will be differentiated, as the purpose is to support and promote small sources.

The so called **3rd Energy Package** [3-14] was approved by the European Parliament. That fact means that the compromise proposed by the Czech Republic was officially approved.

The third energy package contains Directives on common rules for the internal market in electricity and gas, Regulations on conditions for access to the network for cross-border exchanges in electricity and gas and the Regulation establishing an Agency for the Cooperation of Energy Regulators.
Each Member State will be able to opt for the approach that is best suited to its specific conditions. The third energy package contains three equivalent options for the ownership separation of production and transmission activities of gas and electricity companies.

The first option implies strict ownership separation of energy production and the transmission system. The second option presumes the setting up of an independent system operator (ISO), to operate as an ownership unbundled operator securing energy transmission on another party’s assets. The third option provides for legal separation of the transmission system and energy production by setting up an independent transmission operator (ITO).

The Czech Presidency and the European Parliament reached agreement on the final wording of the liberalisation package at the end of March. The EP approved the package by a vote in the plenary on 22 April 2009.

The third energy package also extends the rights of the customers of energy companies. After the package comes into effect, the customers will have the right to change their energy and gas supplier free of charge within three weeks. The original supplier will be obliged to send them the final account within six weeks. Energy companies will also be obliged to provide their customers with all necessary data concerning their consumption and pay compensation if they fail to keep quality standards. Electricity distributors will also have to equip 80% of their customers’ households with intelligent consumption meters by 2020. This measure is however conditional on the positive outcome of an impact study.

### 3.9 Exemption from Tax on Natural Gas

Act No. 261/2007 Coll. on the Stabilization of the Public Budget, which came into effect on January 1st, contains a new provision in Section 45 that introduces a tax on natural gas and certain other gases. This law requires end consumers to pay tax on the date of supply or consumption of gas. The natural gas tax rate for heat production is CZK 30.60 per MWh.

However, gas used for the following purposes is exempt from tax:

a) the production of heat in households (the tax therefore does not apply to Residential customers) and residential heating units,

b) the production of electric power,

c) cogeneration, if heat from the combined production of electric power and heat is supplied to households,

d) fuel for water transport (excepting private recreational vessels),

e) metallurgical processes,
f) mineralogical processes, and

g) purposes other than driving motors or the production of heat, where the relevant technology generates heat.

Customers using natural gas designated for heat production in residential heating units who are eligible to receive tax-exempt natural gas must, by no later than on January 15, 2008, submit a Sworn Statement to stating that the applicable residential heating unit meets the conditions for being exempted from the natural gas tax in accordance with the above law. Based on the current interpretation of the Czech Ministry of Finance, the term residential heating unit designates:

a heating unit located directly in the building to which it supplies heat, where more than one-half of the floor area in the building meets the conditions and is used for permanent residential purposes, or

a heating unit located directly in the building to which it supplies heat, where such a residential heating unit also supplies heat to an adjacent building or a group of buildings via a heat distribution network; at the same time, more than one-half of the floor area in each of such buildings must meet the conditions and be used for permanent residential purposes.

Customers using natural gas for the purposes set out under Letters b) through g) are entitled to receive supplies of tax-exempt natural gas if they obtain the necessary permit issued by the customs authorities. However, they must submit to Pražská plynárenská, a.s., by no later than on January 15, 2008, a copy of the confirmation that an application for the permit has been filed with the customs authorities.

3.10 Mining and mine safety laws

The detailed definitions regarding safety for underground coal mines are included in the following legal acts:


Basics on country situation
Deliverable No. 1


Decree of Czech Mining Office ČBÚ no 72/2002 Sb., regarding the demethaning of the coal mine.

The following regulations should be considered in developing CMM projects:
Decree no 597/2006 Sb. – government decree regarding the monitoring and air quality assessment (Nařízení č. 597/2006 Sb. Nařízení vlády o sledování a vyhodnocování kvality ovzduší)

National programme of the emission reduction in Czech republic (Národní program snižování emisí České republiky) together with National programme of lowering the emission of solid pollutants, nitrogen and sulphur oxides from the existing extra large emission sources.

Updated material version 03 after completing with volatile organic compounds by the company DHV CR Prague, February 2003.

Legal basis:
The obligation to prepare a national programme of emission reduction results from the §6 sections 2–5 Act no 86/2002 Sb. Regarding air protection and change of some other acts (Zakon č. 86/2002 Sb., o ochraně ovzduší a o změně některých dalších zákonů), hereinafter referred to as OP Act (Air Protection Act).
The term of preparing the programme of emission reduction resulted from §54, section 3 of the OP Act and was defined for June 20th 2003. The scope of the programme of emission reduction resulted from attachment no 2 of OP Act and was specified in the government decree no 351/2002 Sb (see below)

Current limits for year 201 are as follows:

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO2</td>
<td>283 thousand tons</td>
</tr>
<tr>
<td>NOx</td>
<td>286 thousand tons</td>
</tr>
<tr>
<td>Volatile Organic Compounds (VOC)</td>
<td>220 thousand tons</td>
</tr>
<tr>
<td>NH3</td>
<td>101 thousand tons</td>
</tr>
</tbody>
</table>

The values result from Goteborg protocol, signed by Czech Republic in 1999, regarding limitation of acidifying, eutrophication and ozone in earthbound layer, to the Agreement of European Economical Committee of UN dated 1979 regarding long term atmospheric pollution exceeding the countries boundaries.
3.11 Environmental laws

The following regulations should be considered in developing CMM projects:

**Decree no 597/2006 Sb.** – government decree regarding the monitoring and air quality assessment (Nařízení č.597/2006 Sb. Nařízení vlády o sledování a vyhodnocování kvality ovzduší)

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Legal basis:

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**Decree no 351/2002 Sb.** Defining emission limits of some air pollutants as well as method of preparation and carrying out inventory control, and emission planing (Nařízení vlády 351/2002, kterým se stanoví emisní stropy pro některé látky znečišťující ovzduší a způsob přípravy a provádění emisních inventur a projekcí), especially §6.

Current limits for year 201 are as follows:

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Limit (thousand tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO2</td>
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</tr>
<tr>
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<td>101</td>
</tr>
</tbody>
</table>

The values result from Goteborg protocol, signed by Czech Republic in 1999, regarding limitation of acidifying, eutrophication and ozone in earthbound layer, to the Agreement of European Economical Committee of UN dated 1979 regarding long term atmospheric pollution exceeding the countries boundaries.

3.12 Energy laws

The following documents are needed to make a connection to the power grid. They are available at [www.cez.cz](http://www.cez.cz).

application for issuing a decision on connection to distribution grid
This application must be submitted by the energy producer to the grid operator if he/she intends to supply power from new location and if intends to increase reserved power consumption for own needs. Only after obtaining a positive decision and meeting terms included in the decision it is possible to apply for a contract for power purchase and for connecting the production plant.

application – agreement for making a connection between the production plant and distribution system with low/high/very high voltage

own production plant form

This form needs to be attached to the application for issuing the decision on connection

application for agreement on power production support

After the connection agreement is concluded, (and meeting technical conditions of production plant) one may apply for agreement on power purchase [on preferential terms].

Access to public grid

Access to national grid is regulated by specific regulations of conditions of power distributions. The company ČEZ Distribuce, A.S., based in Diečín (Děčín) is an Operator of the Distribution System directly connected to transmission system. The Operator issues the so called „Conditions for power distribution acc. to Energy Law and related regulations and technical standards“ [DEE Conditions] in order to ensure equal access of market participants to the distribution system. The Operator ensures exploitation of the distribution system according to conditions and standards specified in regulations and standards being in force. The Operator is obliged to connect each entity to the distribution system and enable each entity, that applies and meets conditions and terms, to distribute power. Power distribution is realised on the basis of an Agreement concluded with each entity that submits required application acc. to regulations in force i.e. Notice no 541/2005 Coll. Rules of power market.
3.13 References

[3-1] IEA 2006

[3-2] The Economist country briefing and, Czech Statistical Office 01.09.09 13.30 h
http://www.economist.com/countries/CzechRepublic/


[3-4] European Commission


[3-6] Ministry of Industry and Trade data


http://www.climnetcee.org/JI/Czech%20Methodical%20Guidelines_EN.doc

[3-9] Statistical pocketbook 2010 Part 2 Energy, online version

[3-10] (http://www.methanetomarkets.org/m2m2009/documents/toolsres_coal_overview_ch9.pdfmethane to
markets Oct 18, 2009 15:34 h)


[3-12] Polak, R., Energy Regulatory Office Support for RES power purchase, 02.03.2009


[3-14] Bartovsky, T., Liberalization of European energy Sector Approved, statement of Press Officer of
the Ministry of Industry and Trade, 22.04.2009.
4 Ukraine

4.1 Economic situation

Ukraine has a population of 46 Million and the GDP in 2008 was 180 billion US$. The country heavily depends on the export of non-precious metals (41 %), Machinery and equipment and food/agricultural products (16 % each)

Ukraine has a major ferrous metal industry, producing cast iron, steel and pipes. Another important branch is the country’s chemical industry which includes the production of coking coal, mineral fertilizers and sulfuric acid. Manufactured goods include metallurgical equipment, diesel locomotives, tractors and automobiles. The country possesses a massive high-tech industrial base, including much of the former USSR’s electronics, arms industry and space program. Ukraine is a major producer of grain, sugar, meat and milk products. [4-1] Ukraine’s economy went through a sharp decline in 2008, 2009 is a recession year. The economic growth slowed to 2.1% versus the previous year, real GDP will probably shrink by 17 %. The 2009 budget was based on overly optimistic macroeconomic parameters and targets. Consumer inflation went up to 22.3% vs. 2008. There is some indication that things might improve or relax for the rest of 2009. Ukraine’s currency lost about 60% of its value with respect to the US Dollar in 2008. Depreciation and a deep economic crisis are threatening banking sector stability; although monetary and government authorities are active in addressing banking sector threats and challenges. “During February 2009, two international rating agencies downgraded Ukraine’s sovereign ratings. December’s figure brought the cumulative industrial output decline to 3.1% yoy in 2008. Signs of a growth rebound may be attributed to a sharp Hryvnia devaluation in 4Q 2008, which allowed Ukraine’s exports to reap some competitive gains even in a weak external environment.” [4-2]

Nevertheless, early Q1 data confirmed that strong and well-planned action to revive economic growth will be needed, devaluation alone cannot be enough. Contributing to the external weaknesses are wages declining by about 12% versus the previous year early 2009, and the unemployment is growing. Ukraine is a lower middle-income country, with a GDP per capita of US$ 3,210, and significant economic potential as a result of its well educated labor force, large domestic market, access to a variety of resources including some of Europe’s best agricultural land, significant coal and some oil and gas reserves, and a strategic location connecting Europe, Russia and Asian markets. Ukraine experienced a solid recovery since the 1998-99 financial crises, with annual growth averaging above 7 percent between 2000 and 2007. By late 2007, the economy was showing increased signs of overheating, with pressures intensifying in the first half of 2008. By the fall of 2008, the global financial crisis exposed Ukraine’s inherent macroeconomic vulnerabilities and led to an economic crisis. [4-3] The transit gas dispute with Russia is regularly making headlines every winter and still is not resolved. Russia’s gas supply can be cut off; the transit gas pipelines have repeatedly not delivered with Russia and Ukraine blaming each for the shortcomings. A number of industrial enterprises had no more or very little access to gas and therefore were forced to reduce or stop production. The reduced gas available was directed to support heating and electricity producers as a priority, and other energy resources were hard to come by. Consequently,
nearly the whole industry, both export and internal oriented market, experienced a drastic reduction of activities. This was the worst downturn in more than 10 years. The government now plans to recapitalize NAFTOGAZ, the national oil and Gas Company, so it will be able to fulfill its obligations for energy imports.

Ukraine’s industrial output sank by 34.1% year on year in January, worst hit were metallurgy, chemicals, and machine-building industries. Production of chemicals was reduced by 49.6% yoy. Production of machinery has dropped by 58.3% yoy, mainly driven by a 64.3% yoy decline in the production of transport vehicles. Production of metals and metal products plummeted by 46% yoy, industrial production from January to April still was down 32 % versus the same time 2009. Still, there was some light at the end of the tunnel, since coke and oil-refining increased in output. Despite the fact that demand for coke from the metallurgical industry fell and world crude oil prices were low, demand for fuel oil as an alternative to natural gas was strong, and there was 2.4% growth in output on a low overall base for this industry.

As a result of the credit squeeze the construction industry went down, housing prices fell, and private and government investments were significantly reduced. The building industry had a 57.6% yoy decline in the value of construction works. Overall trade and cargo transportation turnovers dropped by 33.5% yoy and 32.5% yoy respectively, due to a strong reduction of overall industry activities. As a result of falling consumer demand retail sales dropped by 7.8% yoy and passenger transportation by 5.7%. In April first signs of stabilization were reported. The IMF relaxed the fiscal budget requirements to a deficit of 4 % of GDP, and a portion of the IMF money will be used to cover the fiscal gap.

<table>
<thead>
<tr>
<th>Tab 4-1</th>
<th>Introduction of Ukraine [4-4]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>46.79 million</td>
</tr>
<tr>
<td>GDP (official exchange rate)</td>
<td>$117.1 billion (2009 est.)</td>
</tr>
</tbody>
</table>
| GDP - real growth rate: | -14.1% (2009 est.)  
2.1% (2008 est.)  
7.9% (2007 est.) |
| Inflation rate: | 12.3% (2009)  
22.3% (2008) |
| Energy Production | 82.77 Mtoe |
| Net Imports | 56.20 Mtoe |
| TPES | 137.43 Mtoe |
| Electricity Consumption [4-5] | 159.06 TWh |
| CO₂ Emissions [4-5] | 310.29 Mt of CO₂ |
Fig. 4-1 Real GDP, % change y/y [4-6]

### Tab 4-2 Key Macroeconomic Indicators [4-2]

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009F</th>
<th>2010F</th>
<th>2011F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal GDP, UAH billion</td>
<td>345.1</td>
<td>441.5</td>
<td>544.1</td>
<td>720.7</td>
<td>949.9</td>
<td>918.0</td>
<td>1021.7</td>
<td>1156.9</td>
</tr>
<tr>
<td>Real GDP, % change</td>
<td>12.1</td>
<td>2.7</td>
<td>7.3</td>
<td>7.9</td>
<td>2.1</td>
<td>-15.0</td>
<td>1.0</td>
<td>3.5</td>
</tr>
<tr>
<td>Consumption, % change</td>
<td>9.7</td>
<td>15.7</td>
<td>12.4</td>
<td>13.6</td>
<td>9.0</td>
<td>-21.0</td>
<td>0.4</td>
<td>4.6</td>
</tr>
<tr>
<td>Fixed Investment, % change</td>
<td>20.5</td>
<td>3.9</td>
<td>21.2</td>
<td>23.9</td>
<td>1.6</td>
<td>-47.3</td>
<td>4.1</td>
<td>10.2</td>
</tr>
<tr>
<td>Export, % change</td>
<td>21.3</td>
<td>-12.2</td>
<td>-5.6</td>
<td>3.3</td>
<td>5.2</td>
<td>-16.1</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Import, % change</td>
<td>15.5</td>
<td>6.4</td>
<td>6.8</td>
<td>21.5</td>
<td>17.1</td>
<td>-39.7</td>
<td>0.4</td>
<td>7.3</td>
</tr>
</tbody>
</table>

#### 4.1.1 Financial Country Rating and outlook

March-April 2009 Standard and Poor’s data showed that the pace of economic decline in a number of sectors (e.g., industrial production, construction, and passenger transportation) has slowed. Inflation has notably decelerated, the national currency has stabilized in April-May, and the current account gap narrowed dramatically in 1Q 2009, falling by almost 32% yoy over
January-April 2009. According to various estimates, real GDP shrunk by more than 20% yoy in 1Q 2009. [4-7]

Ukraine’s credit rating was cut two levels by Standard & Poor’s in February, a day after Latvia was downgraded to junk, because political turmoil poses growing risks to the country’s International Monetary Fund loan. The long-term foreign currency rating was lowered to CCC-, eight levels below investment grade, the rating company said in an e-mailed statement. Ukraine’s rating is now the lowest in Europe and on a par with Pakistan. S&P left Ukraine’s outlook negative, indicating it may reduce the ratings further.

A possible recovery is predicted for 2010, but this was also hoped for the second quarter 2009 earlier this year and did not materialize.

### Tab 4-3  Standard and Poor currently rates: [4-8]

<table>
<thead>
<tr>
<th>Rating (Local Currency)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B+/Stable/B</td>
<td>May 17, 2010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rating (Foreign Currency)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/Stable/B</td>
<td>May 17, 2010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rating (uaA+)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>--/--/--</td>
<td>May 17, 2010</td>
</tr>
</tbody>
</table>

Moody’s: B2 and the situation isn’t stabilizing. [4-9]

#### 4.1.2  Local currency situation

As already mentioned, Ukraine’s currency lost about 60% of its value with respect to the US Dollar in 2008. Depreciation and a deep economic downturn are challenging banking sector stability; however, monetary and government authorities are active in addressing banking sector difficulties. Following the sharp drop in the third and fourth quarter of 2008 and high volatility in the first quarter of 2009 the currency started to stabilize and gained 5.3% in April and May.

The current account deficit widened to $11.9 billion or 6.7% of estimated GDP in 2008.

The Hryvnya (code: UAH), has been the national currency of Ukraine since September 2, 1996. It replaced the Karbovanets at the rate of 1 hryvnia = 100,000 karbovantsiv. The hryvnia is subdivided into 100 kopiok.

Official NBU exchange rate at moment of introduction UAH 1.76/USD 1.

In the period from 21 April 2005 through 21 October 2008 the official exchange rate remained stable at around UAH 5/USD 1. Since then the hryvnya abruptly lost one-third of its value, dropping to around UAH 7.5/USD 1 by mid-December 2008. [4-10]
4.1.3 Ability to raise project financing for the specific country

It is extremely difficult to rely on the Ukraine’s government for financial support in CMM projects. Further privatization of the industry and creating a healthy competitive environment would change this situation, but this is not a fast process.

In Ukraine, in practice, options of Kyoto projects financing depend largely on the form of ownership.

Private companies typically use their own or borrowed funds, and only in extreme cases attract funding from foreign partners. Examples of full funding or a significant proportion of its own funds are the projects of companies DTEK, Donetsksteel, Metinvestholding.

State mines are subsidized and are not able to bring their own means. Raising credit from Ukrainian banks is not possible because of high lending rates - 25-35% in UAH and 13-17% in other currencies with the liquid bail value of two to three times higher than the volume of credit. [4-12]

Participation of foreign partners in the project with the state-owned mines has its difficulties because of a deficient regulatory framework. State enterprises can’t establish joint ventures with Western companies, and sign a contract on joint activity requires coordination with the
Cabinet of Ministers of Ukraine. But the procedure is missing, and in practice this form of cooperation is impossible. Therefore, most investment in full is made by Western JI-partners (at the expense of future ERU’s) without any guarantee and with a 100% risk of the investor.

For these reasons JI-projects are implemented with private coal mines, and only with two state enterprises.

The state's role is largely confined to simplify the procedures for processing projects (go by Track 1), provide information and consultancy support.

Ukraine is actively seeking ways to finance the Kyoto projects. This is due, primarily, to a large carbon potential. Ukraine has a leading position in the rating of countries hosting JI-projects

[4-13]

4.1.4 Price situation and outlook for competing products

The market prices for the above products were highly volatile in the past and it would seem probable that they will also be highly volatile in the future. The price for carbon credits ranged between less than 10 euro/ unit to more than 25 euro/unit in less than 12 months.

The price of crude oil a leading benchmark for all primary energy sources fluctuates between 40 and 150 US-Dollar per barrel on world markets trading. In some countries the prices for primary energy fuels are still regulated and below world market prices. Different taxes may be implied on different sources of primary energy or subsidies might be given to some sources like renewable energies or power/fuels based on CMM.

Tab 4-4  Prices for coal and gas: [4-14]

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal, grn. per 1 tone</td>
<td>680,79</td>
<td>605,84</td>
<td>436,28</td>
<td>328,87</td>
</tr>
<tr>
<td>Gas, grn. per 1000 m3</td>
<td>2025,25</td>
<td>934,7</td>
<td>720,0</td>
<td>414,0</td>
</tr>
</tbody>
</table>

Tab 4-5  Consumption of natural gas: [4-14]

<table>
<thead>
<tr>
<th>Customers</th>
<th>2008</th>
<th>2009 (8 month)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gas amount, million m3</td>
<td>Costs, Million grn.</td>
</tr>
<tr>
<td>Public</td>
<td>17 095,1</td>
<td>4 477,8</td>
</tr>
<tr>
<td>budgetary organizations</td>
<td>916,2</td>
<td>1 105,7</td>
</tr>
<tr>
<td>Municipal heat enterprises</td>
<td>8 286,0</td>
<td>7 137,0</td>
</tr>
<tr>
<td></td>
<td>Gas amount, million m3</td>
<td>Costs, Million grn.</td>
</tr>
<tr>
<td>Public</td>
<td>10 364,9</td>
<td>4 110,4</td>
</tr>
<tr>
<td>budgetary organizations</td>
<td>536,8</td>
<td>1 301,8</td>
</tr>
<tr>
<td>Municipal heat enterprises</td>
<td>6 213,1</td>
<td>7 355,6</td>
</tr>
</tbody>
</table>
Industrial enterprises | 12 536,9 | 17 992,6 | 6 085,6 | 14 989,3

Power consumption:
2007: 186 143,8 million KW·h;
2008: 185 150,7 million KW·h;
2009 (8 month): 108 689,7 million KW·h;

Power and heat costs:
2008: 54 526,4 million grn.
2009 (8 month): 38 063,3 million grn.

Source: Ministry of fuel and energy of Ukraine

According to the Ukraine Law “On Heat Supply”, heat tariffs should cover all the economically sound expenses for heat production, transportation and supply. Tariffs should include full costs of heat production and provide for a marginal profitability level that is not lower than the level defined by the Cabinet of Ministers on the base of calculations by the central body of executive power in heat supply.

Tariffs for heat that is produced by CHPs, co-generation or alternative/renewable energy sources are set by the National Electricity Regulation Commission (NERC) but they should not be higher than heat produced by other sources. [4-15]

During 1999-2006 there was no change in electricity tariffs for private consumers. In 2005 the average weighted electricity tariff for industry accounted for UAH 0.198 per kWh, for private consumption – UAH 0.156 per kWh. These were the world’s lowest tariffs for electricity. In 2006 power tariffs for private consumers were raised twice, by 25% in May and by 25% in September. The differentiation of private power tariffs started in April 2007, depending on the amount consumed. According to the suggested scheme, the first 125 kWh will be charged at the current price, and above this limit costs 60% more. [4-16]

In December 2008 the law on “green tariff” was passed, which gave companies the possibility to make profits on the generation of electricity and use of alternative energy sources. In January 2009 the “green” electricity price was 0.6624 UAH per kWh.

On September 1st, 2009 the National Electricity Regulation Commission (NERC) has raised the “green” electricity price. Today it is 0.8708-1.27 UAH (without VAT) depending on the source. The new prices are based on the rate 1122,97 UAH/100 EUR for 21.08.2009.

However, the procedure for registration of “green” projects is complicated and not fully regulated, so there is still no project with a “green tariff”. In addition, for each JI-project the impact of the tariff for “Additionalty” should be defined.
4.1.5 Tax situation.

Personal income is taxed at a flat rate of 15% (raised at the beginning of 2007 from 13%). The corporate tax rate is 25%, and the rate of value-added tax (VAT) is 20%. The 2006 budget reduced the social insurance tax to 30.8%. [4-17]

The government has not changed tax rates (except excise duties) since 2007 when the personal income tax (PIT) rate was raised to 15% (from 13%). That was the final stage of the PIT reform initiated in 2004.

The most serious revisions took place in 2005 when the government eliminated tax privileges for Special Economic Zones (SEZ).

In addition, in 2006 Ukraine and Russia moved to new schemes on natural gas supplies. According to new arrangements, gas supply was subject to VAT taxation, which was not the case before. In 2008 the new VAT reforms changed the tax base.

Charges on foreign exchange transactions (F/X) are gradually being reduced and are expected to be abolished after 2009.

Although the debt on the VAT reimbursement to exporters remains high, there has been noticeable progress in the VAT administration in recent years. The most important one was introduction of the VAT electronic reporting in April 2008.

Unfortunately, tax legislation has not been systematized so far. For many years politicians and officials have discussed the necessity of adopting the Tax Code, however, there had been no progress. As a result, spontaneous permanent amendments to the tax legislation are introduced. [4-18]

There is a fee for environmental pollution - a fixed amount in UAH per unit of major pollutants. [4-19]

On May 21st 2009 President of Ukraine V. Yushchenko signed the the Law "On Coal Mine Gas (Methane)". According it, the profits of Ukrainian enterprises, resulting from the production and use of gas (methane) of coal deposits, from 1 January 2010 to January 1, 2020 will be exempt from taxation. [4-20]

Import duties are levied in accordance with the Ukrainian Unified Custom Tariffs, which were approved on January 13, 1993 (the "UCT"). The UCT provides for three levels of custom duties for products being imported into Ukraine:

preferential;
most favored nation;
full.

The first level is applied to products, originating (I) from countries with which Ukraine has entered into a customs union, (II) from countries with whom Ukraine has created special customs zones, (III) from countries which have provided "preferential" treatment to the Ukraine pursuant based on bilateral agreement and (IV) countries which are classified as "developing countries" by the Ukraine (the list currently includes 145 countries), except for those products from developing countries, which fall within classification # 25-97.
The second level is applied to those countries, which have granted Ukraine a most favoured nation status and to products from developing countries, which fall within classification # 25-97. Currently, thirty countries have established a most favoured nation regime with Ukraine.

The third level is applied to all other goods.

In 1996 Ukraine introduced import licenses. Goods subject to import licensing include: agricultural chemicals, pharmaceutical products (except dental materials and sutures), veterinary medicines, cosmetics, sporting weapons, self-defence articles and hygiene products. [4-21]
4.2 Implementation status of Kyoto protocol

Date of signature: 11 March 1999
Date of ratification: 18 November 2004
Date of entry into force: 16 February 2005 [4-22]

The Ministry states that in 2004 the GHG emissions in the Ukraine came up to about 45% of the 1990 level, the forecast 2006 was that in 2012 they will not exceed the 1990 level. This has to be seen in the context of the economic downturn after the end of the Soviet Union in the 90s and the modernisation and recovery since then, it might mean the country will not have to support any specific measures to fulfil its commitments with regards to the Kyoto Protocol. Fuel and energy consumption dropped from 340 mtce (million tons coal equivalent) to 185 mtce during the decade 1990 to 2000.

Nevertheless there is a national plan of measures on fulfilment of provisions of the Kyoto Protocol. The aims are achieving the following results:

- Creating a national inventory system for greenhouse gas emissions and removals;
- Establishing a national GHG registry;
- Creating an infrastructure for joint implementation (JI) projects;
- Development of a national GHG emissions trading system;
- Regular preparation of National Communications;
- Development of national and regional plans on climate change mitigation;
- Development of a database of environmentally sound technologies. [4-23]

Ukraine signed the Kyoto Protocol on March 15, 1999 in New York City. It was ratified by Ukrainian Parliament on February 4, 2004. The date of entry into force is February 16, 2005. On April 29, 2008 Ukraine met all eligibility criteria under the Kyoto Protocol.

For the economic stimulation of GHG emissions reduction the Kyoto Protocol offers flexible mechanisms. Two of them are relevant for Ukraine:

Joint Implementation Projects (Article 6 of KP);

Emission trading (Article 17 of KP).

The Ministry of Environment Protection bears prime national responsibility for JI. All project proposals must be submitted to it. It holds sole responsibility for identifying ecologically viable projects that meet the requirements of the Kyoto Protocol and (can) contribute to attaining Ukraine’s climate protection targets. The ministry also therefore acts as the focal point for foreign project developers, Accredited Independent Entities (AIEs) and financiers of JI projects. Founded at the beginning of May 2007, the National Agency for Ecological Investments is engaged in appraisal and selection procedures.
Tab 4-6  **Total quantity of JI Projects in Ukraine [4-13]**

<table>
<thead>
<tr>
<th>JI Projects</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>JI Projects submitted to the Agency/Ministry</td>
<td>129</td>
</tr>
<tr>
<td>Letters of Endorsement issued</td>
<td>124</td>
</tr>
<tr>
<td>Letters of Approval issued</td>
<td>24</td>
</tr>
<tr>
<td>Estimated Emission Reductions</td>
<td>129,7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Letters of Endorsement</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

2004 2005 2006 2007 2008

Fig. 4-3  **Quantity of issued Letters of Endorsement and Approval in 2004-2008 [4-13]**

Tab 4-7  **JI Projects Types in Ukraine [4-13]**

<table>
<thead>
<tr>
<th>#</th>
<th>Sectors/source categories</th>
<th>Number of JI projects</th>
<th>Estimated reductions in million tones CO2 eq. for 2008-2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Energy</td>
<td>79</td>
<td>105</td>
</tr>
<tr>
<td>1.1</td>
<td>Fuel combustion</td>
<td>56</td>
<td>59,6</td>
</tr>
<tr>
<td></td>
<td>Energy efficiency at manufacturing facilities</td>
<td>11</td>
<td>18,9</td>
</tr>
<tr>
<td>Description</td>
<td>Number</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>--------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>Utilization of flue gases in manufacturing processes</td>
<td>12</td>
<td>17.6%</td>
<td></td>
</tr>
<tr>
<td>Reconstruction and rehabilitation of the thermal power plants and district heating systems</td>
<td>20</td>
<td>7.8%</td>
<td></td>
</tr>
<tr>
<td>Switch from wet-to-dry process in cement production</td>
<td>4</td>
<td>6.2%</td>
<td></td>
</tr>
<tr>
<td>Reconstruction of the thermal electric power plants</td>
<td>6</td>
<td>4.3%</td>
<td></td>
</tr>
<tr>
<td>Construction of the wind electric power plants</td>
<td>1</td>
<td>3.0%</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation of the hydro electric power plants</td>
<td>2</td>
<td>1.8%</td>
<td></td>
</tr>
<tr>
<td>1.2 Fugitive emissions from fuels</td>
<td>23</td>
<td>45.4%</td>
<td></td>
</tr>
<tr>
<td>Reduction of leakage from natural gas district transportation pipelines</td>
<td>12</td>
<td>24.3%</td>
<td></td>
</tr>
<tr>
<td>Utilization of coal mine methane</td>
<td>11</td>
<td>21.1%</td>
<td></td>
</tr>
<tr>
<td>2 Industrial Processes</td>
<td>8</td>
<td>13.2%</td>
<td></td>
</tr>
<tr>
<td>Nitrous oxide abatement in nitric acid production</td>
<td>4</td>
<td>7.4%</td>
<td></td>
</tr>
<tr>
<td>Energy efficiency at industrial facilities</td>
<td>4</td>
<td>5.8%</td>
<td></td>
</tr>
<tr>
<td>3 Agriculture</td>
<td>3</td>
<td>0.75%</td>
<td></td>
</tr>
<tr>
<td>Utilization of manure methane</td>
<td>3</td>
<td>0.75%</td>
<td></td>
</tr>
<tr>
<td>4 Waste</td>
<td>34</td>
<td>10.7%</td>
<td></td>
</tr>
<tr>
<td>Utilization of landfill methane</td>
<td>26</td>
<td>8.6%</td>
<td></td>
</tr>
<tr>
<td>Utilization of vegetal waste</td>
<td>8</td>
<td>2.1%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>129.7%</td>
<td></td>
</tr>
</tbody>
</table>

The following 18 JI Projects were given the Letters of Approval by the Ministry of Environment Protection.

- Utilization of Coal Mine Methane at the Coal Mine named after A.F. Zasyadko.
- Electricity production from associated oil gas in Borislav.
- Using of Polygon gas on polygon Dergachi, Kharkov region, Ukraine.
• Switch from wet-to-dry process at Podilsky Cement.
• Methane extraction and its processing to carbon dioxide by burning in flare.
• Rehabilitation of the District Heating System in Chernihiv region.
• Improving energy consumption on Mini Metallurgical Plant ISTIL.
• HPPs Rehabilitation Project.
• Rehabilitation of the District Heating System in Crimea.
• Rehabilitation of the District Heating System in Donetsk Region.
• CMM utilization on the JSC named Komsomolets Donbassa Coal Mine of DTEK.
• CMM utilization on the JSC Coal Company "Coal Mine "Krasnoarmeyanskaya Zapadnaya number 1".
• CMM utilization on VP “Coal Mine Molodogvardeyskaya” OJSC "Krasnodonugol".
• CMM utilization on mine “Scheglovskaya Glubokaya” OJSC "Shachtoupravlenie Donbass" in the Donetsk region.
• CMM utilization on mine № 22 “Kommunarskaya” OJSC "Shachtoupravlenie Donbass" in the Donetsk region.
• Utilization of coal mine gas to produce heat and combustion at the mine Yuzhnodonbasskaya 3.
• Construction of wind power plants with total capacity of 300 MW in Crimea.
• Displacement of electricity generation with fossil fuels in the electricity grid by an electricity generation project with introduction of Steel Mill Waste Gas Firing Turbine power generation system at Alchevsk Metallurgical Plant.

However, more important, than these official dates is the fact how Joint Implementation projects are actually handled by the local governments.

Adopted regulations are already being actively applied in practice. Their practical efficiency is testified by the fact that the Ministry of Environmental Protection has already issued 43 letters of endorsement and 4 letters of approval for JI projects. To intensify and facilitate cooperation with potential investors in JI projects, inter-government memoranda of understanding are being concluded. To date, such memoranda are already signed with Canada, Denmark, Netherlands and the World Bank, and are being prepared for signing with France, Austria, Italy and Portugal.

Ukraine adopted a programme on state support of development of non-traditional and renewable energy source. The estimated annual technically achievable potential of non-traditional and renewable energy sources in Ukraine is approximately 79 mtce, which includes 63 mtce from renewable energy sources, and 16 mtce from waste energy. The strategic task of the programme is to achieve 8-10% share of non-traditional energy sources and alternative fuels in the total fuel and energy consumption of Ukraine.
Promising areas for development of non-traditional and renewable energy in Ukraine are bioenergy (waste wood and agricultural waste combustion, use of biogas, fuel briquettes, ethanol, and biodiesel), extraction and utilization of coal bed methane, use of thermal energy from environment, development of wind power plants, and utilization of economically feasible hydro potential of small rivers in Ukraine.

In particular, for development of wind energy special regulations were adopted. Besides, to finance construction of wind power plants, a separate law introduced targeted 0.75% surcharge to tariffs on electricity sold on wholesale electricity market of Ukraine. This law contributed to wind energy development. Thus, at the end of 2003, installed capacity of wind power plants reached 57.4 MW.

Reduction of methane emissions from operating mines is achieved through industrial extraction and use of coalbed methane, as well as trough supplementary measures envisioned by a programme of coal-bed degasification, which is an integral part of a programme to increase coal mines safety levels. As a result, 10% reduction of methane emissions by mines is achieved.

Implementation of these measures is financed primarily from targeted budgetary funds. Some types of activities (such as slaking of waste dumps, their reformation, equipping emission sources with filters etc.) are financed at enterprises’ own expense. [4-22]

Most of the coal companies in the Ukraine are state-owned and not profitable. Attempts to reorganize and streamline the management and organization in the state-owned mines did not have the desired effect. In the private mining sector, however, conditions are much better and a number of projects for CMM have been started successfully.

4.3 Energy politics (preferences for sources of primary energy)

Ukraine is important to world energy markets because it is a critical transit centre for exports of Russian oil and natural gas to Europe, as well as a significant energy consumer.

Ukraine’s geographic position, linking East and West, while also holding critical warm water ports on the Black Sea, has made the country a trade link of growing importance between the former Soviet Union and Europe for energy and other goods.

Ukraine is one of Europe’s largest energy consumers, and it consumes over twice as much energy per unit of GDP than Germany. In 2005, almost half of Ukraine’s energy consumption came from natural gas, and over 75 percent of this natural gas came from Russia. Since 2004, the price of imported natural gas from Russia has almost doubled. The economic impact of these price increases on the economy will depend on the pace at which Ukraine can implement energy efficiency reforms. [4-23]
Fig. 4-4  Map of Ukraine

Fig. 4-5  Energy production of Ukraine
Although the reorientation of trade towards Europe and Asia has resulted in an improved macroeconomic environment in Ukraine, political uncertainty remains problematic. Following the Orange Revolution in 2004, continued lack of clarity on the division of powers between the Ukrainian Parliament, or Rada, and the President continues to hurt the country’s investment climate.

“Ukraine is the world’s fourth largest emitter of methane emissions from coal mining activities (31.9 million metric tonnes of CO2 equivalent in 2000). Most of the attention to coal mine methane (CMM) development has been focused on the Donetsk basin due to its vast coal and methane reserves, large number of coal mines, high ranked coal deposits, and great depth of mining (often in excess of 2000 feet). Only about 4% of CMM liberated in Ukraine is used, presenting ample opportunities for coalbed and coal mine methane development.” [4-24]

By Global Carbon: Global Carbon developed the first Ukrainian JI project in the coal mine sector and is assisting in the sales of the emissions reductions. The project: Utilization of Coal Mine Methane at the coal mine named after A.F. Zasyadko, is also the biggest JI project in Ukraine in terms of generated emissions reductions, and the biggest Coal Mine Methane utilization project in Central and Eastern Europe.

The project will reduce approximately 7,350,045 tonnes CO2e in the period 2004 – 2012 of which 1,460,517 tonnes has already been monitored and verified in the period 2004 – 2007.

“The world's ninth largest coal producer, Ukraine has experienced a precipitous decline in coal production since 1990. Ukraine's annual coal production has stabilized at approximately 80 million raw metric tonnes in recent years. The state owns the coal mines and resources, including methane, but many successful mines are leased. In 2000, Ukraine had 232 active coal mines, all but three of which were underground. Most mines use long wall production. Ukraine has two main bituminous coal basins, the Donetsk in the southeast and the Lvov-Volyn in the northwest.” [4-24]
Coal production in Ukraine grew by 2.06% or 120,000 tons in February compared to January 2009, to 5.945 million tons, according to a report by the Ukrainian Coal Ministry. [4-25]

The production of coking coal rose by 10.18% or 195,000 tons, to 2.11 million tons, whereas that of steam coal fell by 1.89% or 74,000 tons, to 3.835 million tons. In January-February 2009, coal output totalled 11.77 million tons or 107.1% of the target. [4-26]

Ukraine’s total coal resources are estimated at 52 bn t. Commercial coal reserves are estimated at 34.2 bn t, of which 6.5 bn t is located in active mines. Of these reserves, some 3.5 bn t is steam coal and 3 bn t coking coal. Ukraine also has some lignite reserves. The main coal reserves (45.6%) are concentrated in the Donetsk coal basin. A further 34.2% is located in the Luhansk region, 15.3% in the Dnipropetrovsk region and the remaining 5% is located in the regions of Lviv, Volyn and Kirovograd. [4-25]

Until 1970, three quarters of the electricity in the Ukraine was generated by coal-fired thermal power plants. Today, only one quarter of the electricity is produced by solid fuels. The state economy is highly dependent on imported energy, in particular on natural gas and oil. Therefore, taking into account Ukraine’s considerable reserves, coal will remain the main source of energy for decades, guaranteeing its security of energy supply as well as its economic and political independence.

Currently, 160 mines are operational in Ukraine’s coal industry, including 139 mines supervised by the Ukrainian Ministry of the Coal Industry and 21 private mines.

Ukraine’s coal sector includes projects on coal mining processes, such as coal preparation, the development of new mines, and mining engineering. Scientific and research institutes, development laboratories and technological institutes also work for the coal industry.

The coal industry in Ukraine employs more than 300,000 people. Ukraine’s “Energy Strategy to 2030” envisages a series of measures to increase coal production to 90.9 million t by 2010 and, in the longer term, to 120 million t by 2015. To ensure the successful implementation of this strategy, it is planned to reopen 46 mines with a total production capacity of 28.5 million t, achieving a production increase of 11.6 million t.

Another 62 mines, with a combined capacity of 39.5 million t, will be modernized and technically re-equipped. This will ensure a 4.0 million t increase of capacity. The construction of another six new mines is planned, with an expected total capacity of 16 million t. As a result, by 2010, production capacities are expected to reach 108 million t and by 2015, 122.5 million t. 67 coal allotments with reserves of 13.1 billion t are being prepared to establish new mines and cuts buildings, with potential annual coal production reaching 124.9 million t, giving ground to optimistic forecasts for the future of the industry.

Ukraine ranks among the top ten coal-mining countries of the world. However, its technical and economical parameters and the occupational health and safety situation in its mines, lag behind many other coal-mining countries. The main factors that influence occupational safety and the high accident rate in the coal sector are the difficult mining and geological conditions, as well as the outdated state of the mines and mining equipment.

The average depth of mining has reached 700 meters. The maximum depth of coal mining has reached 1,332 meters, and some preparatory work is being undertaken at a depth of 1,386 meters. High-level scientific support is required for such operations. However, a lack of funding since 1991 has drastically reduced the number of scientists in scientific and technical
organizations. The result is a fall in scientific research, as well as in occupational health and safety in the Ukrainian mines.

As a result of economic restructuring in the sector, 101 mines are being closed down, and coal production decreased from 135.6 million t in 1991 to 75.5 million t in 2007. State-owned mines produced 42.2 million t (nearly 55.8%).

The quality of coal produced over the last twenty years has largely remained constant. Taking the modernization of plants into account, there is a real opportunity to improve the use of delivered coal.

The energy policy of the Ukrainian Government is aimed at adapting the enterprises to the market environment. Ukraine’s “Concept for the Development of the Coal Industry” outlines the conceptual principles approved for the leading mines until 2030 and beyond.

After allocation of the capital for technical re-equipment, the miners of Krasnoarmiyska – Zapadnia №1 mine exceeded the planned volume of coal-mining threefold. Average daily coal production has reached 20,000 t and the level of productivity is 787 t/person per year.

On 14th May 2008, the Government of Ukraine approved the Concept for the Development of the Coal Industry. Its main objective is to involve non-state investments, and to enable the sector to work efficiently in the market environment. It is planned that the privatization of the state enterprises will take place exclusively through open auction.”

Energy intensity in Ukraine is around three times higher than in the EU. This means that on average, Ukrainian companies use three times as much energy to produce the same output as companies in the European Union. Almost half of Ukraine’s energy consumption came from natural gas, and over 75 percent of this natural gas came from Russia. Since 2004, the price of imported natural gas from Russia has almost doubled. The economic impact of these price increases on the economy will depend on the pace at which Ukraine can implement energy efficiency reforms. [4-23]
The main energy source in Ukraine is coal. During the Soviet Union times the Ukraine was considered to be the main source of coal for the whole USSR, as it supplied 23% of the total coal extraction of the Union. Ukraine has different kinds of coal: hard coal, bituminous coal, anthracite, etc, the country occupies the 8th place in the world on amount of coal resources – prospective reserves of coal in Ukraine are estimated at 117.5 billion tons, including 56.7 billion tons in explored reserves of which 39.3 billion tons - thermal coal grades. Balance reserves of coal in the operating mines make up some 8.7 billion tons, including 6.5 billion tons of commercial reserves, with a proportion of thermal coal grades in the latter coming to 3.5 billion tons, which make up 54%. [4-27]

Although the coal mining industry of Ukraine occupies a leading position in supplying the country with power and the amount of coal resources is sufficient, coal mining continually has decreased. Coal mining decreased over the decade 1990-2000 by half from 164.8mln tones in 1990 down to 76.2mln tones in 1999. One of the major reasons behind that was technological and technical state of mines. Currently almost 40% of all Ukrainian mines have been functioning for more than 50 years, and 15% for more than 70 years. The decline in coal production during the 1990s was caused in large part by the collapse of domestic demand and the recession of heavy industry as Ukraine's economy contracted. Since Ukraine became independent in 1991, the country's coal sector has fallen into disarray: the industry suffered from labor strikes, hazardous working conditions, inefficiency and low productivity, corruption, consumer non-payments, unpaid wages and huge debts, and outmoded equipment. [4-28]

Coal extraction recovered after its biggest decline on the edge of the century and in 2006 reached the highest level of 80mln tones.

Tab 4-8    Coal extraction in Ukraine 2006-2009, million tones [4-29]

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>Jan-Jul 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam coal</td>
<td>50.1</td>
<td>47</td>
<td>51</td>
<td>26.8</td>
</tr>
<tr>
<td>including</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>extracted by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>state owned</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>enterprises</td>
<td>35</td>
<td>32.4</td>
<td>35.1</td>
<td>17</td>
</tr>
<tr>
<td>Coking coal</td>
<td>30.1</td>
<td>28.4</td>
<td>26.8</td>
<td>15.2</td>
</tr>
<tr>
<td>including</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>extracted by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>state owned</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>enterprises</td>
<td>11.4</td>
<td>9.8</td>
<td>10.2</td>
<td>5.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>80.2</td>
<td>75.4</td>
<td>77.8</td>
<td>42</td>
</tr>
</tbody>
</table>
The structure and the supply of marketable coal produced by enterprises of Coal Ministry, in 2008

The coal industry products consumption is dominated by two major industrial customer groups, namely the coking industry and the electric power generation which together account for 69% of the total volume. Among the other customer groups, coal is supplied to municipal sector, industrial customers etc. [4-29]

A Strategic Goal of the coal sector development lies in stabilization of the situation and then in further sustainable development of the coal sector to meet the demand of national economy and residents for domestic coal.

To attain the above Strategic Goal, a long-term policy of the coal sector development was prepared and provides for the following three stages: short-term (2006 to 2010), medium-term (2011 to 2015) and long-term (2016 to 2030). [4-28]
At the first stage (2006 to 2010), top priority will be given to a comprehensive approach to solve the current problems of the coal mining assets development that will be implemented through, first of all, its modernization based on the modern engineering and technological achievements and, then, further privatization.

In the second stage (2011 to 2015), the coal output is expected to reach 110.3 million tons in 2015, provided that available production capacities are expanded to 122.5 million tons per year.

The third stage (2015 to 2030) is considered to be a long-term measure. The coal output is expected to come to 130 million tons, provided positive development trends of the foregoing decade will be maintained in the national economy in general and the coal-mining sector in particular.

In 2030, when the forecasted consumption of coal in the thermal power generation grows by 39% compared to 2015, the overall national demand for thermal coal and coking coal will be met by 97.1% and 72.6%, respectively. Domestic coal for export is not foreseen. [4-27]

The available production capacity by the end of this period is expected to grow up to 144.4 million tons per year, with the CF making up 90%.

The above objectives will require timely rehabilitation of the active coal mining companies, with expansion of their production capacities, and construction of new mines on the explored sites of the coal deposits showing favorable geological and mining conditions, such construction projects will launch after 2015.
Considering the growing trends of the worldwide consumption of primary energy and the available reserves of fossil fuels in Ukraine, the coal mining sector development becomes one of the most important factors ensuring energy security of Ukraine.

Being a large consumer of natural gas Ukraine depends heavily on foreign supply. The National gas company tries hard to increase domestic production, but outdated equipment and insufficient natural reserves leave little hope for success.

Natural gas together with oil accounts for more than 60% of primary energy consumption in Ukraine, however, unlike in other countries, natural gas in Ukraine takes first place providing 40-45% of the total energy produced in the country. This fact leads to a higher demand for natural gas in comparison with European countries where gas share in primary energy consumption is close to 22% and conditions ultimate importance of this type of fuel for Ukraine.

With gas consumption registered at 118.1 bcm in 1991, Ukraine was the world’s third largest gas consumer, behind only the USA and Russia. After the collapse of the Soviet Union gas consumption decreased significantly; nevertheless Ukraine covers less than 30% of natural gas demand by domestic production.

NJSC Naftogaz states increase in the volume of domestic natural gas extraction as a major priority. As shown in the figure above there is some progress in achieving this goal.
Gas extraction in August and 8 months of 2008, 2009 in Mio m³

![Gas extraction chart](image)

**Fig. 4-11** Gas extraction for 8 months of 2008, 2009, bcm (including Naftogaz of Ukraine) [4-31]

Given the gas production history of fields brought into development, and forecast changes in explored hydrocarbon resources, gas production volumes over the forecast period have been calculated Fig. 4-11. Also it’s planned to reduce gas consumption in Ukraine till 2030 Fig. 4-13. [4-27]

**Fig. 4-12** Gas Production in Ukraine, bcm
Although Ukraine has made efforts at exploration, particularly in its sector of the Sea of Azov, oil production has remained relatively flat since independence. According to the Oil and Gas Journal, Ukraine has 395 million barrels of proven oil reserves in 2007, the majority of these are located in the eastern Dnieper-Donetsk basin. Consumption, on the other hand, has fallen dramatically, from 813,000 barrels per day (bbl/d) in 1992 to around 343,000 bbl/d in 2006 (Fig. 4-14). Despite this decline in consumption, Ukraine remains highly dependent on imported oil, most of which comes from Russia and lesser amounts from Kazakhstan. In 2006, net crude oil imports totalled roughly 267,000 bbl/d, representing roughly 78 percent of consumption. [4-23]
Due to the Energy Strategy of Ukraine the volumes of domestically produced oil with gas condensate will be increasing and will reach 5.1 million tons/year by 2010, and 5.3 million tons/year in 2015. Oil production from domestic deposits will then stabilize at the level of 5.4 million tons/year. A total of 133.9 million tons of oil with gas condensate will be produced over the forecast period (Fig. 4-15).
Considering the above facts, the forecast consumption of the primary energy resources in the period up to 2030, under the Base-case Scenario, will be as follows:

- Coal products consumption will rise about 2.2 times, up to 130.3 million tons;

- Natural gas consumption will drop by about 36%, down to 49.5 billion cubic meters;

**Fig. 4-16** Coal products consumption

**Fig. 4-17** Natural gas consumption
Oil consumption on domestic market will rise by one third, up to 23.8 million tons.

![Graph showing oil consumption growth from 2005 to 2030](image)

**Fig. 4-18 Oil consumption[4-27]**

The consumption growth will require the energy resources production and supply being scaled up correspondingly (Table 4-9, Figure 4-19).
### Tab 4-9  Forecasted Balance of the Fuel-and-Energy Resources in Ukraine for the period up to 2030 [4-27]

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Balance of income</td>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>I. Resources, total</td>
<td>sf  mln ton** *</td>
<td>208,8</td>
<td>245,5</td>
<td>235,9</td>
<td>222,2</td>
<td>270,9</td>
</tr>
<tr>
<td>1.1. Fossil fuel production, total</td>
<td>sf  mln ton</td>
<td>86,2</td>
<td>115,7</td>
<td>106,2</td>
<td>100,2</td>
<td>139,0</td>
</tr>
<tr>
<td>1.2. Power generation without fossil-fuel-consumption, including:</td>
<td>kWh bln</td>
<td>101,1</td>
<td>113,8</td>
<td>113,8</td>
<td>110,9</td>
<td>125,9</td>
</tr>
<tr>
<td>1.2.1. Nuclear power plants (NPP)</td>
<td>kWh billion</td>
<td>88,8</td>
<td>101,2</td>
<td>101,2</td>
<td>101,2</td>
<td>110,5</td>
</tr>
<tr>
<td>1.2.2. Hydropower and pumped</td>
<td>kWh bln</td>
<td>12,3</td>
<td>12,5</td>
<td>12,5</td>
<td>9,6</td>
<td>14,6</td>
</tr>
<tr>
<td>Storage Power Plants (HPP and HPSP)</td>
<td>kWh bln</td>
<td>0</td>
<td>0,1</td>
<td>0,1</td>
<td>0,8</td>
<td>0,8</td>
</tr>
<tr>
<td>1.2.3. Renewable Energy Sources*</td>
<td>sf mln ton</td>
<td>0,3</td>
<td>0,3</td>
<td>0,3</td>
<td>0,3</td>
<td>0,3</td>
</tr>
<tr>
<td>1.3. Heat Generation by Nuclear Power Plants</td>
<td>sf mln ton</td>
<td>0,2</td>
<td>0,4</td>
<td>0,3</td>
<td>0,2</td>
<td>2,0</td>
</tr>
<tr>
<td>1.4. Environmental Heat</td>
<td>sf mln ton</td>
<td>87,2</td>
<td>89,8</td>
<td>89,8</td>
<td>83,2</td>
<td>85,5</td>
</tr>
<tr>
<td>1.5. Fossil Fuel Imports</td>
<td>sf mln ton</td>
<td>208,8</td>
<td>245,5</td>
<td>235,9</td>
<td>222,2</td>
<td>270,9</td>
</tr>
<tr>
<td>Balance of Expenditure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Distribution of Resources, Total</td>
<td>sf mln ton</td>
<td>200,6</td>
<td>220,2</td>
<td>211,6</td>
<td>199,2</td>
<td>241,2</td>
</tr>
<tr>
<td>2.1. Total Ukraine's Consumption, Including:</td>
<td>sf mln ton</td>
<td>43,5</td>
<td>63,0</td>
<td>58,3</td>
<td>53,9</td>
<td>81,8</td>
</tr>
<tr>
<td></td>
<td>sf mln ton</td>
<td>sf mln ton</td>
<td>sf mln ton</td>
<td>sf mln ton</td>
<td>sf mln ton</td>
<td>sf mln ton</td>
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<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>2.1.2. Oil</td>
<td>25,7</td>
<td>28,3</td>
<td>27,6</td>
<td>26,7</td>
<td>31,2</td>
<td>29,9</td>
</tr>
<tr>
<td>2.1.3. Natural gas</td>
<td>87,9</td>
<td>78,4</td>
<td>77,7</td>
<td>74,0</td>
<td>73,4</td>
<td>71,8</td>
</tr>
<tr>
<td>2.1.4. Other fuels</td>
<td>11,0</td>
<td>14,5</td>
<td>12,0</td>
<td>11,5</td>
<td>15,4</td>
<td>13,2</td>
</tr>
<tr>
<td>(mine methane, bio-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fuels, peat etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.5. Power</td>
<td>32,0</td>
<td>35,3</td>
<td>35,4</td>
<td>32,6</td>
<td>37,1</td>
<td>37,1</td>
</tr>
<tr>
<td>generation without</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fossil-fuel-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>consumption*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.6. Heat</td>
<td>0,3</td>
<td>0,3</td>
<td>0,3</td>
<td>0,3</td>
<td>0,3</td>
<td>0,3</td>
</tr>
<tr>
<td>generation by</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nuclear power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.7. Environmental</td>
<td>0,2</td>
<td>0,4</td>
<td>0,3</td>
<td>0,2</td>
<td>2,0</td>
<td>1,7</td>
</tr>
</tbody>
</table>
2.2. Fuel-and-energy exports by Ukraine

<table>
<thead>
<tr>
<th>sf mln ton</th>
<th>8,2</th>
<th>25,3</th>
<th>24,3</th>
<th>23,0</th>
<th>29,7</th>
<th>28,6</th>
<th>26,7</th>
<th>37,4</th>
<th>33,9</th>
<th>30,1</th>
<th>41,3</th>
<th>38,5</th>
<th>35,5</th>
</tr>
</thead>
</table>

| Energy dependence ratio | % 54,5 | 37,5 | 39,0 | 40,2 | 26,1 | 25,5 | 25,6 | 18,2 | 18,0 | 17,8 | 12,4 | 11,7 | 12,2 |

* without power generated by small hydropower and bio-fuel-fired plants; ** except power exports; I – Best case, II – Base case, III – Worst case scenario; *** standard fuel, million ton
**Basics on country situation**

**Deliverable No. 1**

---

- including production abroad (4.4% of the energy consumption).

**Fig. 4-19** Consumption of domestic and imported energy resources in 2005 and 2030 (standard fuel, mln t/%) [4-27]

The technically feasible annual ARES (Alternative and Renewable Energy Sources) potential in Ukraine converted to standard fuel totals about 79 million tons. The economically feasible potential of these sources under the base-case scenario is 57.7 million tons of standard fuel, where renewable natural sources make 35.5 million tons of standard fuel, and off-balance (alternative) sources total 22.2 million tons of standard fuel.
Currently, this potential is not used sufficiently. ARES account for 7.2% in the energy budget of the country (where 6.4% comes to off-balance energy sources; and 0.8%, to renewable energy sources. [4-27]

Tab 4-10 Indicators for ARES Development by Key Development Areas (Base Case Scenario), million tons of standard fuel/year [4-27]

<table>
<thead>
<tr>
<th>ARES Development Areas</th>
<th>ARES Development Level in Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2005</td>
</tr>
<tr>
<td>Off-balance energy sources, total</td>
<td>13.85</td>
</tr>
<tr>
<td>coalbed methane</td>
<td>0.05</td>
</tr>
<tr>
<td>Renewable energy sources, total</td>
<td>1.661</td>
</tr>
<tr>
<td>Bioenergetics</td>
<td>1.3</td>
</tr>
<tr>
<td>Solar Power Engineering</td>
<td>0.003</td>
</tr>
<tr>
<td>Minor Hydropower</td>
<td>0.12</td>
</tr>
<tr>
<td>Geothermal Energy</td>
<td>0.02</td>
</tr>
<tr>
<td>Wind Energy</td>
<td>0.018</td>
</tr>
<tr>
<td>Ambient Energy</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>15.51</td>
</tr>
</tbody>
</table>

The promising areas for ARES development in Ukraine are: bioenergetics, coalbed methane production and utilization, use of secondary energy resources (SER), off-balance hydrocarbon deposits, wind and solar energy, ambient thermal energy, development of economically sound hydro potential of minor Ukrainian rivers. The renewable sources will be the basis on which both thermal and electric power technologies will be developed.

Production and utilization of coalbed methane whose resources are significant in Ukraine represent the major area for increased use of off-balance energy sources. Use of coalbed methane for heat and power generation will provide a replacement of primary inputs totaling 5.8 million tons of standard fuel at the 2030 level, about 1 million tons of standard fuel at the 2010 level, improving at the same time the environmental condition and coal mining safety.

In accordance with the base-case scenario, power generation by other renewable sources is supposed to increase from 51 million kW in 2005 to 2.1 billion kWh in 2030.

Total investment in the development of ARES replacing over 57 million tons of standard fuel will come to about UAH 60.0 billion. The share of ARES in the total fuel and energy balance of the country can grow up to 19% in 2030.

ARES usage is expected to develop fast, and Ukraine has already mastered corresponding technologies (off-balance energy sources, direct combustion of scrap wood and crop debris,
generation of low-grade thermal energy by solar heat plants, etc.), which can be introduced with economic benefit. [4-27]

Activities for electricity production in Ukraine has to be licensed and is implemented in accordance with conditions and rules of doing business for the production of electrical energy, which approved the decision of the National Electricity Regulatory Commission (NERC) of Ukraine.

Due to the terms and rules all the electrical energy that is produced at power stations of the licensee, whose installed capacity exceeds 20 MW or whose average annual volume of electricity to the united power system (UPS) of Ukraine exceeds 100 million kWh, as well as wind power, regardless of the installed capacity or the volume of electrical energy to the UPS of Ukraine, has to be sold on the wholesale electricity market (WEM) of Ukraine, except that electricity consumed for their own need in power plants.

One of the conditions for the producer of electricity to the WEM is to obtain a license from NERC to carry out business activities in electricity. Also signing of the contract between members of the WEM is a necessary condition for the sale of electricity to the WEM. [4-32]

Based on data in EPA's Global Anthropogenic Emissions of Non-CO2 Greenhouse Gases report, in 2005, Ukraine's estimated anthropogenic methane emissions ranked 8th in the world. Approximately 87 percent of its anthropogenic methane emissions—133.0 MMTCO2E—come from agriculture (manure management), coal mines, landfills, and natural gas and oil systems.

Ukraine's Estimated Anthropogenic Methane Emissions by Source, 2005

Total = 153.41 MMTCO2E

The emissions are made up by the following sources:

- Enteric Fermentation 12%
- Manure 2%
- Landfill 9%
- Stationary and Mobile Sources 1%
- Coal 17%
- Oil&Gas 99%

**Fig. 4-20** Sources of emissions in Ukraine. Source: 2006 USEPA Report: Global Anthropogenic Non-CO2 Greenhouse Gas Emissions: 1990-2020 [4-24]

### 4.3.1 Experience and Opportunities for Methane Projects

Ukraine is working to increase the recovery and use of methane in coal mines. In 2005 USAID provided $1.5 million in funding to implement the Coal Mine Safety Program. This funding was provided to the Partnership for Energy and Environmental Reform (PEER), a non-governmental organization-and to REI Drilling, a U.S.-based drilling company. PEER and REI purchased a U.S.-
manufactured horizontal drill for use at two Ukrainian mines to demonstrate safe drilling techniques and to train the Ukrainian crew on how to maintain and operate such equipment. The program is being managed by the U.S. Department of Labor and its counterparts in Ukraine, including the Ministry of Coal, the State Committee on Labor Safety, and selected mines. This project is expected to reduce greenhouse gas emissions by an estimated 100,000 MTCO2E annually.

In the oil and gas sector, Ukraine is working to identify and repair leaks at Cherkasytransgas compressor stations. Upon receiving a grant from the International Utility Efficiency Partnership (IUEP), this transmission company will be able to evaluate and implement methane emission reduction technologies and to practice at all 23 of its compressor stations. The project will provide an excellent model of best management practices for Soviet equipment for other Belorussian, Russian, and Ukrainian natural gas companies.

It is estimated that Ukrainian cities and towns generate over 10 million tons of municipal solid waste a year. More than 90 percent of this waste is disposed of in landfills. About 140 of an estimated 700 landfills across the country are considered suitable for extraction and utilization of landfill gas, with the 90 largest landfills containing roughly 30 percent of the total amount of municipal solid waste. Several pre-feasibility studies have been conducted at Ukraine landfills, and the potential for project development at many sites looks very favorable.

### 4.3.2 Committee Membership

Ukraine participates in the following committees:

- Steering Committee
- Coal Technical Subcommittee
- Oil and Gas Technical Subcommittee
- Landfill Technical Subcommittee

### 4.4 Mining and mine safety laws

#### 4.4.1 Legal overview

The most comprehensive statement of Ukrainian law on the topic of subsurface rights is the Natural Resources Code N 132/94-BP (July 1994).

It sets forth certain fundamental principles, elaborated upon in numerous governmental decrees and regulations. The Minerals Code provides, for example, that the subsurface is the exclusive property of the Ukrainian people, which exercises ownership through the State; that the subsurface may not be bought or sold, but is subject only to a grant of use rights; and that private companies may develop the country's mineral resources upon receipt of permission from the State.

A large number of executive decrees and ministerial regulations, so called "sub-legislative acts", govern specific aspects of mineral development, notably licensing procedure, rent and natural resource payments, and pricing and transportation.

#### Legislative Procedure for Coal Bed/Coal Mine Methane Production

On 16 June 2009 the President of Ukraine, Viktor Yushchenko, signed the Law “On Coal Mine Gas (Methane)”, which came into force on 19 June 2009. The Law determines legal, economic, ecological and organizational fundamental principles of geological survey of coal mine gas (methane) including its commercial development, production and further use.

The application of this law affects a number of areas: the improvement of miners’ work conditions and occupational safety, geological soil research with the purpose of locating resources, further gas (methane) recovery from coal deposits that previously were not industrially exploited regardless of
their further intended use, etc. It is worth mentioning that the right to gas production in the process of degassing the operating coal mines is given to the owner of a special permit for commercial coal mine development within a respective mining lease and/or to other legal entities subject to prior consent of the permits owner. In other words, the law envisages engagement of specialized organizations to produce coal mine gas (methane) that have respective permits provided for by the legislation.

According to the adopted Law the National Electricity Regulatory Commission of Ukraine shall set the limit price for coal mine gas (methane) if it is being recovered at state budget’s cost. In addition, the NERCU shall set the tariff in case of coal bed methane supply or/and transportation by the Unified Gas Pipeline System of Ukraine.

Otherwise, the coal mine gas (methane) shall be sold at agreed prices.

One other important stipulation of this legislative act is that the exploitation of coalmines with higher level of gas (methane) concentration is forbidden unless all necessary ventilation and degassing measures are taken.

Key mine safety laws and regulations

Mine Safety Rules N 257 (November 2004)
Law on Alternative Types of Liquid and Gas Fuel N 1391-XIV (January 2000)
Programme for Increasing Mine Safety Activities N 374 (March 2006)
Plan of Priority Measures for Increasing the Level of Safety and Labor Protection at Coal Mines N 858-p (June 2008)

The main objective of the regulations in the area of degasification is to improve safety by reducing methane emissions in the mine working of an active mine.

There are no national regulations or legal requirements for treatment and utilization of the captured CMM. It is common practice at Ukrainian coal mines to release the CMM into the atmosphere.

In accordance with the Instruction on Coal Mine Degasification N 725 methane concentration has to be higher than 25 % for transportation in a pipeline and for its utilization.

4.4.2 Licensing

As noted above, the Natural Resources Code provides that the subsurface is the exclusive property of the Ukrainian people, who exercise ownership through the State, which in turn grants "use rights" to companies to develop mineral resources. According to the Code, use rights may be permanent or temporary; temporary use rights are classified as either short-term (up to five years) or long-term (up to twenty years).

Use rights are granted in the form of a license, which defines the nature and scope of the license holder’s rights. Two basic types of licenses are available: exploration licenses and production licenses. An exploration license entitles the holder not only to drill test wells, but also to engage in exploratory production. The Code provides that the license holder may sell or otherwise dispose of the output from exploratory production in the same manner as output obtained under a production license.

The law “On Coal Mine Gas (Methane)” makes significant changes in licensing.
One of the key measures in the new law is the requirement to obtain a special permit for companies carrying out coalbed methane exploration and production at existing coal mines, mines being prepared for exploitation and unexploited or abandoned coal fields. The only exemption is for those already holding a special permit for coal production with the right to produce coalbed methane as an accompanying mineral resource.

Special permits:
For vacant coal fields will be granted by auction, although any company which has conducted geological survey of deposits at its own expense is entitled to a special permit without having to undergo the auction procedure
For existing mines may be issued to the holder of the special permit for coal production or, with their written consent, to another company (which must then enter into an agreement for methane exploration and production with the coal production permit holder)
For unexploited or abandoned coal fields may not be granted for a period exceeding 20 years

In its August 2000 country brief on Ukraine, the U.S. Energy Information Administration found that "outdated equipment, a lack of spare parts, and poor safety procedures have resulted in safety problems and lost production, exacerbating the industry's inefficiency."

Working in a coal mine in Ukraine is hazardous. “For every 1 million tons of coal extracted four miners in Ukraine die. Timber, needed to construct mine shafts, is in short supply in Ukraine and is often reused until it rots, creating dangerous conditions. Most mine fatalities in Ukraine are related to methane gas explosions, and most of these accidents take place in mines that produce coking coal used in the steel industry.” [4-33]

The owner of the CMM in Ukraine is mine owner or state.

Market and investment barriers:
- The continuing trend of declining coal production;
- Lack of investment capital for high-capital projects;
- Lack of economic and financial incentives;
- High risks and failure rates of project development and implementation;
- Electricity market prices often are too low to make investments in CMM commercially attractive;
- Insufficient financial position of majority mines. [4-34]

Legislation related to CMM in Ukraine:
- Law On Alternative Types of Liquid And Gas Fuels (2000);
- Law on Green Power Tariff (2008), Law on Coal Mine Methane (draft 2005);
- Natural Resources Code N 132/94-BP (July 1994);
- Law on Alternative Types of Liquid and Gas Fuel N 1391-XIV (January 2000);
- Regulation on Approving the List of Natural Resources of National and Local Importance N 827 (December 1994);
- Mine Safety Rules N 257 (November 2004);
- Programme for Increasing Mine Safety Activities N 374 (March 2006);
4.5 Environmental laws

In addition to an exploration or production license, and subsurface and surface allocations (where necessary), a company must obtain a number of consents and approvals in order to actually begin developing a deposit. The number and type of permits required depends, in part, on the nature and scope of the proposed development activity. To oversimplify a highly complex and confusing system, permits fall broadly into three conceptual categories:

- **Facilities Permits.**

  Permits related to the placement of equipment and the construction of related facilities in a particular location. Under Article 49 of the Minerals Code, locating facilities for the development of a mineral deposit requires approval from (a) mining supervisory authorities, (b) environmental authorities, (c) public health authorities, (d) local geological enterprises, (e) the local soviet, and (f) "other interested agencies." In Article 50, the Code sets forth in broad outline the requirements for such facilities, with additional detail found in regulations. The Code provides that applications must describe, among other things, the location of all facilities, the exploration, development or processing technology to be used, plans for the disposal of waste and the storage of product, the documentation of geological findings, recultivation or other plans to restore the land, and safety measures related to operating procedures.

- **Environmental-Technical Permits.**

  These are permits proving that a proposed development project has passed the required expert review. Article 48 of the Minerals Code provides that projects must pass expert evaluation by (a) environmental authorities, (b) scientific-technical authorities, and (c) "other types of expert review" required by law. Evaluation procedures are set forth in a large number of regulations, including the Instruction on the Conduct of State Environmental Evaluations, approved by Ministry of Environmental Protection Order No. 55 (7 June 1995) and the Regulation on the State Expert Technical [Evaluation] Center, approved by State Committee on Labor Safety Order No. 116 (21 November 1994). Ukrainian law currently requires only environmental and technical evaluation.

- **Operating Permits.**
Operating permits are permits documenting the approval of production plans by the required authorities. Those authorities are (a) the Ministry of Environmental Protection and (b) the State Committee for Labor Safety. The Minerals Code sets forth in broad outline the requirements which should be addressed in production plan, with additional detail found in applicable regulations. The operating permits review occurs at the same time as the environmental and technical assessment, since the reviewing agencies are the same.

The conduct of development activity without the requisite permits constitutes a serious offense, entailing civil, administrative and criminal liability. Civil and administrative penalties include fines, the restitution of damage to the land, land users or land owners, and the suspension or termination of a license (Articles 57, 65-67, Minerals Code).

## 4.6 Energy laws

New key laws which have huge influence on CBM/CMM projects:

- The Law “On Coal Mine Gas (Methane)”

### 4.6.1 The Law “On Coal Mine Gas (Methane)”

The Law “On Coal Mine Gas (Methane)” introduces principles for safe production of coalbed methane as well as licensing and permit requirements and mandatory insurance of property against the risks of environmental damage.

The law will have a particular impact on Joint Implementation projects under the Kyoto Protocol involving the capture and use of coalbed methane. Tax deduction for fuels produced from CMM.

There will be various tax incentives and state guarantees to encourage coalbed methane exploration and production. In particular, income obtained from coalbed methane exploration and production will be exempt from taxation until 1 January 2020.

In addition, a license will be required for activities such as coalbed methane supply and storage, as well as the construction, reconstruction and maintenance of exploration installations.

Gas-transport networks can be accessed for transportation, delivery, storage of coal-bed methane according to the procedure of accessing the Single Gas-Transport System of Ukraine, which is established by the law. Quality of coal-bed methane must satisfy requirements of economic entity of corresponding gas-transport system, taking state standards into account.

The tariff for transporting coalbed methane through Ukraine’s Unified Gas Transportation System will be set by Ukraine’s National Energy Regulation Commission.

### 4.6.2 The Law Stimulation of Utilization of Alternative Energy Sources, “Green Tariff”

On September, 2008 Ukraine's parliament adopted the first law in the country designed to stimulate use of alternative sources of energy through introduction of the so-called "green" tariff – a special tariff by which electricity generated from alternative sources must be purchased at the Wholesale
Electricity Market (the Green Tariff). However, the law did not accomplish its goals, possibly because of its generality and ambiguity.

In response, on April 1, 2009 Ukraine's parliament fundamentally changed the rules on implementation of the Green Tariff by adopting the law of Ukraine "On Amendment of the Law of Ukraine 'On Electrical Energy' Regarding Stimulation of Usage of Alternative Sources of Energy" No. 1220-VI (the Green Tariff Law), which went into effect on April 22, 2009.

The Green Tariff Law significantly changes the rules on implementation of the Green Tariff in Ukraine. The main change is that instead of the unified Green Tariff approach introduced in September 2008, the Green Tariff Law differentiates the Green Tariff depending on the source of alternative energy and the type and capacity of the generation facilities. To address the risk of devaluation of Ukraine's currency, the Green Tariff Law also introduces a fixed minimal Green Tariff nominated in Euros pursuant to the official euro/UAH exchange rate as of January 1, 2009. In addition, the Green Tariff Law stimulates manufacturing and consumption of materials from Ukraine, as well as works and services required for construction of the generation facilities that use alternative sources of energy.

### Green Tariff Amounts and Approval Procedure

The Green Tariff may be applied by companies no later than January 1, 2030. According to the law implementing it, the Green Tariff is approved by the National Electricity Regulatory Commission of Ukraine (NERC) for:

- A company that uses alternative sources of energy for generation of electricity;
- All types of alternative energy;
- Every generation facility.

The basis for calculation of the Green Tariff is a retail tariff approved by NERC for consumers with the second class of voltage for January 2009 in the amount of 58.46 kopeks per kilowatt-hour (kWh) without VAT (the Basic Tariff). Applying various coefficients to the Basic Tariff, the Green Tariff Law differentiates the Green Tariff depending on the type of alternative source of energy and the type and capacity of generation facilities as specified in the table below.

<table>
<thead>
<tr>
<th>Alternative source of energy in Ukraine</th>
<th>Type of alternative source of energy</th>
<th>Capacity of a generation facility, kW</th>
<th>Basic Tariff, UAH kopeks per kWh, w/h VAT</th>
<th>Green Coefficient</th>
<th>Tariff coefficient used in peak hours (three-zone tariff classification)</th>
<th>Green Tariff, UAH kopeks per kWh, w/h VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>&lt; 600</td>
<td>58.46</td>
<td>1.2</td>
<td>N/A</td>
<td>70.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600-1,200</td>
<td>58.46</td>
<td>1.4</td>
<td>N/A</td>
<td>81.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 1,200</td>
<td>58.46</td>
<td>2.1</td>
<td>N/A</td>
<td>122.48</td>
<td></td>
</tr>
<tr>
<td>Biomass</td>
<td>Any</td>
<td>58.46</td>
<td>2.3</td>
<td>N/A</td>
<td>134.5</td>
<td></td>
</tr>
<tr>
<td>Sun</td>
<td>Installed on roofs of buildings and structures, &gt;100</td>
<td>58.46</td>
<td>4.6</td>
<td>1.8</td>
<td>484.1</td>
<td></td>
</tr>
</tbody>
</table>
Surprisingly, the Green Tariff Law does not specify rules for calculation of the Green Tariff for electricity generated from other renewable sources treated by the law in Ukraine as alternative, such as geothermal sources, waves and ebbs, gas of sewage stations, biogas, coal methane and exhaust gases. We expect that Ukraine's parliament will adopt rules for calculation of the Green Tariff for electricity generated from "missed" sources of energy.

In the near future NERC will cancel the current detailed procedure on approval of the Green Tariff adopted pursuant to the law of September 2008 and introduce a new one, complying with the Green Tariff Law.

The Green Tariff Law promotes the quick introduction of green technologies into Ukraine's energy sector. In particular, the Green Tariff Law specifies that the Green Coefficient for electricity generated by generation facilities that use alternative sources of energy and are constructed or substantially upgraded after 2014, 2019 and 2024 decreases 10, 20 and 30 percent respectively from its default rates indicated in the table above. Regarding "substantial upgrade," the Green Tariff Law specifies it as an increase in the initial value of the facilities' generation equipment of more than 50 percent.

**Fixed Minimal Green Tariff**

The Green Tariff Law sets a mechanism for protection of investors from devaluation of Ukraine's currency during construction and exploitation of generation facilities based on alternative sources of energy. In particular, the law specifies that in any event the Green Tariff approved by NERC for a particular company may not be less than a fixed minimal Green Tariff.

The minimal Green Tariff is nominated in Euros and equal to the Green Tariff calculated using the Basic Tariff and coefficients valid as of January 1, 2009 and the official euro/UAH exchange rate set by the National Bank of Ukraine as of January 1, 2009 (1 euro = 1085.546 UAH).

Each time the NERC approves the Green Tariff for a company, it must make sure that the Green Tariff is not less than the Minimal Green Tariff converted into UAH pursuant to the official euro/UAH exchange rate set by the National Bank of Ukraine at the date of last approval of the Basic Tariff.

### 4.6.3 Stimulation of Manufacturing and Consumption of Materials, Works and Services from Ukraine-based Companies

Through the mechanisms of the Green Tariff, Ukraine's parliament stimulates consumption of materials, works and services from the Ukraine during construction of generation facilities based on alternative sources of energy. The Green Tariff Law provides that a generating company has the right to charge its customers the Green Tariff only if, starting from January 1, 2012, the share of...
materials, works and services from Ukraine used for construction of a generation facility based on alternative sources of energy is not less than 30 percent of its total value, and starting from January 1, 2014 – not less than 50 percent.

The Green Tariff Law does not specify the procedure for calculating of the share of materials, works and services used from Ukraine in the construction of generation facilities based on alternative sources of energy. Instead, the Green Tariff Law requires NERC to develop such a procedure within three months after the law goes into effect.

The Green Tariff Law also stimulates domestic development and manufacturing of equipment and components used for generation of energy from alternative sources by fixing a retail tariff for electricity for registered manufacturers at the level of January 1, 2009.

4.6.4 State Guarantees in Case of a Change in the Law

By means of a separate provision of the Green Tariff Law, the state of Ukraine guarantees companies that generate electricity from alternative sources at the constructed generation facilities will have the right to follow the Green Tariff rules valid at the date the generation facilities were put into use, even in case of further change to the Green Tariff rules. In such a case, however, the companies may decide to follow new Green Tariff rules.

The economic crisis of the coal industry as branches of a national economy of Ukraine is not overcome.

Repeatedly attempts to reform administrative structure of branch management undertaken during last time have no effect. Branch re-structuring was spent hasty, with many errors. The result was - opened coal stocks and not-amortized stationary equipment loss, municipal and social infrastructure destruction, etc. Put budgetary funds are used only for simple reproduction and consequently cannot provide manufacture escalating and industrial expenses decreasing.

In the conditions of developing inflationary processes and scarce Ukraine state budget, many problems connected with trade extraction of mine methane, preliminary and advancing decontamination of coal deposits, are unsolvable.

As to current decontamination from mountain developments, this measure in some cases does not solve safety problems of conducting mountain works and methane recycling because of out-of-date imperfect techniques (chisel equipment, vacuum pumps, chink compression devices). Though, it is necessary to notice, that at some non-state ownership mines process of mine methane utilization is very successfully implemented.

Use of mine methane (including as sharing projects in conditions of the Kyoto Protocol) cannot make real radical changes in the economy of Ukraine coal industry. From our point of view, the first step in a way to coal production market diversification is a stabilization of the economic situation by gradual privatization of the state mines.

It should give an impulse to practice the principles of the free economic market and formation of healthy competitive environment at the coal-mining enterprises. [4-35]

4.6.5 Additional requirements

One of the major issues still is state ownership in most mines and the unreliable decisions of the management of these mines. Only a very few privately owned mines exist, and CMM projects as a rule work better there. (As stated in the M2M report)

The other main issue is an absence of financial assets and the great difficulty to rely upon state for financial support in this question.
4.6.6 References


[4-2] US-Ukraine business council USUB


[4-8] A credit rating agency “Standard & Poor’s” [http://www2.standardandpoors.com](http://www2.standardandpoors.com)


[4-12] Information Agency “Minprom”. [www.minprom.ua](http://www.minprom.ua)


[4-18] Policy recommendations on economic and institutional reforms 2009 by Blue Ribbon Analytical and Advisory Centre (BRAAC)

[4-19] Catalogue "Importers and Exporters of Ukraine 2001"


[4-24] Coalbed Methane Outreach Program (CMOP) [www.epa.gov/cmop/international/ukraine.html](http://www.epa.gov/cmop/international/ukraine.html)


[4-32] Information-Searching system of "Energy Portal" http://energoportal.net/


5 Russia

5.1 Economic situation

Full name: Russian Federation
Population: 142.8 million (UN, 2008)
Main exports: Oil and oil products (number 2 worldwide), natural gas (number one worldwide in production and reserves), wood and wood products, metals, chemicals, weapons and military equipment
GNI per capita: US $7,560 (World Bank, 2007)
GDP (billion 2000 US$) 373.20
Inflation rate 13.9% (2008 estimate)
The ten previous years the average growth was 7% per year.

<table>
<thead>
<tr>
<th>Tab 5-1 Introduction of Russia [5-1]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy Production (Mtoe)</strong></td>
</tr>
<tr>
<td><strong>Net Imports (Mtoe)</strong></td>
</tr>
<tr>
<td><strong>TPES (Mtoe)</strong></td>
</tr>
<tr>
<td><em><em>Electricity Consumption</em> (TWh)</em>*</td>
</tr>
<tr>
<td>**CO2 Emissions <strong>(Mt of CO2)</strong></td>
</tr>
</tbody>
</table>

Russia heavily depends on oil, gas and other raw material exports and has been hit hard by the drop of prices during the last year. Now, since some recovery of oil and gas prices is visible, this will allow the exchange rate and foreign exchange reserves to consolidate their recent recovery. Inflation is expected to decline this and the next year. "In 2007, Russia’s real gross domestic product (GDP) grew by approximately 8.1 percent, surpassing average growth rates in all other G8 countries, and marking the country’s seventh consecutive year of economic expansion. Russia’s economic growth over the past seven years has been driven primarily by energy exports, given the increase in Russian oil production and relatively high world oil prices during the period". [5-1]

Russia enjoyed a decade of strong growth until mid-2008, but has since been gripped by a severe recession. The near term challenge is to limit the severity and duration of the downturn. Real GDP is forecast to contract by 5% in 2009, reflecting sharply lower commodity prices, restricted access to external financing and reduced external demand. A recovery to 2% growth is expected in 2010. Under the impact of the economic downturn, the budget is forecast to shift into a large deficit in 2009, of over 8% of GDP. The current account is expected to switch to a small deficit in 2009, but to return to surplus in 2010. [5-2]

5.1.1 Financial Country Rating and outlook

Standard and Poor currently rates Russia as BBB+, Moody’s: Baaa1 and the situation is stabilizing.
5.1.2 Local currency situation.
The Russian ruble suffered a very severe drop in value versus the Euro currency at the end of 2008 and has not been able to recover to anywhere near its former strength since then.

![Graph showing exchange rate of RUB versus Euro from Aug-04 to Aug-10](image)

**Fig. 5-1  Exchange rate of RUB versus Euro [5-3]**

Again, the recent trend seems to indicate stability or even a slight recovery. But Analysts of Barclay’s Capital fear that by the end of the year, after enjoying a spell of stability in both economy and exchange rate, a further slide might reduce the ruble value by another 15%.

5.1.3 Ability to raise project financing

The information given indicates that the state and state banks will not give financial aid to raise capital for CMM projects. Financing is the responsibility of the project partners.

CMM projects started so far in the Kemorovskaya region, for instance, were financed by the SUEK company.

The Russian State may grant certain privileges, for instance reduced tax rates or tax holidays.

The market prices for the above mentioned products have been highly volatile in the past and it is probable that they will also be highly volatile in the future. The price for carbon credits ranged between less than 10 euro/unit to more than 25 euro/unit in less than 12 months.

The price of crude oil, a leading benchmark for all primary energy sources, recently fluctuated between 40 and 150 US-Dollar per barrel on world markets. In Russia the prices for primary energy...
and fuels are still regulated and there are regional differences as well as differences and price discounts for various users. Different taxes are imposed on different sources of primary energy, subsidies might be given to some sources like renewable energies or power/fuels based on CMM.

5.1.4 Price Situation and Outlook for Competing Products

The fuel and energy prices in Kemerovskaya region have been researched and will serve as an example. They are subject to changes, depending on various factors. The prices for thermal and electric power are established by the Regional Energy Committee of the region (REC). While determining tariffs, REC evaluates the power generating companies’ cost for thermal and electric power production and controls whether the cost calculation is valid.

Gas prices are regulated by the Federal Tariff Agency. Coal prices are more flexible and determined at the free market by individually negotiated contracts between producers and consumers.

Fig. 5-2 Average coal prices in the Kemerovskaya region for private consumers
The wholesale price per 1,000 m³ of gas (without VAT) recovered by JSC ‘Gazprom’ amounts to (on the basis of Executive order of Federal Tariff Agency in Kemerovskaya region):

The prime cost of 1 Gcal of thermal power generated in boilers (Kemerovskaya region) may amount to 189.1 RR. The calculations have been made for 10 years. The rate of depreciation cost
is accepted at the level of 10% per year. The received data leads to the conclusion on the decrease of prime cost of 1 Gcal from 189.1 RR down to 109.7 RR by the 10th year (Table 1-2).

### Tab 5-2  Changes of prime cost of 1 Gcal of thermal power for 10 years

<table>
<thead>
<tr>
<th>Year</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
<th>Year 7</th>
<th>Year 8</th>
<th>Year 8</th>
<th>Year 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>189.1</td>
<td>176.1</td>
<td>164.5</td>
<td>154.0</td>
<td>144.5</td>
<td>136.0</td>
<td>128.3</td>
<td>121.5</td>
<td>115.3</td>
<td>109.7</td>
</tr>
</tbody>
</table>

### 5.1.5 Tax Situation

Duties 5-20% (avg. 14%)

VAT 18% (10% in 2010)

Excise Tax 20-570%

When a legal entity subject to general taxation has been registered it obtains the obligation to pay the following basic taxes:

- Value Added Tax (VAT);
- Company profit Tax;
- Single social tax including payments to Pension Fund, Obligatory Medical Insurance Fund, and Social Insurance Fund;
- Payments to insurance against accidents at work;
- Tax on the Company’s property;
- Individual personal income tax

VAT taxation is levied on the following transactions:

Sale of goods (works, services) in the territory of Russian Federation including sale of pawned objects and transfer of goods (results of accomplished works, services) according to the agreement of presenting smart money or innovations, and also transfer of title. Transfer of title for goods, results of accomplished works, services by gratuitous assignment is considered as sale of goods (works, services);

Transfer (in the territory of Russian Federation) of goods (work, rendering of services) for own needs costs of which are not deducted (including through depreciation payments) while calculating tax on company’s profit;

Construction and assembly works for own use;

Import of goods into customs territory of Russian Federation. [5-4]
For the tax calculation the company’s income from sale of products, goods, works/services are taken into account. The VAT rate is 18%, but there is a preferential category of goods which are taxed by 0% and 10% rates.

Tax on profit is paid on the basis of actually gained profit. The tax rate is 20%. When the company calculates tax on profit, it takes the basis as the difference between income and costs.

The basis for single social tax is payment to persons hired by labor, civil and author’s contracts. The tax rate is 26%, but for some companies of preferential category tax rates are 14% and 20%.

When calculating payments for insurance against accidents at work as well as for single social tax the payments to employees are taken into account. Insurance rates differ depending upon risk grades for the position and amount to 0.2% - 8.5%. Coal mining industry means maximal risk, the rate for the industry is 8.5%.

When calculating the property tax the book cost of movable and immovable property in the company’s books is taken into account. The tax rate is determined by regional authorities but it cannot exceed 2.2%.

To calculate the tax on personal income the payments to employees by labor, civil and author’s contracts, remunerations to directors and members of the board are taken into account. The tax rate is 13%.

There are no special regulations (laws), federal or regional, concerning privileges for coal mine methane recovery and utilization. At the regional level of law (subject of Russian Federation) attempts to get preferential conditions for methane utilization projects have been made since 2001.

In the Kemerovskaya region a law granting tax privileges (tax paid to regional budget) for legal entities involved in scientific research, test, design, and industrial projects for Geology, particularly coal mine methane recovery was passed. [5-5] The law was passed because the project ‘Methane of Kuzbass’ in collaboration with JSC Gazprom had been done, it covered tax on profit, tax on property, land-tax, payments for using subsoil, and stayed valid from 2001 to 2003. Above that, several laws granting tax privileges for companies involved in innovation projects have come into force in the Kemerovskaya region since 1999. [5-6], [5-7] These laws were made in accordance with the Tax Code of the Russian Federation and other regulations. The companies registered in Regional Government innovative projects were freed from paying tax on property, tax on profit, tax on vehicle’s owners, tax on vehicle purchase (by portion paid to regional budget) during the actual payback term of the project.

In 2005 the law «On state support of investment and production activities» and the law «On tax privileges for subjects of investment and production activities in Kemerovskaya region» was passed according to which the enterprises that invest and initiate production activities can receive tax privileges, compensation of interest for loans, postponement for paying regional taxes, tax loan and other options of state support. [5-8], [5-9]

Forms of state support for investors include:

- Privileges for taxes, fees and duties;
- Postponement, rescheduling, investment tax loans;
- Privileges for the rent of property owned by the state;
- State guarantees;
- Financing interest rate of a bank loan;
- Participation of the region in joint stock companies;
- Non-financial support;
• Organizational, informal and consulting support;
• Development and support through expert examination of investment projects, paid for by the state

In accordance with the law of Kemerovskaya region dated 14.02.2005 # 22-OЗ «On tax privileges for subjects of investment and production activities in Kemerovskaya region», the company is freed from paying tax on that part of the property (2.2%) which is only used for the investment project that is included in the Register of Investment Projects.

The law also suggests reducing the tax on property from 17.5% down to 13.5% with the stipulation that the revenues from sale of goods (works, services) produced in the investment project during the tax period must be no less than 90% of total income. As for production activities the company is also freed from paying tax on that property (2.2%) which is used or purchased for this production activity. This privilege is valid no longer than 12 month from the moment of including the company in the Register of Commodity Producers. The rate of tax on profit is reduced from 17.5% to 13.5%. The stipulation is an increase of the tax base for tax on profit no less than 1.3 times, compared to the tax base of the previous year.

Therefore, if the company is formed in accordance with the necessary requirements and registered in the Register of Priority Investment Projects, coal mine methane recovery and utilization projects can claim state support.

In 2008 the law was amended in such a way that those types of production activities that can claim state support without presenting an investment project were determined. Activities represent no less than 70% of the total income of the company. The following activities with regards to methane recovery and utilization were included in this list:

- Recovery of natural gas and gas condensate (recovery of methane, ethane, butane and propane at the location of recovery);
- Coal mine methane recovery and utilization;
- Underground gasification;
- coal processing;
- Coal seam degasification;
- Implementation of energy-saving technologies;
- Activities referring to executing projects within the frames of Kyoto Protocol

An additional factor in favour of economic efficiency for methane utilization projects is penalties for methane emissions. Up to July 2005 those payments were insignificant and they didn’t really influence the economic viability of projects. Since July 1, 2005 though, the payments for methane emissions which do not exceed norms have been increased by a factor of 1,000 – from 0.05 RUR to 50 RUR per 1,000 м3. [5-10], [5-11] Since July 2005 the fines for emissions within the established limits have been increased by a factor of 1,250 - from 0.2 RUR to 250 RUR per 1,000 м3. The increase of the fines for methane emissions significantly improved the economic efficiency of methane utilization projects.
5.2 Implementation Status of Kyoto Protocol

The Russian Federation participates in the application of the Kyoto protocol and always participates actively in international political initiatives referring to global climate. The basic dates of Russia’s participation in the Kyoto protocol are as follows: [5-12]

<table>
<thead>
<tr>
<th>Date of signature:</th>
<th>11 March 99</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of ratification:</td>
<td>18 November 04</td>
</tr>
<tr>
<td>Date of entry into force:</td>
<td>16 February 2005</td>
</tr>
</tbody>
</table>

The legal base for JI projects is fully formed and it includes the following laws and regulations:

- Executive order of Ministry of Economic Development (MED) of Russia # 248 dd. 15.08.2008 "On stating typical principal indices of project efficiency and its limiting values".
- Executive order of MED of Russia # 271 dd. 10.09.2008 "On stating the membership of Committee for consideration of applications for approval of projects undertaken in accordance with Article 6 of Kyoto protocol and UNCCFC ".
- Executive order of MED of Russia dd. 14.03.2008 # 70 "On stating the list of independent experts' organizations ".
- Regulation of RF government dd. May 28, 2007 # 332 "On order of approval and checking realization of projects undertaken in accordance with Article 6 of Kyoto protocol and UNCCFC ".
- Executive order of MED of Russia # 52 dd. 22.02.2008 ,On stating the form of passport of the project undertaken in accordance with Article 6 of Kyoto protocol and UNCCFC ".
- Executive order of MED of Russia # 444 dd. December 20, 2007 "On stating Methodical guidelines for consideration of project documentation ".
- Executive order of MED of Russia # 424 dd. November 30, 2007 "On approving Regulations of Committee for consideration of applications for approval projects undertaken in accordance with Article 6 of Kyoto protocol and UNCCFC ".
- Executive order of MED of Russia # 422 dd. November 30, 2007 "On stating limits of amounts of greenhouse gases emissions reduction".
- Executive order of MED of Russia # 21 dd. February 1, 2008 " On stating the membership of Committee for consideration of applications for approval of projects undertaken in accordance with Article 6 of Kyoto protocol and UNCCFC".
- Executive order of Ministry of Natural Resources of RF #121 and MED of RF #148 dd. May 7, 2007 "On stating the order of forming and keeping Russian register of carbon units".
- Governmental decree dd. 20.02.2006 # 215.
- Governmental decree dd. 01.03.2006 # 278.
The order of consideration of JI projects is regulated by Regulation of Government of RF dated May 28, 2007 # 332 which is listed above and summarily includes the following steps.

Application for approval of the project is presented to Ministry of Economic Development (MED) of RF.

MED hands the project to the appropriate ministries which issue their conclusion on the project.

Decision of approval of the project is taken by Committee formed by MED with participation of representatives of federal Ministries.

The project is approved by Government of RF.

Steps 1-4 are undertaken in project investor’s country taking into consideration peculiarities of the country’s law.

The project is registered in Surveillance Committee for JI projects in UN.

Each year the project passes consideration of independent experts’ organization which confirms (verify) GG emissions reduction, e.g. methane.

Judging by experts’ decision the confirmed amount/quantity of reduced emissions is handed over to the investor, and investor transfers money for reduction to a Russian company.

In accordance with the executive order of MED dd. 14.03.2008 # 70 the JI project validation in Russia can be undertaken by Det Norske Veritas Certification Ltd., Bureau Veritas Certification Holding SAS, TÜV SUD Industrie Service GmbH, SGS United Kingdom Limited or TÜV NORD CERT GmbH.

Executive order of MED dd. November 30, 2007 # 422 stated the limits for GG emissions reduction for different industries and the limits of their absorption by scrubbers (gas absorbers) of RF in amount of 300 million ton in CO2eq.

GHG emissions reduction targets (MMt CO2eq):

- power engineering - 205;
- industrial processes - 25;
- usage of solvents and other products - 5;
- agriculture - 30;
- waste -15;

limit of GHG absorption at the account of land using and changes in land using and forestry is stated as 20.

At the moment there is total of 104 Russian JI projects at JISC site, only two of them for coal mine methane: Utilization of CMM in the coal mine Chertinskaya-Koksovaya and utilization of CMM in Coal Mines of OAO “SUEK-Kuzbass. The decision of the Committee for consideration of applications for approval of projects based on Article 6 of the Kyoto protocol was taken on March 4, 2008. Applications for projects in Russia can be presented since March 10, 2008. Up to now 28 projects have been accepted for consideration including one CMM project: “Utilization of CMM in Coal Mines of OAO “SUEK-Kuzbass”.”
Despite existing laws, initiatives of industrial enterprises and efforts of Russian and foreign investment companies, none of the Russian projects have been approved at the national level and, therefore, have not been registered as JI project in JISC.

The risk that the projects which are being considered by the Government of RF won’t get approved by the end of 2009 is still present. The other risks that may influence CMM JI projects are an expected increase of tariffs for electric power in Western Siberia and in Kuzbass – the leading coal mining regions in Russia, because of a decrease of electricity generating capacities in the Krasnoyarsk region after the recent accident at the Sayano-Shushensky hydroelectric power plant.

An additional factor influencing economic efficiency of methane utilization projects and also influencing additiornality of CMM projects in the RF to be approved as JI projects is the fines for methane emissions into the atmosphere.

“In 2003, a Global Environment Fund/United Nations Development Programme project began to remove barriers to financing and implementing CMM recovery. This project will include establishing a CMM Recovery and Utilization Company that is expected to remain as a self-sustaining entity following project completion.

Also in 2003, GAZPROM implemented a pilot well drilling program to assess the feasibility of establishing a new CBM-based fuel and energy complex in southern West Siberia and to identify priority areas in the Kuzbass for CBM/CMM development. As of late 2005, four experimental CBM wells (from 640 to 980 meters deep) were in place communicating with five to seven coal seams. Gas production ranged from 1,000 to 3,000 m³ per day, following a month of dewatering.

In early 2005, the Rosnauka, a federal agency in the Ministry of Science and Higher Education, began an effort to accelerate CBM/CMM development projects to improve mine safety and reduce greenhouse gas emissions. This activity involved improving stimulation techniques to enhance methane desorption and drainage, improving methane production and utilization technologies, organizing a scientific and educational center for CBM/CMM development and coordinating same with foreign experts, and developing a CBM/CMM business plan. “ [5-13]

5.3 Energy politics (preferences for sources of primary energy)

Gas and oil are the two major sources of energy in Russia, followed by coal. The importance of coal has been reduced from the 1960s on, due to the discovery of huge oil and gas deposits. Nevertheless coal production is forecasted to rise.

Contrary to expectation and demand, production of gas is sinking and since the collapse of the Soviet Union only one new gas field has started production.

Russia’s estimated proven coal reserves [5-1] are 157.000 Million tonnes, making the country Number 2 in the ranking of all countries with coal reserves. The annual production in 2005 was around 277 Million tonnes, making it Number 5 in a global ranking.

The coal mining industry in Russia has been privatized. From 1996 on, Russia was involved in a project with the World Bank to restructure the country’s coal industry. Today the state monopoly RosUgol, does not exist anymore, and about 77 percent of Russian coal production comes from private companies [5-1].

22 mines out of a total of 92 mines are using degasification technology.

The Methane to Markets International CMM Projects Database has currently identifying seven CMM recovery projects in Russia. All are in place in active underground mines. Four projects in the
Pechora basin and one in the Kuznetsk Basin (also known as the Kuzbass) provide boiler fuel, and two remaining projects (one in the Kuzbass) provide power generation [5-14]. A project is proposed for recovery and use of gob gas for two mines [5-15].

Russia also has an estimated CMM potential of 80 Trillion m3 methane in coal seams. The total yearly emissions of methane from coal were estimated at 2478.29 million cubic meters in 2005. [5-13]

![Energy production of Russia](image)

**Fig. 5-5**  
Energy production of Russia

Russia is also the world's largest exporter of natural gas, the second largest oil exporter and the third largest energy consumer.

Internally, Russia gets over half of its domestic energy needs from natural gas, up from around 49 percent in 1992. Since then, the share of energy use from coal and nuclear has stayed constant, while energy use from oil has decreased from 27 percent to around 19 percent.
Russia’s economy is heavily dependent on oil and natural gas exports. In order to manage windfall oil receipts, the government established a stabilization fund in 2004. By the end of 2007, the fund was expected to be worth $158 billion, or about 12 percent of the country’s nominal GDP. According to calculations by Alfa Bank, the fuel sector accounts for about 20.5 percent of GDP, down from around 22 percent in 2000. According to IMF and World Bank estimates, the oil and gas sector generated more than 60 percent of Russia’s export revenues (64% in 2007), and accounted for 30 percent of all foreign direct investment (FDI) in the country.

Kremlin policy makers continue to exhibit an inclination to advance the state’s influence in the energy sector. Taxes on oil exports and extraction are still high, and Russia’s state-influenced oil and gas companies are obtaining controlling stakes in previously foreign-led projects. State-owned export facilities have grown at breakneck pace, while private projects have progressed more slowly or have been met with roadblocks by state-owned companies or by various government agencies.

“Falling prices, and continued rising cost pressures could result in as much as 20% of Russia’s thermal coal production sold at below cash cost this year 2009” says analyst Wood McKenzie:

Undoubtedly, the period 2009-2012 will be a difficult time for some Russian thermal coal exporters who once again find themselves as the marginal producer. Whilst industrial electricity demand remains depressed, coal has become very competitive against US$5-8/mmBTU gas in NW Europe, and some renewed buying interest from European utilities has arisen at the back end of Q1 2009.”

Based on the general plan for power generating enterprises, the share of gas will see a constant decrease from 68.1% in 2006 to 56.4 % in 2020. Also the oil share will fall, from 3.6% in 2006 to 1.6% in 2020 with the fast growth of coal share: from 25.3% in 2006 to 39.5% in 2020. The share of renewable energy sources in the power generating structure in Russia is very small, and in 2008 it amounted to about 1% (without taking into account power plants with capacities over 25 MW). In future the power generation from coal will not decrease; on the contrary, its growth is forecasted.
### Tab 5-3  Forecast of coal production in Russian Federation to 2030

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production, total, million t</td>
<td>360 - 375</td>
<td>425 - 445</td>
<td>470 - 485</td>
<td>515 - 580</td>
<td>565 - 650</td>
</tr>
<tr>
<td>Kemerovskaya region’s share in production, %</td>
<td>50</td>
<td>50 - 51</td>
<td>49 - 51</td>
<td>50 - 52</td>
<td>49 - 51</td>
</tr>
</tbody>
</table>

It is planned to construct and put into operation additional 24 deep coal mines, 9 open cast mines and 7 prep plants in the Kemerovskaya region alone up to 2025. It is expected that coal consumption by Russian electric power stations will increase in 2.7 – 3.4 times by 2030, its share in coal consumption structure will increase from 45 % to 64 - 69%.

### Tab 5-4  Breakdown of coal in Russia up to 2030, million ton per year

<table>
<thead>
<tr>
<th>Description</th>
<th>Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Production</td>
<td>238 - 245</td>
</tr>
<tr>
<td>Export</td>
<td>65 - 70</td>
</tr>
<tr>
<td>Import</td>
<td>12</td>
</tr>
<tr>
<td>Domestic consumption</td>
<td>185 - 187</td>
</tr>
<tr>
<td>Boilers</td>
<td>16 - 17</td>
</tr>
<tr>
<td>Other consumers</td>
<td>70 - 69</td>
</tr>
<tr>
<td>Kemerovskaya region</td>
<td>139 - 145</td>
</tr>
<tr>
<td>Including shipments to European regions</td>
<td>49 - 50</td>
</tr>
<tr>
<td>Including Urals</td>
<td>25</td>
</tr>
<tr>
<td>Export</td>
<td>55 - 60</td>
</tr>
<tr>
<td>Consumption in Siberia</td>
<td>35</td>
</tr>
<tr>
<td>Including: thermoelectric power station</td>
<td>16</td>
</tr>
<tr>
<td>Boilers</td>
<td>5</td>
</tr>
<tr>
<td>Other consumers</td>
<td>14</td>
</tr>
</tbody>
</table>
5.4 Mining and Mine Safety Laws

Basic laws to be observed in the Russian Federation are:

- Federal Law on State Regulation of Coal Mining and Utilization
- N 81-ФЗ (June 1996)
- Federal Law on Industrial Safety of Dangerous Production
- Facilities N 116-ФЗ (July 1997)
- Coal Mine Safety Rules ПБ 05-618-03 (June 2003)

Federal law # 200-FZ of 31.12.2005 «On licensing certain kinds of activities» does not cover issuing licenses for the recovery of methane from coal seams, a license for using underground resources is necessary. This subject is regulated by the law «On subsoil» of 21.02.1992 # 2395-1. The license covers geological prospecting and development of a deposit. Proprietor of minerals is the state that has the right to dispose of the minerals in accordance with the established rules. The license for recovery of natural resources (including methane of coal seams) is granted through auctions. The license states the amount of recovered minerals, title (property) for it, terms of development of deposits and terms of payment for using natural resources.

While developing documentation for coal seam methane recovery projects it is necessary to evaluate the ecological part and estimate the influence upon the environment. The requirements for methane are similar to the requirements set by ecological law for natural gas recovery.

If coal mine methane transported to the surface by degasification systems is considered as a waste of mining production, then, according to the law ‘On subsoil’ the coal mine can use this waste if the opposite is not defined in the license.

To receive the license for coal seam methane recovery the following five steps must be taken:

Address the regional authorities of the region where the deposit containing methane in coal seams is located, (in case of realizing the project in the Kuznetsky coal basin – to the Administration of Kemerovskaya region (Department of natural resources and ecology; in the Pechyorsky coal basin – to the Administration of Komy Republic) with the request of a petition to the Federal Agency of Subsoil Use about including the deposit identified in the plan of the next auction of natural resources.

Next, the administration of the region forwards the petition to the Federal Agency of Subsoil Use in Moscow.
In case of an approval by the Federal Agency of Subsoil Use the company prepares the required set of documents. Then it files an application for participation in the contest for the right of methane recovery at the chosen location.

The Federal Agency of Subsoil Use sets the date of auction, at the auction the winner company is determined.

The Federal Agency of Subsoil Use issues the license for methane recovery.

Total time for preparing all required documents, getting approval and subsequently a license may take around one year or longer. List of state agencies granting approvals: Federal Agency of Subsoil Use, GPN, Rospotrebnadzor, Emergency Control Ministry Industrial Safety.

The list of domestic documents regulating safe coal mining includes but is not limited to the following guidelines:

Guidelines for safe mining at mines developing coal seams that are likely to develop rock bursts (RD 05-328-99)
Regulation of Gostechnadzor of Russia of 29.11.99 # 87.

Guidelines for air and gas control in coal mines (RD 05-429-02). Regulation of Gostechnadzor of Russia of 21.09.01 # 43.

Safety rules in coal mines (PB 05-618-03).
Regulation of Gostechnadzor of Russia of 05.06.03 # 50.

Methodical Recommendations for coal seam degasification (RD-15-09-2006). Executive order of Federal Agency of Ecological, Technological and Atomic Control of 24.08.06 # 797.

5.4.1 Guidelines for air and gas control in coal mines (RD 05-429-02)

Set the rules for operation of systems like ‘Methane’ as well as systems of a new technological level. Guidelines for air and gas control in coal mines state obligatory standards and requirements for the system of air and gas control in coal mines applying modern computer technologies at the following stages: creation, designing, assembly and operation. These guidelines do not cover degasification systems; conditioning mine air; special devices for control of fire in boreholes. The Guidelines also contain requirements for remote centralized control of methane concentration and other gases in mine air by stationary devices and the operation of extraction facilities.

Safety rules in coal mines (PB 05-618-03) contain requirements for safe underground mining, safe operation of mining equipment, vehicles, electric facilities, fire protection and other issues of industrial safety, including a plan for breakdown elimination. As for degasification systems, the Rules accept its application at mines after receiving Rostechnadzor’s approval.

PB 05-618-03 prohibits smoking and using open fire in underground workings, mine buildings, and on the surface – not closer than 30 meters to the fan and ventilation shaft.

Each mine should maintain the safety system prohibiting access of unauthorized persons to the main objects of the mine, to the underground workings and mine buildings. It is prohibited without permission of Technical director of the mine (except emergencies) to shut down the following objects: electric substations, fans, lifts, water drainage, gas extraction facilities, coolers and heaters, boilers, etc.
A special chapter of the Rules states additional requirements for gassy mines. Depending upon the index of relative methane content and type of methane emission gassy mines are divided into 5 categories.

By PB 05-618-03 standards of methane concentration in the air of underground workings and in pipelines are determined.

Degasification of workplaces must be done in the order approved by Gosgortechnadzor of Russia. The Rules oblige enterprises to develop safety measures (which must get the experts’ approval for industrial safety) for the prevention of methane ignition and fire spread through degasification pipelines.

These Rules oblige the Chief Engineer of the mine to report all cases of methane burst from the rock or methane blows to the regional Gosgortechnadzor. All incidents must be registered in the order stated by Gosgortechnadzor of Russia.

The mines of III Category gas must prepare a forecast of methane bursts in the order stated by Gosgortechnadzor of Russia.

The Rules PB 05-618-03 state that degasification must be applied in gassy mines, wherever it is impossible to create standard methane concentrations by ventilation. The plans for construction and reconstruction of mines, mining levels, blocks and panels have to contain a baseline for ventilation, including the application of degasification technology.

Methodical Recommendations for coal seam degasification (RD-15-09-2006) contain requirements for: degasification system designing; degasification system operating; control of captured gas air mixtures, identification of the amount of recovered methane and its utilization at the mine; description of the methods applied for methane emission sources, its parameters and efficiency; safety rules for degasification activities; requirements for maximum coal mime methane recovery, and its use.

These Methodical recommendations were developed in accordance with Law of Russian Federation "On Subsoil" in version of Federal Law of 03.03.95 # 27-FZ "On changes and amendments to Law of Russian Federation "On Subsoil"; Federal Law of 21.07.97 # 116-FZ "On industrial safety at dangerous industrial objects" and Safety Rules in coal mines (PB 05-618-03) approved by Regulation of Gosgortechnadzor of Russia of 05.06.03 # 50.

According to RD 15-09-2006 degasification at gassy coal mines must be done when it is impossible to provide standard safety concentrations of methane by ventilation. Degasification must always be applied if the methane content is equal to 13 m3/t and higher in the mine and when it is economically profitable to recover and utilize methane.

Methodical recommendations define the chapter ‘Degasification’ as a part of passport for a block or development face; this chapter is developed by mine authorized staff and approved by the technical director before starting work at the site. The gas extraction facilities must be operated under conditions eliminating the possibility of methane ignition and provide safety measures against explosions. Methane concentrations in degasification pipelines must be above 25%. It is prohibited to use methane from degasification for direct combustion or as a fuel for industrial facilities if the methane concentration is lower than 25% and for domestic use if the methane concentration is lower than 50%.

There is no way off to avoid these requirements. The only possibility is to make amendments to the Methodical recommendations.

RD 15-09-2006 contains basic recommendations:

- For technological processes of degasification of methane sources;
• For degasification systems of mines;
• For executing degasification work;
• Technical recommendations:
  • For the safety of degasification work;
  • For the utilization of gas from degasification.

5.5 Environmental Law

Basic Laws. The basic law – The Constitution of RF- contains two categories of laws: Articles 9, 36, 42, 58, 72 determining ecological relations and Articles 1, 2, 7, 8, 17-19, 45-48, 57 concerning ecological regulation. In accordance to the RF Constitution the citizens have a right to live in a favorable environment and they are obliged to protect nature and the environment, treat natural resources carefully, as the latter are the basis for stable development, life and activities of people living in Russia.

Federal law ‘On the protection of environment’ of 10.01.2002 # 7-FZ is part of the ecological laws and it determines the legal basis for state politics in the sphere of environment protection.

Federal law ‘On protection of environment’ regulates the relationship in the field of interaction of society and nature arising from industrial and other activities that have an influence on the natural environment within the limits of Russian territory, and on the continental shelf.

For example, environment is determined as the sum of all natural environment, including natural and anthropogenic objects; components of natural environment are land, underground, flora and fauna, surface and underground water, air, the ozone layer and near-Earth space providing favourable conditions for life on Earth, etc.

Environment protection is defined as the activities of state agencies of the Russian Federation, authorities of regional level, non-governmental and non-profit organizations, legal entities and persons who strive to keep the natural environment safe, care for its restoration, use well and reproduct natural resources, avoid negative impact of industrial and other activities on the environment and work on minimizing the impact.

Federal law ‘On protection of environment’ determines methods of economic regulation in the sphere of environment protection, standards and norms of quality of natural environment, standards and norms of permissible emissions and waste discharge, standards of creation for production waste and limits for its disposal, norms of legal physical impact on the environment, norms on the permitted recovery of natural environment components, norms of allowable anthropogenic impact on the environment. Article 4 of the law defines the protection from pollution, exhaustion, degradation, damage and destruction to the land, subsoil, flora and fauna, surface and underground water, air, ozone layer and near-Earth space.

The law also determines the power of state agencies on the federal and regional level in the sphere of environment protection. The law states that non-governmental and nonprofit organizations active in the sphere of environment protection have the right to develop, publish and realize programs for environment protection, protect rights and legitimate interests of citizens in the sphere of environment protection, and recruit citizens free of charge for activities regarding the protection of environment.

Articles 32 and 33 of the law determine the order of evaluation of the impact on the environment and experts’ statement. It is noted that the evaluation of the impact on the environment is undertaken in relation to planned industrial or other activities which may make an impact on environment without concern of the form of property, and experts’ statement is undertaken in order to state compliance of documents describing planned industrial or other activities to the
requirements in the sphere of environment protection. Article 34 of Federal law 'On environment protection' contains general requirements like placing, design, construction, operation, reconstruction, putting into operation, temporary closing-down and destruction of buildings and other objects:

Placing, design, construction, operation, reconstruction, putting into operation, temporary closing-down and destruction of buildings and other objects making impact on environment is executed in accordance with the requirements in the sphere of environment protection. The activities on environment protection, restoration of natural environment, rational usage and reproduction of natural resources, and providing ecological safety must be evaluated.

Violation of the requirements in the sphere of environment protection leads to adjournment of placing, design, construction, operation, reconstruction, putting into operation, temporary closing-down and destruction of buildings and other objects by order of authorities providing public administration in the sphere of environment protection.

Termination of placing, design, construction, operation, reconstruction, putting into operation, temporary closing-down and destruction of buildings and other objects when the requirements in the sphere of environment protection have been violated is done on the basis of court (arbitration court) decision.

Article 37 of the law determines the nature-conservative requirements for construction and reconstruction of buildings and other objects:

Availability of the approved project with positive state ecological experts' statement;

Observance of requirements in the sphere of environment protection, and also sanitary and construction standards and rules;

Defining measures for environment protection and restoration of natural environment;

Land reclamation;

Land improvement.

The projects of buildings and other objects must observe the standards and norms of allowable anthropogenic burden on environment, stipulate measures for prevention and elimination of pollution, and also means of disposal of production and consumption waste, apply resource-saving, low-waste, and non-waste technologies contributing to environmental protection, restoration of natural environment and rational usage of natural resources and its reproduction.

Commissioning of buildings and other objects is done only if all requirements in the sphere of environment protection have been observed, according to Statements of Acceptance issued by Committees for commissioning the staff of which includes representatives of state authorities responsible for public administration in the sphere of environment protection.

According to Article 30 of Federal law 'On ambient air protection' legal entities possessing stationary sources of emissions of contaminants into ambient air are obliged to the following:

Conform locations of construction of industrial and other objects having a negative impact on ambient air with regional departments of specially authorized state agency in the sphere of environment protection and other regional authorities;

Plan and execute activities for capturing, utilization and sterilization of contaminants in ambient air, its reduction or prevention;

Observe operational rules of facilities and equipment designed for treatment and control of contaminant emissions in ambient air.
According to Article 56 of the law, if the nature-conserving requirements have been violated such activities can be limited, suspended or terminated in the way designated by Russian law. In accordance to Article 80 of the law the demand for limitation, suspension or termination of activities which violate the requirements is considered by court or arbitration court.

The federal law ‘On environment protection’ also contains requirements in the sphere of environment protection for placing, design, construction, commissioning, reconstruction, operation of power engineering facilities and plants; placing, design, construction, commissioning, reconstruction, operation of military objects; placing, design, construction, reconstruction of urban and rural settlements, etc.

### 5.5.1 Regulation of emissions into ambient air.

The basic legal statement in the field of ambient air protection is the federal law ‘On ambient air protection’ which includes the following:

- State quality standards for ambient air and norms of contaminant emissions into ambient air (there are hygienic and ecological standards, technical norms of emissions, maximum permissible emissions and temporary approved emissions);
- Determine state registration of contaminants and potentially dangerous substances; state obligation of receiving special permission for emissions into ambient air for stationary sources;
- Define the requirement that production and use of fuel in Russia is only allowed if the certificate of conformity of fuel to ambient air protection requirements is available;
- Prohibit emission of hazardous substances when the impact for people and the environment is not known;
- Prohibit placing and operation of industrial and other installations which do not have defined ambient air protection rules, facilities of gas treatment and control devices;
- Prohibit production and operation of vehicles if their emissions exceed established standards;
- State obligations of persons and legal entities that have stationary or movable sources of contaminant emissions into ambient air.

Within the frames of laws designed for ambient air protection the following standards have been stated: PDV – standards of maximum permissible contaminant emissions into ambient air; PDK – standards of maximum permissible concentrations of contaminants in ambient air and standards of maximum permissible impacts, etc. Responsibility for violation of ambient air protection laws is stated in Articles 8.21-8.23 of KoAP RF, criminal liability – in Article 251 UK RF (Criminal Code).

### 5.5.2 Economic regulation in the sphere of environment protection.

Means of economic regulation in the sphere of environment protection are contained in Article 14 of federal law ‘On environment protection’ and they include:

- Design of state forecasts of social economic development on the basis of ecological forecasts;
- Development of federal programs in the sphere of environment protection of Russian Federation and target programs in the sphere of environment protection in regions of RF;
- Development and undertaking activities in the sphere of environment protection in order to prevent pollution;
Stating payments for negative impact on environment;

Determination of limits of contaminant emissions, production and consumption waste and other kinds of negative impacts on environment;

Implementation of an economic evaluation for natural and anthropogenic objects;

Realization of an economic evaluation of the impact of industrial and other activities on the environment;

Granting tax and other privileges for implementation of the best existing technologies, new types of energy and also initiating other efficient measures for environment protection in accordance to the law of RF;

Support of innovative and other activities (including ecological insurance) designed for environment protection;

Compensation for negative impact on the environment;

Other means of economic regulation of mastering and efficient execution of environment protection.

Types of negative impact on environment include:

- Contaminant emissions into ambient air;
- Disposal of contaminants into surface and underground water, water storages;
- Pollution of subsoil and soil;
- Disposal of production and consumption waste;
- Pollution by noise, heat, electromagnetic, ionizing and other types of radiation;
- Other kinds of negative impact on environment.

According to Article 16 of federal law ‘On environment protection’ a negative impact on environment is requiring payment. Forms of payment for negative impact on environment are determined by federal laws. The order of calculating and charging such payments is stated by Russian law. Having paid for negative impact does not free subjects of industrial and other activities from executing measures for environment protection and compensation for the caused damage.

According to federal law ‘On environment protection’ compensation for negative impact on environment caused by violating the laws in the sphere of environment protection is executed voluntarily or by court (arbitration court) order. Determination of amount of impact is calculated judging the actual cost of restoration of the damage situation of natural environment and taking into account incurred losses including loss of profit, and also in accordance with plans of reclamation and other recovery works, if there are no such – in accordance with fees and methods of harm calculation stated by state agencies undertaking public administration in the sphere of environment protection. There are some approved methodologies:

Executive order of Ministry of Nature of RF of May 4, 1994 # 126 "On stating fixed rates for calculating amount of payment for damaged caused by illegal recovery or destruction of flora and fauna ";

Executive order of Ministry of Agriculture of RF of May 25, 1999 # 399 " On stating fixed rates for calculating amount of payment for damaged caused by legal entities or persons from illegal recovery or destruction of fauna defined as hunt objects");
Regulation of Government of RF of May 21, 2001 # 388 "On stating fixed rates for calculating amount of payment for damaged caused to forest resources and forests not included in forest resources by violation of forest law of RF" and others.

5.6 Energy Law

In the Kuzbass the regulation of tariffs for thermal and electric power is established by the Regional Energy Committee of Kemerovskaya region (REC). The Committee controls the application of established prices and expenses for power generating companies, and takes measures for excluding unjustified expenses taken into the calculation for determining electric power tariffs. While calculating tariffs the justified expenses (costs) include purchase of fuel, electric and heat power, raw materials, repair of fixed assets, depreciation, wages and social payments and other expenses connected to electric power production. Investments for expanding production capacities and profits distributed by generating companies to its shareholders are not taken in account in the price calculation.

E.g., Regulation of REC approves tariffs for heat power in 2009 for consumers of JSC 'Novokuznetsky metallurgical plant' (Table 1-5). The established tariffs for consumers of JSC 'Kuzbassenergosbyt' are contained in Table 1-5.

<table>
<thead>
<tr>
<th>Tab 5-5</th>
<th>Tariffs for heat power for consumers of JSC &quot;Novokuznetsky metallurgical plant&quot; in 2009 (w/o VAT) [5-19]</th>
</tr>
</thead>
<tbody>
<tr>
<td># #</td>
<td>Tariffs for heat power</td>
</tr>
<tr>
<td></td>
<td>Choice steam under pressure</td>
</tr>
<tr>
<td></td>
<td>Hot water</td>
</tr>
<tr>
<td></td>
<td>from 1.2 to 2.5 kgf/cm²</td>
</tr>
<tr>
<td></td>
<td>from 2.5 to 7.0 kgf/cm²</td>
</tr>
<tr>
<td></td>
<td>from 7.0 to 13.0 kgf/cm²</td>
</tr>
<tr>
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<td>above 13.0 kgf/cm²</td>
</tr>
<tr>
<td></td>
<td>Direct and reduced steam</td>
</tr>
<tr>
<td>1.</td>
<td>Consumers paying for production and supply of heat power</td>
</tr>
<tr>
<td>Budget*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One-part tariff, RR/Gcal</td>
</tr>
<tr>
<td></td>
<td>392,6</td>
</tr>
<tr>
<td></td>
<td>3</td>
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<tr>
<td></td>
<td>Two-part tariff</td>
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<td>For power, RR/Gcal</td>
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<tr>
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<td>For rating, thou. RR per month/Gcal-hour</td>
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<td></td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Other consumers</td>
</tr>
<tr>
<td></td>
<td>One-part tariff, RR/Gcal</td>
</tr>
<tr>
<td></td>
<td>392,6</td>
</tr>
<tr>
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<td>Two-part tariff</td>
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<tr>
<td></td>
<td>For power, RR/Gcal</td>
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<td></td>
<td>—</td>
</tr>
<tr>
<td>For rating, thou. RR per month/Gcal-hour</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---</td>
</tr>
</tbody>
</table>

### 2. Consumers paying for production of heat power (receiving heat power at producers’ collectors)

#### Budget

<table>
<thead>
<tr>
<th>One-part tariff, RR/Gcal</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-part tariff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For power, RR/Gcal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For rating, thou. RR per month/Gcal-hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Other consumers

<table>
<thead>
<tr>
<th>One-part tariff, RR/Gcal</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-part tariff</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>For power, RR/Gcal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For rating, thou. RR per month/Gcal-hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Tariffs established in Item 1 for budget consumers are applied for payments for heat power consumed by communal organizations to supply it to population, and also for payments of population by direct contracts (with direct contract payments VAT is applied)*

Tab 5-6 Tariffs for electric power supplied by JSC «Kuzbassenergosbyt» to consumers’ market since 01.01.2009 (w/o VAT) [5-20]

<table>
<thead>
<tr>
<th>#</th>
<th>Consumers</th>
<th>Unit</th>
<th>Voltage range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>BH</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. Population (with VAT)

<table>
<thead>
<tr>
<th>One-part tariff</th>
<th>kop/kW-hr</th>
<th>132,00</th>
</tr>
</thead>
</table>

1.1. Tariff differentiated by day and night zone

<table>
<thead>
<tr>
<th>Night zone since 23-00 to 7-00</th>
<th>kop/kW-hr</th>
<th>118,80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day zone since 7-00 to 23-00</td>
<td>kop/kW-hr</td>
<td>146,70</td>
</tr>
</tbody>
</table>

2. Consumers equal to population

<table>
<thead>
<tr>
<th>One-part tariff</th>
<th>RR/MW-hr</th>
<th>1 118,64</th>
</tr>
</thead>
</table>

2.1. Tariff differentiated by day and night zone
### Basics on country situation

#### Deliverable No. 1

| Night zone since 23-00 to 7-00 | RR/MW-hr | 1 006,80 |
| Day zone since 7-00 to 23-00 | RR/MW-hr | 1 242,90 |

#### 3. Other consumers

##### 3.1.1. One-part tariff

- from 7001 hours and more | RR/MW-hr | 1 620,58 | 1 662,63 | 1 664,32 | 1 700,17 |
- from 6001 to 7000 hours | RR/MW-hr | 1 672,58 | 1 714,63 | 1 716,32 | 1 752,17 |
- from 5001 to 6000 hours | RR/MW-hr | 1 743,58 | 1 785,63 | 1 787,32 | 1 823,17 |
- below 5000 hours | RR/MW-hr | 1 846,08 | 1 888,13 | 1 889,82 | 1 925,67 |

##### 3.1.2. Two-part tariff

| Payment for electric power | RR/MW-hr | 524,74 | 558,00 | 584,39 | 756,16 |
| Payment for rating | RR/MW-mo | 514 409 | 590 143 | 598 978 | 668 020 |

##### 3.1.3. Tariff differentiated by day and night zone

- Night zone | RR/MW-hr | 1 548,68 | 1 590,73 | 1 592,42 | 1 628,27 |
- semi-peak (day zone) | RR/MW-hr | 1 625,18 | 1 667,23 | 1 668,92 | 1 704,77 |
- peak zone | RR/MW-hr | 1 710,18 | 1 752,23 | 1 753,92 | 1 789,77 |

#### Connected via energy facilities of electric power producers

##### 3.2.1. One-part tariff

- from 7001 hours and more | RR/MW-hr | 1 579,70 | 1 588,49 | 1 563,79 | 1 427,87 |
- from 6001 to 7000 hours | RR/MW-hr | 1 631,70 | 1 640,49 | 1 615,79 | 1 479,87 |
- from 5001 to 6000 hours | RR/MW-hr | 1 702,70 | 1 711,49 | 1 686,79 | 1 550,87 |
- below 5000 hours | RR/MW-hr | 1 805,20 | 1 813,99 | 1 789,29 | 1 653,37 |

##### 3.2.2. Two-part tariff

| Payment for electric power | RR/MW-hr | 483,86 | 483,86 | 483,86 | 483,86 |
| Payment for rating | RR/MW-mo | 514 409 | 590 143 | 598 978 | 668 020 |

##### 3.2.3. Tariff differentiated by day and night zone

| Night zone | RR/MW-hr | 1 507,80 | 1 516,59 | 1 491,89 | 1 355,97 |

| № n.n. | Consumers | Unit | Voltage range |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - semi-peak (day zone) | RR/MW-hr | 1 584,30 | 1 593,09 | 1 568,39 | 1 432,47 |
| - peak zone | RR/MW-hr | 1 669,30 | 1 678,09 | 1 653,39 | 1 517,47 |

Budget consumers
3.3.1. One-part tariff

<table>
<thead>
<tr>
<th>Hours</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>from 7001 hours and more</td>
<td>1 620,58</td>
<td>1 662,63</td>
<td>1 664,32</td>
<td>1 700,17</td>
</tr>
<tr>
<td>from 6001 to 7000 hours</td>
<td>1 672,58</td>
<td>1 714,63</td>
<td>1 716,32</td>
<td>1 752,17</td>
</tr>
<tr>
<td>from 5001 to 6000 hours</td>
<td>1 743,58</td>
<td>1 785,63</td>
<td>1 787,32</td>
<td>1 823,17</td>
</tr>
<tr>
<td>below 5000 hours</td>
<td>1 846,08</td>
<td>1 888,13</td>
<td>1 889,82</td>
<td>1 925,67</td>
</tr>
</tbody>
</table>

3.3.2. Two-part tariff

<table>
<thead>
<tr>
<th>Hours</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment for electric power</td>
<td>524,74</td>
<td>558,00</td>
<td>584,39</td>
<td>756,16</td>
</tr>
<tr>
<td>Payment for rating</td>
<td>514 409</td>
<td>590 143</td>
<td>598 978</td>
<td>668 020</td>
</tr>
</tbody>
</table>

3.3.3. Tariff differentiated by day and night zone

<table>
<thead>
<tr>
<th>Zone</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night zone</td>
<td>1 548,68</td>
<td>1 590,73</td>
<td>1 592,42</td>
<td>1 628,27</td>
</tr>
<tr>
<td>- semi-peak (day zone)</td>
<td>1 625,18</td>
<td>1 667,23</td>
<td>1 668,92</td>
<td>1 704,77</td>
</tr>
<tr>
<td>- peak zone</td>
<td>1 710,18</td>
<td>1 752,23</td>
<td>1 753,92</td>
<td>1 789,77</td>
</tr>
</tbody>
</table>

3.4.1. One-part tariff

<table>
<thead>
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<th>Hours</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>from 7001 hours and more</td>
<td>1 579,70</td>
<td>1 588,49</td>
<td>1 563,79</td>
<td>1 427,87</td>
</tr>
<tr>
<td>from 6001 to 7000 hours</td>
<td>1 631,70</td>
<td>1 640,49</td>
<td>1 615,79</td>
<td>1 479,87</td>
</tr>
<tr>
<td>from 5001 to 6000 hours</td>
<td>1 702,70</td>
<td>1 711,49</td>
<td>1 686,79</td>
<td>1 550,87</td>
</tr>
<tr>
<td>below 5000 hours</td>
<td>1 805,20</td>
<td>1 813,99</td>
<td>1 789,29</td>
<td>1 653,37</td>
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3.4.2. Two-part tariff

<table>
<thead>
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<th>Hours</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment for electric power</td>
<td>483,86</td>
<td>483,86</td>
<td>483,86</td>
<td>483,86</td>
</tr>
<tr>
<td>Payment for rating</td>
<td>514 409</td>
<td>590 143</td>
<td>598 978</td>
<td>668 020</td>
</tr>
</tbody>
</table>

3.4.3. Tariff differentiated by day and night zone

<table>
<thead>
<tr>
<th>Zone</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
<th>RR/MW-hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night zone</td>
<td>1 507,80</td>
<td>1 516,59</td>
<td>1 491,89</td>
<td>1 355,97</td>
</tr>
<tr>
<td>- semi-peak (day zone)</td>
<td>1 584,30</td>
<td>1 593,09</td>
<td>1 568,39</td>
<td>1 432,47</td>
</tr>
<tr>
<td>- peak zone</td>
<td>1 669,30</td>
<td>1 678,09</td>
<td>1 653,39</td>
<td>1 517,47</td>
</tr>
</tbody>
</table>

4. Companies granting services of electric power transportation purchasing electricity in order to compensate losses in lines legally belonging to these companies

4.1. One-part tariff

<table>
<thead>
<tr>
<th>Hours</th>
<th>RR/MW-hr</th>
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<tbody>
<tr>
<td>below 5000 hours</td>
<td>826,76</td>
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</table>

Tariffs for electric and heat power generated by coal mine methane utilization facilities do not have any privileges compared to traditional generating companies. But in Kemerovskaya region there are several regulations granting tax privileges for companies utilizing CMM. JSC ‘Kuzbassky Technopark’ designed to support innovative activities in the region was founded in Kemerovskaya.
region. Technopark’s residents can receive privileges for property tax (2.2%), decrease of profit tax (from 17.5% down to 13.5%) paid into regional budget.

5.6.1 Connection to the grid

Actual laws and regulation for energy production, especially connection to public grid:

The law ‘On electric power engineering’ is in force in Russia, and it regulates legal relationships in the field of electric power generation between producers, electric power consumers and state agencies. Service fees for electric power supply via electric power lines are paid. The companies operating the power lines agree to contracts with the producers of electric power.

For instance, JSC ‘SUEK’ has a significant share of JSC ‘Kuzbassenergo’s stock. That is why it is easy for JSC ‘SUEK’ to get access to the electric power lines in order to supply electricity generated by methane utilization facilities. Requirements for electric power generation for their own need are near identical to the requirements for electric power generated for consumers.

The power grid of Kemerovskaya region includes 10 heat electric power stations. The total installed capacity is 4,938 MW. 6 electric power stations belong to JSC ‘Kuzbassenergo’. JSC ‘Kuzbassenergo’ altogether with its Barnaul branch is the part of TGK -12. South-Kemerovskaya regional hydroelectric power station and Western-Siberian thermoelectric power stations located in the Kemerovskaya region were purchased by the companies ‘Metchel’ and ‘EvrazGrupp’.

Tariffs for power from CMM

Tariffs for electric and heat power generated by coal mine methane utilization facilities do not have any privileges compared to traditional generating companies. But in the Kemerovskaya region there are several regulations granting tax privileges for companies utilizing CMM. JSC ‘Kuzbassky Technopark’ designed to support innovative activities in the region was founded in the region. Technopark’s residents can receive privileges for property tax (2.2%), decrease of profit tax (from 17.5% down to 13.5%) paid into regional budget.

5.7 References

[5-1] IEA 2006 Russia report www.iea.org/textbase/country/r_country.asp 20.08.09
[5-2] Organisation of economic, co-operation and development. http://www.oecd.org/home/0,2987,en_2649_201185_1_1_1_1_1_1,00.html
[5-5] Law 44-OZ of April 19, 2001 ‘On stating tax privileges for legal entities undertaking scientific, research, test, design, industrial and project works of geological kind referring to test industrial recovery of methane from coal seams’. Закон 44-ОЗ от 19 апреля 2001 года «Об установлении налоговых льгот юридическим лицам, осуществляющим проведение научно-исследовательских, опытно-конструкторских, опытно-промышленных и проектных работ
геологического профиля, связанных с опытно-промышленной добычей метана из угольных пластов»

[5-6] Law 105-OZ of November 19, 2001 'On stating tax privileges for enterprises undertaking investment activities in Kemerovskaya region.' / Закон 105-ОЗ от 19 ноября 2001 года «Об установлении налоговых льгот субъектам инвестиционной деятельности в Кемеровской области».


[5-8] Law 102-OZ of December 10, 2004 'On state support to investment and production activities.' / Закон 102-ОЗ от 10 декабря 2004 года «О государственной поддержке инвестиционной и производственной деятельности».

[5-9] Law 22-OZ of February 14, 2005 'On tax privileges for enterprises undertaking investment and production activities in Kemerovskaya region.' / Закон 22-ОЗ от 14 февраля 2005 года «О налоговых льготах субъектам инвестиционной и производственной деятельности в Кемеровской области».

[5-10] Decree of Government of RF # 344 of June 12, 2003 'On standards of payments for contamination emissions to the air by stationary and movable sources, contamination of surface and underground water, allocation of production and consumption waste'. / Постановление Правительства РФ от 12 июня 2003 г. № 344 "О нормативах платы за выбросы в атмосферный воздух загрязняющих веществ стационарными и передвижными источниками, сбросы загрязняющих веществ в поверхностные и подземные водные объекты, размещение отходов производства и потребления".


[5-13] M2M summary of coal industry, Russia


[5-16] EIA country Analysis briefs: Russia


[5-18] www.unece.org/energy/se/pdfs/cmm/4ahge_cmm/2a_Burn.pdf


[5-20] Regulation of REC of Kemerovskaya region # 65 of 22.05.2009 "On stating tariffs for heat power sold by JSC ‘Novokuznetsky metallurgical plant’ (Novokuznetsk) at consumers’ market'./ Постановление РЭК Кемеровской области №65 от 22.05.2009 г. «Об утверждении тарифов
на тепловую энергию, реализуемую ОАО «Новокузнецкий металлургический комбинат» (г. Новокузнецк) на потребительском рынке».
6 Romania

6.1 Economic situation

The major fact about Romanis are given in the table above.

Tab. 6-1 Characteristics of Romania [6-1]

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>21.59 (million)</td>
</tr>
<tr>
<td>GDP</td>
<td>52.63 (billion 2000 US$)</td>
</tr>
<tr>
<td>GDP (PPP)</td>
<td>187.88 (billion 2000 US$)</td>
</tr>
<tr>
<td>Energy Production</td>
<td>27.99 (Mtoe)</td>
</tr>
<tr>
<td>Net Imports</td>
<td>11.34 (Mtoe)</td>
</tr>
<tr>
<td>TPES</td>
<td>40.15 (Mtoe)</td>
</tr>
<tr>
<td>Electricity Consumption*</td>
<td>51.85 (TWh)</td>
</tr>
<tr>
<td>CO₂ Emissions **</td>
<td>94.68 (Mt of CO₂)</td>
</tr>
</tbody>
</table>

Economic growth in Romania 2008 was 8.5%. For 2009 the growth is estimated to be 2.5% by the government, the IWF predicts a reduction of 8% which might result in zero growth for this year. Moody’s estimates the economy will shrink by 5.7% this year. In the first quarter, the reduction was 6.4%. The export volume in 2007 was 80.38 billion Euro.

Despite the negative trend the construction industry will grow this year since the infrastructure of Romania is in urgent need of improvement.

Since joining the European Union a thorough reform to reduce corruption, increase employment and make investment easier and reliable has not made real progress. Reforming the economy and reducing bureaucracy has become more difficult in the present economic downturn.

The most important industries for Romania are textiles, manufacturing of machines, metallurgy, Chemical industry, Petrochemicals and oil. All these are on the right track to modernization and restructuring and the industry is moving to more advanced, sophisticated and competitive products. The importance of the automotive sector is growing, more and more automotive parts manufacturers are moving their facilities to Romania.

The most important sector with regards to the number of employees, textiles, which creates approximately one quarter of all exports, is moving from cheap Products to advanced and valuable sectors. The aim is to remain competitive with China and India.

In the engineering sector equipment manufacturing, shipyards and automotive are competitive and have a good basis for future development. Due to the availability of trained engineers the IT and software industries are developing fast.

The construction industry has grown rapidly and much faster than the rest of the economy. In 2007 the private, industrial and infrastructure construction growth rate was around 30% and in 2009, despite the world economic downturn, it is predicted to be 13%.
For the future Telecommunication, IT and technology, Environmental activities (waste management and disposal) and the energy sector are earmarked for outstanding growth and development. The trade deficit in 2007 was 21 billion Euro. [6-2]

6.1.1 Financial Country Rating and outlook
The Standard and Poor`s local currency rating is BBB-/negative/A-3, the country rating is BB+ (May 2009).

“Moody’s is the only one of the three financial assessment agencies, that keeps granting Romania the "investment grade" - Baa3 rating, with negative perspective. S&P and Fitch have downgraded Romania to "junk" category (speculative rating) last autumn”. (Bucharest Herald 10.07.2009)

6.1.2 Local currency situation.
According to the National Bank of Romania Inflation was 6.3 % in 2008. For the current year 2009 the target is 4,3 %, in 2010 3,8 %

Independent sources (Source of data : Auswärtiges Amt Germany-Rumänien: Wirtschaft) estimate the 2008 inflation to be 7,9 % and predict 5,3 % for 2009.)

6.1.3 Price situation and outlook for competing products
Energy produced in Romania might become more expensive if the country exceeds the carbon dioxide levels imposed by the European Commission, a requirement that applies to all EU members states, Ionuț Purica, a member of the Academia Română and an energy and environment expert,
said. The increase could be between 5 and 10 per cent, Romanian HotNews daily reported on 19 June 2009.

Following Romanian authorities' decision to lower gas costs by 3 percent as of May 1, E.ON Gaz Distributie said it recorded 'justified uncovered costs' worth 172 million lei ($40.8 million) so far. Romanian officials recently said gas tariffs will fall by another 5 percent as of July.

The market prices for the above products were highly volatile in the past and it can be predicted that they will also be highly volatile in the future. The price for carbon credits ranged between less than 10 euro/ unit to more than 25 euro/unit in less than 12 month.

The price of crude oil a leading benchmark for all primary energy sources fluctuates between 40 and 150 US-Dollar per barrel on world markets trading. In some countries the prices for primary energy fuels are still regulated and below world market prices. Different taxes maybe implied on different sources of primary energy or subsidies might be given to some sources like renewable energies or power/fuels based on CMM.

The current price situation for power and natural gas is shown in the following two figures. In both cases all taxes are included in the prices for households. The prices for the industry include the excise tax.

![Electricity half-yearly Prices for Industry and Households](image)

**Fig. 6-2 The current costs for power in Romania [ 6-4]**
The Value Added Tax is 19%. The lower quote of 9% is for hostelry, pharmacy products and culture. Since 29.12.2004 the income and corporate earning tax is 16% flat. Duties are in the range between 0 and 30% and are average 11.7%.

6.2 Implementation status of Kyoto protocol

Date of signature: 05 January 1999
Date of ratification: 19 March 2001
Date of entry into force: 16 February 2005

Romania is a state listed in Annex I to Kyoto Protocol, so JI projects are possible to implement there. According to the presentation of Romania as a party involved additional to the international procedure for validation of JI projects also the national procedure is possible. The recent national guidelines are uploaded on the UNFCCC official site.

According to Report on the in-depth review of the national communication of Romania, CMM is not specially concerned.
There were 15 JI project approved in Romania till November 2006 [6-5]. As there were 8 memoranda of understanding, the projects were implemented bilateral between Romania and Switzerland, Norway, The Netherlands, Sweden and Denmark. Only four of the project were listed on the official site of unfccc till December 2009.

After the official information of the state CMM projects are not explicit listed as potential JI projects. Romanian JI projects could mean modernization, re-habilitation, energy efficiency and new technologies. It is imaginable to implement CMM projects in areas such as:

- co-generation installations
- fuel-switching in energy productive or industrial installations
- district heating systems;
- energy production installations creating clean energy (especially hydro-electric, geothermal, wind, solar, biogas or biomass)

[6-6]
The present CMM potential in Romania is low, so the an implementation of bigger standalone projects is not very probably.

### 6.3 Energy politics

The energy mix of Romania is based on gas, solid fuels and oil but there is a significant part of the renewables.
Romania was one of the first EU candidate countries transposing the Directive 2001/77/EC provisions into its own legislation (see GD no.443/2003 with modification of GD no.958 / 2005). Its indicative target for 2010 was fixed at 33%, representing the share of E-RES in the gross national electricity consumption. After that, through GD no.1069/2007 regarding the approval of the National Energy Strategy for 2007-2020, there were established the indicative target of 35% for 2015, respectively of 38% for 2020 representing the share of E-RES (energy from renewable resources) in the gross national electricity consumption.

Romania has made a clear and strong statement and committed to reduce Greenhouse Gas emissions by 8 % in the period 2008 – 2012. The national strategy is to increase electricity generation using renewable energy sources and to improve overall energy efficiency. In the long run (10 to 20 years) this will lead to a reduction of coal mining and production.

It is planned to reduce the portion of hard coal in the long run unless technology is available to cope with CO2 emissions. No significant reduction is planned for the immediate future, capture and storage technology for CO2 coming from coal power generation might or might not change the long-term perspective.

For the scope of the current project the amount of coal mined will probably be stable within the next ten years.

The Germany-based Energy Watch Group even predicts an increase in coal production worldwide by 30 % to a peak in 2025 despite all efforts to reduce Greenhouse Gas.
6.3.1 Tax incentives for investors

The law mentions a number of tax incentives for renewable energy projects. However, the conditions applying to such incentives will be specified in further regulatory instruments. Among other fiscal measures, the law provides for (i) tax exemptions and reductions for investors in the sector for three years from the commissioning of the installation; and (ii) excise tax exemptions under the provisions of the EU Energy Tax Directive (2003/96/EC).

The law also emphasizes that investors may be eligible for incentives in respect of strategic projects under the national energy policy. If so, the government will undertake to:
- guarantee up to 50% of the value of the long-term and middle-term loans supporting the project;
- ensure that adequate transport and utilities infrastructure is in place for the start-up and development phases;
- modify existing infrastructure and create new access roads as necessary to support start-up and development; and
- supply funds from the state budget to support job creation.

6.3.2 Additional measures

The law envisages further support for renewable energy projects by guaranteeing (6-14):
- accelerated depreciation deductions on investments;
- a 50% reduction in the fees payable for permits required for investment projects;
- an expedited procedure for the issuance of such permits;
- a 50% subsidy for the cost of the electricity consumed by geothermal energy installations; and
- support for local public authorities in attracting direct investment by:
  - facilitating the provision of investment facilities;
  - simplifying authorization procedures; and
  - establishing a dedicated bureau for authorizations.

6.4 Laws

To create a new electricity producing facility in Romania, interested firms must fulfill certain requirements and obtain a number of documents and authorizations from the institutions and the local authorities authorized to provide them. Investors must secure from local administration authorities a city planning certificate (which includes a list of required documentation) and a construction authorization. These two documents apply to all constructions, not just E-RES facilities.

In accordance with Article 13 of Law 13/2007, building new energetic facilities (i.e., facilities for the production of electricity), as well as updating existing technological facilities, is accomplished on the basis of an incorporation authorization. The incorporation authorization is the technical legal document issued by the National Authority for Energy Regulation ("NAER"), by which a natural or legal person, Romanian or foreign, is given the permission to build or to update existing technological facilities for electricity production. The incorporation authorization is necessary only for power units with installed power higher than 1MW. The NAER establishes the duration for which the authorization is granted, correlated with the duration of the construction and functioning of the facility and the terms taken from the applicant’s documentation.
According to Article 15 of the Energy Law, NAER issues incorporation authorizations for the establishment of E-RES and licenses for activities such as commercial exploitation of energy production facilities, transport, the provision and distribution of energy, etc.

The production, transport, service system, distribution and supply of electricity, as well as the activities of administration for the centralized markets of electricity are accomplished on the basis of licenses granted by NAER by which a natural or legal person, Romanian or foreign, is given permission to commercially exploit energy facilities. The term for which the license is granted is for 25 years for the commercial exploitation of electricity production facilities.” (from The Romanian Digest, Herzfeld and Rubin Associates)

System operators are contractually entitled against their grid operator to the connection of their systems to the grid. The grid operator is obliged to enter into contracts with the system operators (art. 31 par. 2 Electricity Law in conjunction with art. 33 Regulation no. 90/2008).

Grid operators are obliged to connect renewable energy systems to their grids as a priority, unless this poses a risk to the correct operation of the national energy system (art. 20 Law no. 220/2008).

There are no special provisions on the costs and the distribution of the costs of grid usage by electricity from renewable sources. The costs of connection of a system to the grid are borne by the system operator, who is obliged to pay a once-only grid connection fee (art. 31 Regulation no. 90/2008).

ROMGAZ is the National Gas Company, having the responsibility of performing the national strategy within the natural gas field and is also responsible for the production, geological research for the discovery of natural gas reserves, the storage, transmission, dispatching, import, international transit and distribution of natural gas.

Although in the last years the natural gas consumption has declined compared to the last decade, due in large part to the reform and restructuring processes, it is estimated that the natural gas would further represent a significant primary energy source for Romania, covering about 35-40% of the total resources. ROMGAZ gives special consideration to the descending evolution of the domestic gas production, as a consequence of the reservoir depletion and the reduction of research-exploration activities. Presently, ROMGAZ imports natural gas from the Russian Federation, the only gas source from abroad.

The underground gas storage capacity will continuously increase and after 2000 the gas quantities extracted from deposits during winter will represent about 10% of the consumption.

ROMGAZ has a vast network of pipes with a total length in excess of 35,000 kilometers. ROMGAZ's output of natural gas declined steadily from a maximum 36.2 billion cubic meters (cum) in 1986 to 13.5 billion cum in 1999. This is around 60 percent of the domestic production, the rest being extracted by the National Oil Company, PETROM. In addition to this, Romania imported a total of 4.5 billion cum in 1998, out of which ROMGAZ took 1.2 billion directly and transported the rest for third parties.

At present, ROMGAZ has in its concession 140 commercial natural gas reserves exploited by means of 3800 wells, which are in advanced degree of exploitation, most of them having an actual recovery factor of more than 65%. ROMGAZ forecasts a continuing domestic fall in natural gas output, due to the advancing depletion of the existing gas fields. Therefore, the focus on their capital investment program, is on increasing the volume of underground storage capacity, which is set to reach 4.6 billion cbm in 2005, up from 1.3 billion cum today. The distribution business has already been divided into two regional branches and the company is slated for privatization, expected to take place next year. [6-10]
6.5 Environmental laws

Which environmental laws and regulations has to be considered regarding any kind of CMM-Utilisation

Due to the fact that EU environmental legislation has only recently been known in Romania, there are still areas of confusion regarding terminology and definitions, and some incoherence in the existing regulations.

The following terms are used in Romanian legislation at present:

Environmental Impact Assessment (EIA), an evaluation of possible effects of a future activity on the environment. MO 170/1990 provides that an "Environmental Impact Study is required for a new investment". This corresponds to Directive 85/335/EEC. EIA is required to obtain approval to undertake a new activity (i.e., investment).

Environmental Impact Analysis, which entails the checking and verification by analysis, measurements, on-site studies, of existing activities or the review of those conducted previously. This definition is mirrored by MO 619/1992 and corresponds somewhat with the definition in Council Regulation 1836/93 on the Eco-management and Audit Scheme.

Environmental Balance, which means both EIA and EI Analysis is in accord with EA (Art.1). Both formulations written above are met in the new EPA as well.

Summarizing the incorporation of 85/335/EEC provisions in existing Romanian legislation, it can be said that they are fully embodied in:

MO 170/1990, which sets forth the requirement that developers obtain consent based on EIA (i.e., EIS) for new investments;

MD 113/1990, which lays down the content of the documentation to be presented to the local environmental authorities for consent. A list of projects subject to EIA is presented in Annex 2 of MD 113/1990. The list comprises the same activities presented in Annex II of 85/337 EEC.

MO 437/1991 provides a list of activities which require environmental authorization (Annex 3 of the report).

MO 619/1992 establishes the minimum content of EIA or EI Analysis necessary to receive consent (acceptance) or authorization. [6-11]

6.6 Energy laws

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Grid operators are obliged to connect renewable energy systems to their grids as a priority, unless this poses a risk to the correct operation of the national energy system (art. 20 Law no. 220/2008).

There is a promotion system implemented for the use of renewable energy sources, which is similar to that in Poland and works with mandatory quota for the electricity suppliers.

Romania has adopted the mandatory quota system combined with the trade system with minimum and maximum price limits legally set up for the green certificates. The electricity suppliers demonstrate the compliance with the quota system by the number of green certificates they buy each year. This number has to be equal to the mandatory quota value multiplied by supplied electricity quantity. In case the suppliers do not comply with the annual mandatory quota, they will pay to the TSO 70 Euro for each green certificates they were unable to buy.

The green certificates can be issued for energy produced from wind, solar, geothermal, biomass energy, waves, hydrogen as well as the electricity produced in hydro power units with installed power less or equal than 10 MW, put into function or modernized starting with 2004.

E-RES may be sold: within bilateral contracts, to electricity suppliers or eligible consumers, at negociated prices, within bilateral contracts, to electricity suppliers, at regulated prices, according to the provisions of art. 3 from Order ANRE no. 44/2007 or on the centralized Day Ahead Market (DAM), at the market clearing price. E-RES has priority on the electricity market transactions.  

[ 6-7] [ 6-8]

There is also a CHP promoting scheme planned implementing the directive of the EC. This would work with a bonus system with bonus for each electric power unit given over the electric power selling price.. As eligible fuels are solid fuel, gas fuel provided from the transportation network (including liquid fuel) and gas fuel provided from the distribution network. There is no explicite limitation to natural gas.[ 6-9]
6.7 Hard coal and CMM mining in Romania

The hard coal mining in Romania is possible in the Jiu Valley Basin (see Fig. 6-6). The surface of the basin is about 16 km². There are reserves of total 1.6 billion tones. About 50% of the total reserves are in abandoned pillars and seam with low thickness (less than 1m) The surface of the mining area licensed by the mining law is about 48 km² [6-12]

According to [6-13] there till now are no studies regarding the energetically potential of Jiu Valley coal mine gas in Jiu Valley coal basin. The main goal of the studies concerning coal mine methane from this coal basin, was related only to underground safety and security measures, without any solutions for a commercial use of the coal mine gas. Until now drainage of methane in Jiu Valley collieries was made only for safety reasons, energetically applications basic covered only for ensuring heating necessity of mining operators

Through the ventilation shafts deliberate ca 4,1 million m³ CH₄ per day. The measured concentration are between 0,1 and 0,7 %.

The degassing systems of the mines capture methane with higher concentration. The amounts are given in the table below

**Tab. 6-2 CMM amounts captured through degassing systems in Romanian mines**

<table>
<thead>
<tr>
<th>Mine</th>
<th>CH4%</th>
<th>CH4 volume per month m³/month</th>
<th>CH4 volume per day m³/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livezeni</td>
<td>61</td>
<td>56657</td>
<td>1715</td>
</tr>
<tr>
<td>Vulcan</td>
<td>86</td>
<td>55728</td>
<td>1879</td>
</tr>
<tr>
<td>Paroseni</td>
<td>70</td>
<td>115517</td>
<td>3671</td>
</tr>
<tr>
<td>Lupeni</td>
<td>66</td>
<td>99792</td>
<td>3397</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>327694</td>
<td>10663,9</td>
</tr>
</tbody>
</table>
The captured amounts are very low and allows not really a project implementation of project in a MW-range. As the methane amount deliberated through the ventilation is high, the first step could be a redesign of the capture system in order to get higher concentrated methane in bigger amounts.

At the Lupeni mine is already one project implemented. At the mine CMM is fired in a boiler. No other projects are cited in the literature.

6.8 References

Aug. 13, 2009, 12: 33 h


[6-6] Romania's fourth national communication on climate change under the United Nations Framework Convention on Climate Change


[6-9] Government decision project regarding the implementation of the support scheme on the promotion of electricity from high efficiency cogeneration based on the useful heat demand, ANRE, June, 2009


[6-11] Regional Environmental Center for Central and Eastern Europe, list: Romania


[6-13] Gheorghe, Ch., POSSIBILITIES FOR USING CMM IN JIU VALLEY COAL BASIN, WEC REGIONAL ENERGY FORUM 2008

7  Kazakhstan

7.1  Economic situation

Kazakhstan is the largest country that has developed from former Soviet territories. It has huge natural raw material resources, fossil fuel and minerals. Extraction and processing of these raw materials is the major focus of the economy. The country enjoyed an average economic growth of 8 % from 2002-2007 and slowed down to about 3 % in 2008 and the IMF expects only 1 % this year, while the government still hopes for 2 %.

Full name: Republic of Kazakhstan;
Population: 15.5 million (UN, 2008);
Capital: Astana;
Largest city: Almaty;
Area: 2.7 million sq km (1 million sq miles);
Monetary unit: 1 Kazakh tenge = 100 tiyn;
Main exports: Oil, gas, uranium, ferrous and nonferrous metals, machinery, chemicals, grain, wool, meat, coal
GNI per capita: US $5,060 [7-1]

<table>
<thead>
<tr>
<th>Tab 7-1  Introduction of Kazakhstan [7-1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population, total (millions)</td>
</tr>
<tr>
<td>Population growth (annual %)</td>
</tr>
<tr>
<td>GDP (current US$) (billions)</td>
</tr>
<tr>
<td>GDP growth (annual %)</td>
</tr>
<tr>
<td>GNI, Atlas method (current US$) (billions)</td>
</tr>
<tr>
<td>Inflation, consumer prices (annual %)</td>
</tr>
<tr>
<td>Time required to start a business (days)</td>
</tr>
<tr>
<td>GDP (billion 2000 US$) [7-2]</td>
</tr>
<tr>
<td>GDP (PPP) (billion 2000 US$)</td>
</tr>
<tr>
<td>Energy Production (Mtoe)</td>
</tr>
<tr>
<td>Net Imports (Mtoe)</td>
</tr>
<tr>
<td>TPES (Mtoe)</td>
</tr>
<tr>
<td>Electricity Consumption (TWh)</td>
</tr>
<tr>
<td>CO2 Emissions (Mt of CO2)</td>
</tr>
</tbody>
</table>
The short-term economic indicator is an index describing economic development trends also in January – March 2009, in January – March 2008 it comprised 95.5%. The short-term economic indicator is calculated to speed up the process of assessment and is based on the change of production indexes in basic branches: industry, construction, agriculture, trade, transport and communication, comprising 67% to 68% of GDP.

### 7.1.1 National economy

According to the newest data the volume of the gross domestic product in January-December 2008 amounted on current basis to 15 907.0 bln KZT. The growth of the real GDP compared to the same period of 2007 comprises 3.2%. In the structure of GDP the share of goods production made up 45%, the share of services – 52.5%.

Capital investments in January-March 2009 amounted to 639.3 bln KZT, which is 4.9% less than during the same period of the previous year. The decrease was determined by the reduction of own resources investment by 14.5%.

<table>
<thead>
<tr>
<th>Tab 7-2 Resources investment of Kazakhstan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>January - March 2008</strong></td>
</tr>
<tr>
<td>Capital investments</td>
</tr>
<tr>
<td>Budgetary funds</td>
</tr>
<tr>
<td>Own resources</td>
</tr>
<tr>
<td>Foreign resources</td>
</tr>
<tr>
<td>Borrowed resources</td>
</tr>
</tbody>
</table>

Investments in construction and assembly operations dropped significantly (by 41.8%). At that investments into machines, equipment, accessories and other capital works grew significantly. Their volume grew by more than 20%.

Priority branches for investments still are coal mining, transport and communication, their share in the total investment volume comprised 24.9% and 18.2% respectively.

The main part of investment is made by large enterprises, their capital investments amount to 339.5 bln KZT and increased compared to the previous year by 1.4%.

Investments into mineral development increased more than 10 times in 2008 compared to 1996 and amounted to 22 266.7 Mio USD, including 2 054.7 Mio USD (9% of the total investment volume) spent for geological exploration.

Investments into the development of raw hydrocarbons amounted to 16 008.2 Mio USD (72% of the total investment volume), of solid commercial minerals – 5 833.6 Mio USD (26%), of common commercial minerals – 344.6 Mio USD (2%), of ground waters – 80.3 Mio USD (less than 1%).
The investments into solid commercial minerals include investments into the development of polymetals – 1 045 Mio USD, of iron and manganese – 1 011.8 Mio USD, of uranium – 913.4 Mio USD, of coal – 936.3 Mio USD, of copper – 672.

The number of workers employed at contract sites made up 201 thousand people. 334.2 Mio USD was invested into the social sphere and local infrastructure. 135.4 Mio USD was spent for training of Kazakh specialists. The average Kazakh content in all subcontracted works amounts to 43%.

In 2008 mineral developers arranged subcontracted works for 16 816 Mio USD, including:
outsourced services – 6 306.5 Mio USD (46% (2 902.1 Mio USD) – Kazakh content (КС));
constructed facilities – 5 376.4 Mio USD (43% (2 331 Mio USD) – КС);
purchased equipment – 1 946.4 Mio USD (23% (438.4 Mio USD) – КС);
purchased goods – 1 330.6 Mio USD (53% (699.6 Mio USD) – КС);
other works – 1 856.1 Mio USD (43% (805.7 Mio USD) – КС).

### Tab 7-3  Taxes and payments of mineral developers into the state budget 2008

<table>
<thead>
<tr>
<th></th>
<th>Mio USD</th>
<th>share in the total sum of taxes and payments, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>15 300.2</td>
<td>100</td>
</tr>
<tr>
<td>Corporate income tax</td>
<td>7 281.7</td>
<td>47</td>
</tr>
<tr>
<td>Royalty</td>
<td>3 334.4</td>
<td>22</td>
</tr>
<tr>
<td>VAT</td>
<td>299.9</td>
<td>2</td>
</tr>
<tr>
<td>Social tax</td>
<td>290.3</td>
<td>2</td>
</tr>
<tr>
<td>Bonus</td>
<td>91</td>
<td>1</td>
</tr>
<tr>
<td>Other taxes and payments</td>
<td>4 002.3</td>
<td>26</td>
</tr>
</tbody>
</table>

#### 7.1.2 Trade

The retail turnover of the reporting period comprised 504 877.2 Mio KZT (excluding catering) and dropped by 3.4% compared to January-March 2008.

Foreign trade turnover in January-February 2009 comprised 9 109.1 Mio USD (excluding unstructured trade) and dropped compared to January-February 2008 by 38.8%. Export made up 5 306.0 Mio USD (dropped by 48.8%), import – 3 803.1 Mio USD (dropped by 17.4%).

#### 7.1.3 Real economy

Industrial production in January-March 2009 comprised 1 595.3 bln KZT on the current basis, which is 4.6% less than in January-March 2008. The decrease was registered in processing industry (88.2%), in production and distribution of power, gas and water (93.3%) and in mining (99.8%).
Mining industry produced 854 bln KZT, processing industry –569 bln KZT, production and distribution of power, gas and water –173 bln KZT.

Gross product of agriculture comprised in January-March 2009 134.9 bln KZT, having increased by 3.6% compared to January-March 2008.

Freight turnover in January-March 2009 comprised 77.5 bln ton-km (including the estimated freight turnover of non-transport organizations and commercial carriers) and dropped by 9.1% compared to the relevant period of 2008.

Number of registered legal entities was 287 554 like in April 01, 2009 and increased compared to the relevant period of the previous year by 6.6%, including 272 303 entities with less than 50 employees. The number of active legal entities made up 183 325, including 169 085 small enterprises. Small business is represented in the republic by 206 567 entities, which is 8, 2% bigger than in the relevant period of the previous year.

### 7.1.4 Financial system

Budget income as for March 01, 2009 comprised 510.7 bln KZT. Expenditures – 408.4 bln KZT. Compared to the relevant period of 2008 the income dropped by 9.2%, and the expenditures increased by 1, 2%.

Financial result of enterprises and organizations in the 4th quarter of 2008 composed total income of 527.4 bln KZT, which is 52.4% lower than in the relevant period of 2007. The level of profitability was 13.8%.

Credits provided by second rank banks to the representatives of economic branches as of the end of February 2009 comprised 8 127.6 bln KZT, which is 43.9% bigger compared to the relevant period of the previous year. The share of long-term credits is 80.7%, that of credits in foreign currency – 51%. The total sum of bank deposits made up 6 079.2 bln KZT, which is 53.2% bigger compared to the relevant period of 2008. Individual deposits amounted to 1 592.9 bln KZT and grew by 9.4%.

### 7.1.5 Financial Country Rating

On May 08, 2009 Standard & Poor's revised the “Negative" rating forecast on Republic Kazakhstan into “Stable". At that, long-term sovereign credit ratings on the commitments of Republic Kazakhstan in foreign and national currency – “BBB-“ and “BBB“ respectively – were confirmed. Moreover, the short-term sovereign credit rating “A-3" and the national rating “kzAAA" were confirmed too.

Forecast:

The “Stable" forecast reflects our supposition that the government of Kazakhstan can manage the existing economic difficulties and avoid significant deprivation of its budget indexes and balance of payments. If the assistance (mainly that for banks in trouble) in the form of stimulating actions for budget and tax policy significantly exceeds our current expectations, this can be a reason of negative influence on the rating level. The long-lasting fall of petrol prices can become a serious challenge for the monetary system of Kazakhstan and put pressure on the national currency, and this can aggravate problems of the banking sector. Ratings can be raised if the current difficulties are overcome, and as a result the economy of the country starts growing with the rates corresponding to the long-term potential.

Moody’s rates Kazaksthan Baa2, the Outlook is negative according to S&P. (August 09)
Tab 7-4  CreditWatch of Kazakhstan

<table>
<thead>
<tr>
<th>Sovereign credit ratings</th>
<th>Revised</th>
<th>Previous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term, commitments in foreign currency</td>
<td>BBB-</td>
<td>BBB-</td>
</tr>
<tr>
<td></td>
<td>/negative</td>
<td>/stable</td>
</tr>
<tr>
<td>Long-term, commitments in national currency</td>
<td>BBB</td>
<td>BBB-</td>
</tr>
<tr>
<td></td>
<td>/negative</td>
<td>/stable</td>
</tr>
<tr>
<td>Confirmed ratings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sovereign short-term credit rating</td>
<td>A-3</td>
<td></td>
</tr>
<tr>
<td>National scale rating</td>
<td>kzAAA</td>
<td></td>
</tr>
</tbody>
</table>

7.1.6

7.1.7 Local currency situation.
Inflation in 2008 was 18 % up from 10 % the previous year.

Fig. 7-1 Euros (EUR) to Kazakhstan Tenge (KZT) [7-3]
7.1.8 Ability to raise project financing for the specific country:
Kar-Metan LLC has no possibility to finance the project with its equity capital. The implementation of the project is possible only at the condition of credits (loans) from the government, other investors and our German shareholders.

7.1.9 Price situation and outlook for competing products
According to the Coal Industry Development Concept in order to achieve the planned coal extraction volumes with the help of new technologies, reconstruction and technical re-equipment of the existing enterprises in the period before 2020 it is essential to put up the weighted average estimated production cost of steaming coal extraction (FOB open cast, FOB coal mine) from 598.58 KZT per 1 ton in 2007 up to 1432.4 KZT/t in 2020, and the weighted average estimated sales price of steaming coal (FOB open cast, FOB coal mine) at the domestic market – from 709.2 KZT/t in 2007 up to 1717.9 KZT/t in 2020.

Estimated price and production cost of the steaming coal (FOB open cast) at the domestic market of Republic Kazakhstan, KZT

![Graph showing estimated price and production cost of steaming coal from 2007 to 2020.]

Fig. 7-2 Estimate and production cost of the steaming coal at the domestic market of Republic Kazakhstan

According to the adopted Law of the Republic of Kazakhstan “On the introduction of amendments and changes into some laws of the Republic of Kazakhstan in the issues of independent industry regulators” changes and amendments have been introduced in the Law of the Republic of Kazakhstan “On electric power industry”.

The main aim of these changes and amendments is to create conditions for the acquisition of investments into power generating assets of the electric power industry along with the implementation of a new tariff regulation tool in the electric power industry.
The prices for power sold by power stations shall secure the payback of investments used for the creation of new assets, expansion, renewal, reconstruction and technical re-equipment of the existing assets.

Power stations can use three types of power rates: cap, constructed and individual.

The cap rate is set separately in each group of power stations for seven years, year by year. Power stations are divided into groups according to their type, installed capacity, type of the used fuel, and distance from the fuel source.

The cap rate is set at the level necessary for power stations of the specific group in order to fulfill investment commitments as for the creation of new assets, expansion, renewal, reconstruction and technical re-equipment of the existing assets.

Upon the recommendation of the Ministry of Energy and Mineral Resources the government shall approve the power cap rates for the period of seven years, year by year.

In 2009 it is planned to sign the agreements with all power stations stipulating all investment conditions, which the power stations shall be obliged to fulfill after the raise of rates.

By the year 2015 power cap rates shall rise more than twofold - from 3.6 KZT/kWh up to 8.8 KZT/kWh and this rate shall be the selling price of power stations.

Price statistics for extracted coal, power and heat in Karaganda region are shown in the table.

**Tab 7-5  Price statistics for extracted coal, power and heat in Karaganda region**

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Designation</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>KZT</td>
<td>EUR</td>
<td>KZT</td>
</tr>
<tr>
<td>1</td>
<td>Coal</td>
<td>2 467</td>
<td>14.4</td>
<td>4 423</td>
</tr>
<tr>
<td>2</td>
<td>Power</td>
<td>2.0</td>
<td>0.011</td>
<td>2.52</td>
</tr>
<tr>
<td>3</td>
<td>Heat</td>
<td>1 121</td>
<td>6.59</td>
<td>925.4</td>
</tr>
</tbody>
</table>

Note:
2007 EUR rate is 171.3
2008 EUR rate is 177.2
2009 EUR rate is 200.2

Calculation of the production cost of industrial heat using coal as fuel for production
This calculation was made during the assembly of 2 coal-fired UPNV-6 boilers.
One boiler of this type generates 6 Gcal/h, 2 boilers – 12 Gcal/h respectively.

In the winter period (6 months) heat generation makes up:
12 Gcal/h x 23 hours x 30 days x 6 months = 49 680 Gcal.
Heat generated in the summer period (6 months) makes up approx. 200 Gcal/month, 200 Gcal/month × 6 months = 1,200 Gcal.

Annual output:
49,680 Gcal + 1,200 Gcal = 50,880 Gcal.
The generation of this amount of heat uses the following amount of coal as fuel:
50,880 Gcal × 0.3 t = 15,264 tons coal
(1 Gcal = 0.3 t coal)

At the coal price of 4,430 KZT/1 t the fuel cost makes up:
15,264 t × 4,430 KZT = 67,620 thousand KZT
Tab 7-6  Production cost of industrial heat using coal as fuel

<table>
<thead>
<tr>
<th>Works and expenses</th>
<th>Cost</th>
<th>Cost structure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>thousand KZT</td>
<td>thousand EUR *</td>
</tr>
<tr>
<td>Construction and assembly</td>
<td>14 000</td>
<td>63.6</td>
</tr>
<tr>
<td>Equipment: UPNV-6 boiler (2 pc.)</td>
<td>123 000</td>
<td>559.0</td>
</tr>
<tr>
<td>Raw material - coal</td>
<td>67 620</td>
<td>307.3</td>
</tr>
<tr>
<td>Other expenses</td>
<td>5 000</td>
<td>22.7</td>
</tr>
<tr>
<td>Total expenses</td>
<td>209 620</td>
<td>952.6</td>
</tr>
</tbody>
</table>

* EUR/KZT exchange rate as of September 14, 2009 comprises 220.04

It can be seen in the table that total expenses comprise 209 620 thousand KZT.

Heat generation within 10 years:
50 880 Gcal x 10 years = 508 800 Gcal.

Heat production cost after 10 years amortization:
209 620 thousand KZT: 508 800 Gcal = 412 KZT (1.8 EUR)

Calculation of the production cost of industrial heat using CMM as fuel for production
This calculation was made during the assembly of the Pro-2 cogeneration unit (CHP). CHP generates 1.35 MW power and 1.8 MW (1.55 Gcal) heat.

Annual output:
1.35 MW x 8 760 hours = 11 800 MW power.
1.55 Gcal x 8 760 hours = 13 578 Gcal heat.

At the power price 2.75 KZT (0.012 EUR) /kWh – cost saving of the power generation makes up:
11 800 MW x 2.75 KZT = 32 450 thousand KZT (147.5 thousand EUR)

At the heat generation efficiency of 40% the coal mine is saving approx. 5 400 tons coal annually.
At the coal price of 4 430 KZT/t 23 922 thousand KZT shall be saved.
5 400 t x 4 430 KZT = 23 922 thousand KZT.

Total benefit comprises:
32 450 thousand KZT + 23 922 thousand KZT = 56 372 thousand KZT

<table>
<thead>
<tr>
<th>Works and expenses</th>
<th>Cost</th>
<th>Cost structure, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction and assembly incl. gas pipeline</td>
<td>5 000 thousand KZT, 22.7 thousand EUR</td>
<td>1.5</td>
</tr>
<tr>
<td>Equipment total:</td>
<td>340 026 thousand KZT, 1 545.3 thousand EUR</td>
<td>98.5</td>
</tr>
<tr>
<td>Power cable - 3x35</td>
<td>5 456 thousand KZT, 24.8 thousand EUR</td>
<td></td>
</tr>
<tr>
<td>Transforming station</td>
<td>4 092 thousand KZT, 18.6 thousand EUR</td>
<td></td>
</tr>
<tr>
<td>Disconnect switch</td>
<td>418 thousand KZT, 1.9 thousand EUR</td>
<td></td>
</tr>
<tr>
<td>Cogeneration unit</td>
<td>330 060 thousand KZT, 1 500 thousand EUR</td>
<td></td>
</tr>
<tr>
<td>Total expenses</td>
<td>345 026 thousand KZT, 1 568 thousand EUR</td>
<td>100</td>
</tr>
</tbody>
</table>

It can be seen in the table that total expenses make up 345 026 thousand KZT – 56 372 thousand KZT (power output + saved coal) = 288 654 thousand KZT.

Heat generation within 10 years makes up:
13 578 Gcal x 10 years = 135 780 Gcal.

Heat production cost after 10 years amortization:
288 654 thousand KZT: 135 780 Gcal = 2 126 KZT (9.7 EUR), without considering the Kyoto Protocol.

This calculation presumes annual CHP working hours as 100%, and if the factors are taken into account which can influence CH4 concentration fall down to less than 25%, the heat production cost shall rise.

If the power rate in Kazakhstan is raised twofold by 2015, the heat production cost can be lowered down to 1800 – 1900 KZT (between 8 and 8.6 EUR) due to the operation of CHP units.

The given calculation shows that the heat production cost with coal used as fuel (1.8 EUR) is much lower than that with CMM used (9.7 EUR), i.e. 5 times smaller.
The market prices for the above products were highly volatile in the past and it could be predicted that they will also be highly volatile in the future. The price for carbon credits ranged between less than 10 euro/unit to more than 25 euro/unit in less than 12 month.

The price of crude oil a leading benchmark for all primary energy sources fluctuates between 40 and 150 US-Dollar per barrel on world markets trading. In some countries the prices for primary energy fuels are still regulated and below world market prices. Different taxes maybe implied on different sources of primary energy or subsidies might be given to some sources like renewable energies or power/fuels based on CMM.

7.1.10 Tax situation

In addition to 30% income tax, a permanent establishment is subject to branch profits tax equal to 15% of its net (after-tax) income. This results in an effective tax rate of 40.5% on permanent establishments. Progressive tax rates ranging from 5% to 20% apply to salary and other fringe benefits earned by employees. The maximum personal income tax rate of 20% is reached at an annual income of approximately US$51,000.

The standard VAT rate is 15 %. [7-4]

The taxation is regulated generally by the Tax Code of the Republic of Kazakhstan ("On taxes and other compulsory payments to the budget").

Preferences are not foreseen. The refund of VAT is possible, if the organization has a non-commercial status. Tax exemption is also possible, if the organization implementing the project is listed in the Government Order of RK “On approval of the list of national and international nonprofit organizations and grant foundations” No. 376 dated March 20, 2009.

According to the Tax Code the corporate income tax (profit tax) shall be paid by legal resident entities of the Republic of Kazakhstan. The corporate income tax (profit tax) is calculated and paid on the basis of the Tax Code of RK, therefore no exception is made for Kar-Metan LLC. The taxable item is the taxable income, i.e. the difference between the total annual income and the deductions (expenses) foreseen by the Tax Code, tax rate is 15% per annum. The fiscal period of the corporate income tax is the calendar year from January 01 till December 31.

The value added tax (VAT) for 2009 comprises 12% and is applied to the taxable turnover (sales revenue) and to the taxable import. The amount of VAT subject to payment to the budget is calculated as the difference between the amount of the value added tax for the taxable turnover (sales revenue) and the amount of deductions (i.e. that of purchased goods, works and services). As already mentioned above, the Tax Code stipulates the refund of VAT also for LLCs (Limited Liability Companies), but only after the requirements of Art. 273 are fulfilled. As a rule the requirements of this article contradict to the production activity of an LLC, therefore almost in all cases the excess VAT subject to deduction is added to the future payments. The fiscal period of the value added tax is a calendar quarter and the payment deadline is the 25th of the second month following the reported fiscal period, to be paid where located.

The Tax Code of the Republic of Kazakhstan stipulates the environmental emissions fee according to the special exploitation of natural resources. The special exploitation of natural resources is performed on the basis of an environmental license issued by the responsible state environmental protection authority or by the local executive bodies of regions, cities of republican status and the capital city. This fee is to be paid by natural persons and legal entities acting at the territory of the Republic of Kazakhstan according to the special exploitation of natural resources. The taxable item is the actual volume of environmental emissions within and/or above the normative limits for environmental emissions: emission of pollutants.
The fee rate is determined on the basis of the monthly estimate indicator (MEI) approved for the respective financial year by the Republican Budget Law (for 2009 – 1 296 KZT, or 6.06 EUR).

Fee rates for the emissions of pollutants from flaring of the associated/natural gas according to the laws of the Republic of Kazakhstan comprise:

**Tab 7-8 Fee rates for the emissions of pollutants from flaring of the associated/natural gas**

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Pollutant</th>
<th>Fee rate per 1 ton (MEI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hydrocarbons</td>
<td>2.23</td>
</tr>
<tr>
<td>2</td>
<td>Carbon oxides</td>
<td>0.73</td>
</tr>
<tr>
<td>3</td>
<td>Methane</td>
<td>0.04</td>
</tr>
</tbody>
</table>

**Tab 7-9 Fee rates for the emissions of pollutants by stationary plants**

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Pollutant</th>
<th>Fee rate per 1 ton (MEI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hydrogen sulphide</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>Phenols</td>
<td>166</td>
</tr>
<tr>
<td>3</td>
<td>Hydrocarbons</td>
<td>0.16</td>
</tr>
<tr>
<td>4</td>
<td>Carbon oxides</td>
<td>0.16</td>
</tr>
<tr>
<td>5</td>
<td>Methane</td>
<td>0.01</td>
</tr>
</tbody>
</table>

**Tab 7-10 The fiscal period is the calendar year from January 01 till December 31 [7-5]**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground coal mines – ventilation emissions</td>
<td>408.0</td>
<td>347.4</td>
<td>303.4</td>
<td>227.3</td>
<td>286.23</td>
</tr>
<tr>
<td>Underground coal mines – drained emissions</td>
<td>55.4</td>
<td>48.2</td>
<td>42.6</td>
<td>27.2</td>
<td>41</td>
</tr>
<tr>
<td>Post-underground emissions</td>
<td>14.9</td>
<td>12.7</td>
<td>9.0</td>
<td>7.1</td>
<td>8.0</td>
</tr>
<tr>
<td>Surface mine emission</td>
<td>381.7</td>
<td>350.2</td>
<td>304.3</td>
<td>277.3</td>
<td>381</td>
</tr>
</tbody>
</table>
When performing mineral development activities under the contracts concluded according to the laws of the Republic of Kazakhstan, mineral developers pay all taxes and other compulsory fees to the budget as stipulated by the Code of Republic of Kazakhstan.

Special fees for mineral developers include:

- Subscription bonus.
- Commercial discovery bonus.
- Reimbursement of past costs.
- Tax on the extraction of commercial minerals.
- Excess profit tax.

Subscription bonus

Subscription bonus is a fixed one-time payment of a mineral developer for the acquisition of the right for mineral development at the contract territory.

The subscription bonus is paid by natural persons and legal entities who concluded mineral development contracts according to the laws of the Republic of Kazakhstan.

Starting rate of the subscription bonus is set for each concluded mineral development contract separately in the following amount:

I) contracts on geological exploration of the territory, where mineral resources are not registered:

contracts on the extraction of mineral raw materials, excl. technogenic mineral formations - 280-fold monthly estimate indicator approved for the relevant financial year by the Republican Budget Law;

II) contracts on the extraction of mineral raw materials, excl. technogenic mineral formations:

500-fold monthly estimate indicator approved for the relevant financial year by the Republican Budget Law;

The subscription bonus is paid to the budget as follows:

fifty per cent of the set amount – within thirty calendar days of the announcement of the taxpayer as the winner of the tender according to the laws of the Republic of Kazakhstan on mineral resources and its development;
fifty per cent of the set amount – not later than thirty days of the coming into force of the mineral development contract.

Commercial discovery bonus

Commercial discovery bonus is paid by the mineral developer for each commercial discovery of minerals at the contract territory, including discovery in the course of additional explorations leading to the increase of previously determined volume of resources subject to extraction.

The taxable item of the commercial discovery bonus is the actual volume of the extracted commercial minerals approved by the responsible state authority at the specific contract territory.

The tax base for the calculation of the commercial discovery bonus is the cost of the extracted minerals volume approved by the responsible state authority.

For the calculation of the commercial discovery bonus the cost of the extracted minerals volume is determined according to the stock exchange price set for the relevant minerals at the International Petroleum Exchange or London Metal Exchange and published in “Platt's Crude Oil Marketwire” guide by McGraw-Hill Companies Inc., in the “Metal Bulletin” by Metal Bulletin Journals Limited, in Metalpadges by Metal-pages Limited on the date of payment.

The amount of the commercial discovery bonus is determined according to the taxable item, tax base and rate.

The rate of the commercial discovery bonus comprises 0.1 per cent of the tax base.

The commercial discovery bonus must be paid not later than 90 days of the approval by the responsible state authority of the minerals volume subject to extraction at the deposit.

Reimbursement of past costs

Reimbursement of past costs is a fixed payment of a mineral developer refunding total expenditures of the state for exploration and arrangement of the relevant contract territory before the mineral development contract was concluded.

The amount of the reimbursement of past costs incurred by the state as the result of exploration and arrangement of the relevant contract territory is calculated by the responsible state authority as stipulated by the laws of the Republic of Kazakhstan and is paid to the budget.

According to the laws of the Republic of Kazakhstan on mineral resources and its development a part of the past costs shall be paid to the budget in form of a state-owned geological information fee.

The rest of the amount of the past costs shall be paid to the budget in form of a past costs reimbursement fee.

The reimbursement of past costs incurred by the state as the result of exploration and arrangement of the relevant contract territory is paid by the mineral developer starting with the beginning of extraction period after commercial discovery in the following order:

- if the total amount of the reimbursement of past costs incurred by the state as the result of exploration and arrangement of the relevant contract territory comprises more than 10 000-fold monthly estimate indicator set for the relevant financial year by the Republican Budget Law, the reimbursement shall be paid by the mineral developer on a quarterly basis in equal shares together amounting to a sum equivalent to a 2500-fold monthly estimate indicator set for the relevant financial year by the Republican Budget Law according to the schedule
confirmed by the state authority responsible for economic examination, but not more than within 10 years.

Tax on the extraction of commercial minerals

The tax on the extraction of commercial minerals is paid by the mineral developer separately for each kind of mineral raw materials, petroleum, ground waters and peloids extracted at the territory of the Republic of Kazakhstan.

According to Art. 332 paragraph 5 the amount of the flared natural gas (coal mine gas) is exempted from tax on the extraction of commercial minerals.

Excess profit tax

The taxable item of the excess profit tax is a part of the net profit of the mineral developer from each separate mineral development contract during the fiscal period when the ratio of the total annual income inclusive of corrections foreseen by the Tax Code (Correction of the total annual income) to the deductions exceeds 1,25.

Total annual income is determined by the mineral developer for contractual activity according to each separate contract as stipulated by the Tax Code.

The tax base is the part of the net profit of the mineral developer calculated for each separate mineral development contract during the fiscal period, which exceeds 25 per cent of the deductions amount.

Net profit is calculated as difference between the taxable income and the corporate income tax.

The excess profit tax is paid by mineral developers according to a sliding scale in the following amounts:

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Ratio of the total annual income to deductions</th>
<th>Tax base</th>
<th>Rate in %</th>
<th>Tax amount subject to payment to the budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.25 or less</td>
<td>not imposed</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>1.25 through 1.3</td>
<td>part of the net profit corresponding to the value from 1.25 to 1.3</td>
<td>10</td>
<td>tax amount calculated at the 10% rate</td>
</tr>
<tr>
<td>3.</td>
<td>1.3 through 1.4</td>
<td>part of the net profit corresponding to the value from 1.3 to 1.4</td>
<td>20</td>
<td>tax amount calculated at the rate 10% and 20%</td>
</tr>
<tr>
<td>4.</td>
<td>1.4 through 1.5</td>
<td>part of the net profit corresponding to the value from 1.4 to 1.5</td>
<td>30</td>
<td>tax amount calculated at the rate 10%, 20% and 30%</td>
</tr>
</tbody>
</table>
5. 1.5 through 1.6 part of the net profit corresponding to the value from 1.5 to 1.6 40 tax amount calculated at the rate 10%, 20%, 30% and 40%

6. 1.6 through 1.7 part of the net profit corresponding to the value from 1.6 to 1.7 50 tax amount calculated at the rate 10%, 20%, 30, 40% and 50%

7. more than 1.7 part of the net profit corresponding to the value from exceeding the value 1.7 60 tax amount calculated at the rate 10%, 20%, 30%, 40%, 50% and 60%

The fiscal period of the excess profit tax is the calendar year from January 01 till December 31. The excess profit tax shall be paid not later than April 15 of the year following the fiscal period.

### 7.2 Implementation status of Kyoto protocol

The actual status of each country in the Kyoto process can be tracked on UNFCCCs website. Important dates for each country are:

Date of signature: 12 March 1999
Date of ratification: 19.06.09
Date of entry into force: 17.09.09

Kazakhstan is a country of Annex 1, base year 1992, quantitative commitments – 100% (at the level of the base year).

As for now the preliminary registration of CO projects is carried out by the Coordination Centre on Climate Change, where the following projects are registered:

- Construction of small hydropower stations – 25;
- Wind power station – 1;
- Forestation and restoration (CO2 absorption) – 1;
- Utilization of associated gases -3;
- Upgrade and reconstruction of city heat supply systems -1;
- Utilization of coal mine methane- 1.

Emission reduction from these projects by estimate will make up 3.6 Mio tons annually.
At present time two projects are fully approved in Kazakhstan:
- Pilot project on power efficiency of Ural Heat and Power Plant;
- Project on utilization of associated gases at the deposit of Kumkolskoye.

Both projects have been approved by the government. Several projects will get the letter of endorsement from government soon.

There are no reasons for exclusion of the country from the procedures of the UNFCCC, it is just that Kazakhstan has signed the Kyoto Protocol in March of the current year. Projects on coal mine methane comply with the principles of “Additionality”.

7.3 Energy politics (preferences for sources of primary energy)

Kazakhstan’s energy market is dominated by domestic coal. It is cheaper than natural gas and all other energysources. In a report by Cherednichenko V.S. “Potential of renewable energy sources usage in the Republic of Kazakhstan”, CMM projects of any type are not considered. Wind energy is considered and the chances are analyzed in detail, but success is mainly dependent on price. Wind energy would have to be subsidized substantially to make it interesting for investors. As long as domestic coal remains cheap, any success of other sources will remain low to zero.

Fig. 7-3  Energy production of Kazakhstan
About 85 % of the electricity is generated from coal. Coal production in Kazakhstan is down 35 % since the collapse of the Soviet Union, the actual energy mix is not available. All power plants have been privatized.

Just recently Kazakhstan’s Parliament passed the final amendments to a Law on the Use of Renewable Energy Sources, which sets the foundations for a full regulatory book of rules for renewable energy.

Renewables contribute only about one percent to the country’s energy balance today.

Coal-fired power plants generate around 45 % of the GHG emissions in Kazakhstan, they dropped significantly from 1990 to 2000 but will reach their 1990 levels again by 2012 (100 million tons of CO2 equivalent).

"The national program for transition to sustainable development calls for increasing renewables' share in Kazakhstan’s energy balance to 5 percent by 2024. Wind power could play a particularly important role here: in a number of Kazakhstan’s regions, average annual wind speeds exceed 5 metres per second, quite high by international standards." [7-6]

To promote renewable energy sources such as wind and CMM feed-in tariffs and renewable energy certificates have to be established. Feed-in tariffs are standard worldwide, and help to reach a higher price for the individual producers who sell to the electricity distributors or gas companies.

The Kazakh government has now drafted the Renewable Law with a certificate system. The government also decided to include feed-in tariffs in the RES regulation.

The new law allows the state to:

promote the expansion of renewable energy according to a state plan for renewables usage;

make private investment in renewable energy more attractive by reserving land, by obliging electricity transmission companies to allow renewables to connect to the grid.

The draft legislation was approved by the government in 2008, and its final revisions were passed by Parliament on 17th June, 2009.

“Expert assessments suggest that the market could today absorb some 3 billion kWh of electricity generated from renewable sources. By 2024, this figure could rise to 10 billion kWh, covering some 6 percent of Kazakhstan’s total electricity needs. The resulting reductions in GHG emissions during 2010-2024 are estimated at 70 million tons of CO2 equivalent. Kazakhstan’s experience with renewables regulation could be useful for neighbouring CIS countries, where climatic conditions and the situation with regards to renewable energy development are similar,” notes Gennady Doroshin, head of the UNDP and Kazakhstani Government Project on Wind Energy. [7-7]

Overall, coal production in Kazakhstan has declined by about 35 percent since its independence from the Soviet Union [7-2]. Much of the decline is attributed to restructuring, mine problems, accidents, and problems obtaining foreign investment to maintain the economic viability of the mines and their production. Government goals to significantly improve production by 2015 will depend largely on its ability to encourage foreign interest in its coal mining industry. Consumption has also declined, largely offsetting the impact of the production decline, thus helping to sustain the level of exports. [7-8]

Coal production fell from 106 Million Tons in 2006 to 95 Million Tons 2007, which effectively was the level of 2005. 100-105 Million tons is the official target for the next years. [7-2]
Electric power industry is a basic branch of economy of the Republic of Kazakhstan. A reliable and efficient functioning of the branch, constant heat and power supply to consumers are considered to be the foundation of the economic development of the country and an essential factor in providing of civilized life conditions for population.

The electric power industry of the Republic of Kazakhstan includes following sectors:
power generation;
power transmission;
power supply;
other organizations participating in the sphere of the electric power industry.

Power generation sector
Power generation is carried out by more than 60 power stations of different patterns of ownership.

Power stations are divided into:
national power stations;
industrial power stations;
regional power stations;
power stations at heat supplying enterprises.

<table>
<thead>
<tr>
<th>Pos</th>
<th>Power station</th>
<th>Installed capacity, MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AES Ekibastuz LLC (Ekibastuz Coal-fired Power Station 1)</td>
<td>4000</td>
</tr>
<tr>
<td>2</td>
<td>EEK Joint-stock Company (Aksu Coal-fired Power Station)</td>
<td>2110</td>
</tr>
<tr>
<td>3</td>
<td>Zhambyl Baturov Coal-fired Power Station Open Joint-stock Company</td>
<td>1230</td>
</tr>
<tr>
<td>4</td>
<td>Ekibastuz Coal-fired Power Station 2 Joint-stock Company</td>
<td>1000</td>
</tr>
<tr>
<td>5</td>
<td>MAEK-Kazatomprom LLC Heat and Power Plant 2</td>
<td>630</td>
</tr>
<tr>
<td>6</td>
<td>MAEK-Kazatomprom LLC Heat and Power Plant 3</td>
<td>625</td>
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<tr>
<td>7</td>
<td>Karaganda Coal-fired Power Station 2 (Kazakhmys Corporation)</td>
<td>608</td>
</tr>
<tr>
<td>8</td>
<td>APK Joint-stock Company (Almaty Heat and Power Plant 2)</td>
<td>510</td>
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<tr>
<td>9</td>
<td>Pavlodar Heat and Power Plant 3 (Pavlodarenergo Joint-stock Company)</td>
<td>440</td>
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<tr>
<td>10</td>
<td>Access Energo LLC Petropavlovsk Heat and Power Plant 2</td>
<td>380</td>
</tr>
<tr>
<td>11</td>
<td>Aluminium of Kazakhstan Joint-stock Company (Pavlodar Heat and Power Plant 1)</td>
<td>350</td>
</tr>
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</table>
### Hydro Power Stations

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AES Shulbinsk Hydro Power Station LLC</td>
<td>720</td>
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<tr>
<td>2</td>
<td>Bukhtarma Hydro Power Station Joint-stock Company (Kaztsink Joint-stock Company)</td>
<td>675</td>
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<tr>
<td>3</td>
<td>Kapchagay Hydro Power Station (APK Joint-stock Company)</td>
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</tr>
<tr>
<td>4</td>
<td>AES Ust-Kamenogorsk Hydro Power Station LLC</td>
<td>331</td>
</tr>
</tbody>
</table>

### Power transmission sector

The electric mains of the Republic of Kazakhstan include:

- Transmission facilities with voltage of 0.4-1150 KV and extension of 464 132 km;
- 3419 electric substations with voltage of 35-1150 KV and total capacity of 63 175.5 MVA.

Interregional and/or interstate transmission facilities are facilities with voltage of 220 KV and more, they supply power between regions and/or states.

The power mains with voltage of 220-500-1150 KV serves as the backbone network of the power grid of the Republic of Kazakhstan. Interconnections with power grids of Russian Federation, the Kyrgyz Republic and the Republic of Uzbekistan are functioning with voltage of 110-220-500 KV.

National power grid is the integrity of substations, distribution plants, interregional and/or interstate transmission facilities and transmission facilities of power stations with voltage 220 KV and more, which are not subject to privatization or prior procedures.

According to the live data the power production has made up 80.0 bln kWh in 2008 and the consumption - 80.6 bln kWh. Comparing to the year 2007 there is an increase by 4.8% and 5.5% respectively.
The import of power has made up 2.8 bln kWh (incl. from Russia – 2.2 bln kWh, from Central Asia - 0.6 bln kWh) and decreased by 18.4 % comparing to the previous year. The export of power has made up 2.2 bln kWh and decreased by 33.1 % comparing to the previous year.

The increase of power production in the republic is ensured by the annual increase of power generation at Ekibastuz Coal-fired Power Station 1 - by 1603.2 Mio kWh (117.0%), Ekibastuz Coal-fired Power Station 2 - 900.8 Mio kWh (117.0%), Zhambyl Coal-fired Power Station – 1199.6 Mio kWh (140.0%), Almata Heat and Power Plants 1,2,3 - 589.8 Mio kWh (119.8%), Mangistau Heat and Power Plants 1,2,3 - 413.7 Mio kWh (111.3%).

In the meantime, in November 2008 the power production has decreased within the republic comparing to the same period of the previous year by 387.5 Mio kWh (95.6%), in December – 541.1 Mio kWh (93.2%) and in the 1st decade of January – 211.0 Mio kWh (91.7%).

To solve strategic tasks of the electric power industry as for energy safety and constant economic development of the country the Plan of development activities in the electric power branch of the Republic of Kazakhstan for 2007-2015 No. 147-p was formulated and approved by the Prime-minister of the Republic of Kazakhstan on the 31st of May 2007.

The forecast of power consumption and of electrical load for the period till 2015 has allowed to estimate the expected power shortage in the southern part of the power grid of Kazakhstan, setting into operation of new facilities at power stations, validation reports and propositions as for location of basic power station in the southern zone and a pilot scheme of power generation from it have been prepared as well as the assessment of necessary investments into the development of the electric power industry of the Republic of Kazakhstan.
Power balances till 2015 and the list of electric power industry sites subject to reconstruction, upgrade and expansion as well as new power generation objects subject to construction were approved.

The following draft laws were drawn up and introduced to Mazhilis of the Parliament of the Republic of Kazakhstan: “On the support of renewable energy sources use”, “On amendments and additions to some legislation acts of the Republic of Kazakhstan on support of renewable energy sources use”. Passing of these laws will allow developing a schedule of implementation of renewable energy sources for power generation and in particular:

to involve about 3000 MW capacity of renewable energy sources by 2024 with annual output of about 10 blk kWh power;

to assure by 2024 the annual fuel saving of 3-3.5 Mio tons of equivalent fuel due to the use of renewable energy. Total fuel saving resulting from the proportional increase of renewable energy use for the period 2010-2024 can make about 22-26 Mio tons of equivalent fuel;

to decrease the energy loss caused by transportation as renewable energy sources are local sources and the power generated from them is not transported for long distances;

to stimulate the development of new technologies and new industrial branches as well as the development of small and middle scale businesses in the field of renewable energy sources.

The infrastructure project of construction of the second transmission line North-South Kazakhstan VL-500 with the increase of transmission capacity up to 1350 MW is carried out in order to continue a sustainable development of the branch. Completion of construction is planned for the 4th quarter of 2009.

Investment projects on extension, upgrade and reconstruction of energy generating capacities, power and heat networks are developed in the energy zones of Kazakhstan.

- Northern zone of the Uniform Power Grid

Financing issues of construction of the 3rd generating unit at the Ekibastuz Coal-fired Power Station 2 are on agenda; implementation of the project on expansion and reconstruction of the Heat and Power Plant 2 and power and heat networks of the city of Astana is in progress, the feasibility study of Bulaksk Hydro Power Station has been done, a recovery of the 8th generating unit at the Ekibastuz Coal-fires Power Station 1 is planned for 2009-2011.

- Southern zone of the Uniform Power Grid

The feasibility study of the project on construction of Balkhash Thermal Power Station was made to guarantee a reliable energy supply of the southern part of Kazakhstan.

The project on construction of Moynak Hydropower Station with capacity of 300 MW is in progress.

- Western zone of the Uniform Power Grid

The construction of the interregional transmission facility Northern Kazakhstan - Aktobe region has been completed.
Coal mining industry

The coal mining industry of Kazakhstan is one of the biggest branches of the country economy. Following China, USA, Russia, Australia, India, SAR and Ukraine Kazakhstan is among ten countries, which have the biggest coal reserves in the world. The reserves of coal from 49 coal deposits stipulated in the government's balance make up 33.6 bln tons, among them those of black coal - 21.5 bln tons, brown coal - 12.1 bln tons. The majority of deposits are located in the central part of Kazakhstan (Karaganda, Ekibastuz coal basins and Shubarkol coal deposit) and in the northern part of Kazakhstan (Turgay coal basin).
Today 33 companies conduct their business in the republic, the largest of them are Bogatyr Akses Komir LLC, Eastern Open Cast of Eurasian Energy Corporation, Coal Department of ArselorMittal Temirtau Joint-stock Company, Borly Coal Department of Kazakhmys Corporation, Shubarkol Komir Joint-stock Company and others. During 10 years more than 3 bln USD were invested into the coal mining.

The annual level of coal production in the republic is 100-104 Mio tons at the moment. The expected extraction volume in the current year shall make about 101.8 Mio tons.

Total export volume has stabilized at the level of 30-33 Mio tons. The main importer is Russian Federation. Since 2003 the geography of international coal supplies has widened. Kyrgyzstan, Tadzhikistan, Uzbekistan, Ukraine, Romania, Poland, Czech Republic, Turkey, Latvia, Estonia, Lithuania, Finland, Italy, Great Britain, Germany, Bulgaria and other countries became consumers of coal from Kazakhstan. Taking into account the production potential of the coal mining industry of Kazakhstan the volume of the international coal supplies can grow up to 35 Mio tones in the nearest years.

During 2000-2007 the investments into the upgrade of production facilities and implementation of new equipment and technologies in coal mining made up about 2.5 bln USD.
High concentration of production and management has been reached at separate coal mining enterprises. Industrial and technological policy aimed at constant development and efficient growth of production volume is carried out.

A special attention is paid at the coal mining enterprises of the republic to the implementation of quality and environment management according to standards ISO 9000 and 14000.

To coincide with these standards the Ministry of Energy and Mineral Resources has worked out the republican Program of Adaptation of Coal Mining to International Standards for the period from 2007 to 2010.

Taking into account the acute necessity in provision of new generating capacities with solid fuel the Ministry of Energy and Mineral Resources has also created the Development Concept of Coal Mining of Kazakhstan till 2020 (hereinafter “Concept”), which was approved by the Government of the Republic of Kazakhstan on the 28th of June 2008 under the No. 644.

The “Concept” stipulates the increase of the coal extraction volume from 94.4 Mio tons in 2007 up to 145.6 Mio tons in 2020 that would cover the demand of the domestic and the foreign markets of coking and steaming coal.

Investments necessary for the increase of coal production in Kazakhstan for the period 2007-2020 are estimated at 3.9 bln USD, incl. 2.1 bln USD – for the development of capacities for coking coal production and 1.8 bln USD - for steaming coal production.

In order to achieve the stated volumes measures will be applied to increase the coal production due to the further upgrade of the existing mining facilities and open casts, improvement of equipment and technologies of coal production.
Raw material sources of the coal mining and the production potential of active coal mining enterprises of the republic allow satisfying of the effective demand of coal consumers inside and outside of Kazakhstan.

Coal will remain the main source of energy in Kazakhstan; gas production will also increase in the Western Kazakhstan due to the utilization of associated gases.

The reduction of coal utilization is not foreseen; moreover in 2014 the Balkhash Heat and Power Plant will be put into operation using coal.

At the present time the share of renewable energy is very small; in the sustainable development concept it is planned the following:

to increase the use of renewable energy sources in the Republic of Kazakhstan up to 0.05% by 2012, to 1% by 2018 and to 5% by 2024;

to substitute with alternative energy sources 0.065 Mio tons of equivalent fuel by 2009, 0.165 Mio tons - by 2012, 0.325 Mio tons - by 2018, 0.688 Mio tons - by 2024 and 1.139 Mio tons of equivalent fuel - by 2030.

Energy/fuel produced from CMM is not considered as renewable in Kazakhstan but it is considered to be an alternative energy source here.

The access to the public grid of the republic is regulated and will be given after passing through the same procedures as for power producers.

The power production for own needs is not regulated.

With the passing of the laws “On the support of renewable energy sources use” and “On amendments and additions to some legislation acts of the Republic of Kazakhstan on support of renewable energy sources use” a number of measures will be taken to support the renewable energy sources (RES):

reduction of energy/output ratio and impact of energy industry on environment;

increase of use of RES;

creation of favourable conditions for the use of RES;

assistance in compliance with international commitments of the Republic of Kazakhstan on GHG emissions reduction;

purchase of power produced from RES in order to compensate 50% of the losses of the distributing power enterprise;

at the increase of RES production to more than 50% from the total losses of the distributing power enterprise, the surplus volume is purchased by the Grid operator KEGOC Joint-stock Company.

RES states the sales price himself but it should not be higher than the price stated in the feasibility study:

free and non-discriminated connection of RES to the nearest point in the infrastructure of the distributing power enterprise and heat networks;

exemption of RES from liability to pay for the connection;
benefits according to the Land Code (reservation and priority in allocation of land plots).

Kazakhstan ranks tenth in the world in coal production, supplying 51.5 percent of its total energy consumption in 2005 ([7-2], 2005). It exported 26.4 percent of the coal produced, primarily to Russia and Ukraine. Most power generation (80 percent) is coal-fired, including the largest generator, Ekibastuz No.1 at 4,000 MW ([7-2], 2008).

Stakeholders
At least seven companies operate mines in Kazakhstan, as reflected in reference [7-9]. There are also lists other potential stakeholders in Kazakhstan’s coal mine methane (CMM) industry.

7.4 Status of coal and the coal mining industry
Kazakhstan’s coal mining industry was restructured and largely privatized between 1995 and 1997 (State, 2005). The Karaganda and Ekibastuz mining associations were dissolved and the mines put up for sale or lease. Many of the coal mining enterprises were closed or reorganized (Levine, 1998; KazNIIMOSK, 2002).

Overall, coal production in Kazakhstan has declined by about 35 percent since its independence from the Soviet Union ([7-2], 2008). Much of the decline is attributed to restructuring, mine problems, accidents, and problems obtaining foreign investment to maintain the economic viability of the mines and their production. Government goals to significantly improve production by 2015 will depend largely on its ability to encourage foreign interest in its coal mining industry. Consumption has also declined, largely offsetting the impact of the production decline, thus helping to sustain the level of exports.

Underground mining only occurs in the Karaganda basin, which produces the coking coals essential to the steel and iron sectors and coke plants in Kazakhstan, Russia, Ukraine, and Georgia, and also to the phosphoric and ferroalloy industries. The share of production from underground mines has decreased from about 27 percent in 1990 to just 11 percent in 2000 (KazNIIMOSK, 2002). At least 14 of the 26 underground mines in operation in 1990 have been closed. Of the 12 underground mines remaining, 4 operated by KomirInvest and Transenergo have nearly stopped production. Ispat-Karmet’s eight underground mines were expanded after acquisition in 1986 to stabilize production levels.

Given Kazakhstan’s large size (9th largest country in the world), numerous electricity distributors and low population density, it is difficult to distribute electricity and gas. Access to the grid is regulated and possible according to law.
7.5 Mining and mine safety laws

For decades the methane in coal beds was considered to be a harmful component, which hampers the increase of coal production and requires almost a half of costs for coal production to be invested in creation of safe working conditions.

When the preliminary degassing of coal beds has become a normal procedure in coal mining, the attitude towards methane has changed because of the possibility of its use in boiler rooms of coal mines or at nearest thermal power stations.

Experts of coal mining and energy branches have begun to look at coal basins and deposits not only as coal resources but as resources of natural hydrocarbon gases, where the main component is methane. The majority of such deposits are considered as methane and coal deposits. However methane extraction by degassing means is of secondary meaning as it only ensures safe working conditions. Methane utilization resulting in price decrease for coal and making it competitive is carried out not in all mines and not the whole captured methane is used. In mines of Karaganda basin the utilization makes up about 20%.

Change of the attitude to the coal bed methane alters the purpose of researches of methane content in coal deposits during exploration and development. The studies are aimed now not only at accident prevention in coal production but also at estimation of production of coal bed methane as of independent commercial mineral. The development of coal and methane deposits involves the solution of new tasks as for determination of characteristics of gas content of coal beds and experimental evidences of economic value of methane as a commercial mineral as well as validation of reasonability and necessity of calculation of its reserves in productive groups of coal beds. Solution of the stated tasks is put into the preparation program for development of coal and methane deposits and non-traditional efficient production of coal bed methane from active mines and from worked-out areas of closed coal mines.

Coal-bearing formations of Kazakhstan are considered to be the largest generators and storage of methane in coal beds (non-traditional collectors), among which the most perspective are Karaganda and Ekibastuz basins, regarded as methane and coal deposits.

The peculiarities of gases of coal strata are syngenetics of the basic mass comparing to coal and significant predominance of metamorphogene coal gases due to regional (geothermal) metamorphism of coal. The petrographic composition of coal also influences the process of coal and gas development.

The study of composition of natural gases in coal deposits of the Republic of Kazakhstan showed that these gases have the same composition as the majority of coal deposits or magmatic horizons.

Methane is the main component of natural gases in coal deposits within the zone of metamorphogene gases. Its content in coal beds (untouched by the processes of gas airing, i.e. located in methane gas zones) ranges from 70% to 98%, heavy hydrocarbons make up 12-18% at the maximum in coal at the middle stage of metamorphism, trace components include carbon dioxide, hydrogen and nitrogen with inactive gases. During industrial production methane is generally extracted from coal beds (up to 95-98%) and its homologs remain in coal layers due to the increased sorption.
Efficient coal mine methane extraction by means of degassing with further utilization allows solving the following vital problems of coal-mining regions:

- air protection;
- protection of surface and ground waters;
- preservation of land fertility.

According to the constitution of the Republic of Kazakhstan, land and commercial minerals contained in it (including coal mine methane) are state property. Republic of Kazakhstan has a desire to use its commercial minerals in a reasonable and efficient way and to carry out exploration and extraction of coal mine methane.

According to the Law of Republic of Kazakhstan No. 2828 “On mineral resources and its development”, dated January 27, 1996 (hereinafter Law “On mineral resources”) and other legislative acts about separate kinds of minerals – the Competent body (the Ministry of Energy and Mineral Resources of the Republic of Kazakhstan, which has rights on conclusion and fulfillment of the Contract) carries out the preparation and organizes tenders on rights to implement exploration, extraction and combined exploration and extraction of coal mine methane (commercial mineral).

The Entitlement to exploration, extraction and combined exploration and extraction is rendered according to the Law “On mineral resources” by means of contract conclusion with the Competent body according to the results of the tender.

In accordance with the Law “On mineral resources” and with the decision of the commission of the Competent body (protocol No. 5 dated December 26, 2005) Methane and K LLC (one of the co-founders of Kar-Metan LLC) has won the rights to explore and to extract methane in the closed coal mines “50 Years of October Revolution” and “Maykuduk” in Karaganda region.

Geological and industrial assessment and calculation of methane resources are carried out in accordance with “Temporary guidelines on resources assessment and methane calculation in coal beds of the deposits of the Republic of Kazakhstan”. The compliance with the guidelines is obligatory for all organizations, despite of the pattern of ownership or departmental subordination. Documentation as for calculation of methane in coal beds as independent commercial mineral is given for consideration and approval to the State Reserves Commission of the Geology and Mineral Resources Protection Committee of the Ministry of Mineral Resources and Environmental Protection of the Republic of Kazakhstan.

Documents on methane reserves calculation are given for consideration to the State Reserves Commission of the Republic of Kazakhstan three months prior to the term of approval.

After getting the approval of reserves calculation the documents are submitted to the Republican Geological Fund, to the corresponding territorial geological fund and to the organization which provided the report.

According to the law of the Republic of Kazakhstan “On licensing” a state license is necessary for the following activities:

- operation of mining enterprises;
- gas production.
Kar-Metan LLC and Methane and K LLC obtained such license from the Committee on State Energy Control by the Ministry of Energy and Mineral Resources of the Republic of Kazakhstan.

According to the Coal Mine Safety Rules approved conjointly by the order of the Minister of Energy, Industry and Trade of the Republic of Kazakhstan No. 327 dated October 25, 2000 and by the order of the Chairman of the Emergency Situations Agency of the Republic of Kazakhstan No. 235 dated October 13, 2000 and according to Art. 243 “Degassing shall be applied in gas containing coal mines where the methane content in the air cannot be maintained in the standard limits by means of ventilation”.

As for today degassing activities during the design engineering and the operation of coal mines are regulated in Karaganda coal basin by “Guidelines for degassing of coal mines of the Republic of Kazakhstan approved by State Technical Supervision Committee of the Republic of Kazakhstan on August 26, 1994 and Degassing guidance for coal mines of Karaganda coal basin”.

This guideline is binding for all companies and persons engaged in design engineering, construction and operation of degassing systems at coal mines.

According to the “Guidelines for degassing...” the following requirements shall be observed during degassing activities:

- gas suction equipment shall comply with safety rules and eliminate the possibility of inflammation of the methane-air mixture;
- when a consumer is using gas, the vacuum pump station must be equipped with an advanced safety system foreseen by the degassing guidance for coal mines and the process of gas feeding must comply with the requirements of the guidance for design engineering and operation of CMM-fired plants;
- for the preliminary degassing of mined, tapped or overworked seams the methane concentration in the degassing pipeline must comprise not less than 25%. During the degassing of goafs the transportation of gas with CMM content less than 25% is allowed, if the actual air inflow through the wellhead does not exceed the permitted value and the gas pipeline corresponds completely to the tightness requirements of the degassing guidance for coal mines;
- it is forbidden to combust the drained gas with methane content lower than 25% as fuel for industrial plants (boilers) and that with methane content lower 50% - for household purposes;
- all assembly and repair works of degassing systems and vacuum pump stations must be agreed with the technical director of the company. Such works must comply with the additionally developed safety regulations;
- the contingency plan shall provide for degassing equipment operation mode in case of an emergency in the coal mine or in the degassing system;
- if the methane-air mixture vented to the atmosphere inflames it is necessary to shut down the valve at the inflow gas pipeline, to switch the flare to exhaustion, to stop the vacuum pump, to warn the mine clerk and to act according to the contingency plan. When stopping and starting the vacuum pump the water separator and the vacuum pump must be vented for min. 5 minutes;
- it is forbidden to stop vacuum pumps for longer than 30 minutes without a written consent of the technical director of the company (chief engineer).
On April 03, 2002 the Law of the Republic of Kazakhstan “On the industrial safety at the hazardous production facilities” No. 314 was adopted.

According to this Law hazardous production facilities include:
mining, exploration and drilling operations for the extraction of commercial minerals;
electric installations of all kinds used at hazardous production facilities.

This Law regulates legal relations in the issues of the safe operation of hazardous production facilities and is aimed at the prevention of emergencies at hazardous production facilities, at the readiness of companies to their containment and elimination of consequences, at the guaranteed compensation of losses inflicted by the emergency to natural persons, legal entities, to the environment and the state.

The Ministry of Energy and Mineral Resources of the Republic of Kazakhstan has developed a republican “Program of coal mining industry conversion to the international standards” for 2007-2010.

In the course of implementation of this Program it is planned by 2010 to analyze regulatory and other legal acts concerning the coal mining industry and to create a regulatory system complying with the European Directives of the new pattern and with international standards, to introduce changes to the existing state coal mining standards. 89 regulatory documents shall be developed altogether, including:
regulatory legal act - technical regulations - 1;
state standards – 72;
amendments to standards – 4;
catalogues and classifiers of coal products - 12.

The application of the above mentioned regulatory documents by the companies shall result in the following:
adoption of international practices in the sphere of technical regulation by the coal mining industry;
creation of the regulatory and legal base;
competitiveness of coal products;
elimination of technical barriers in trade;
creation of conditions for the implementation of quality management and environmental management systems according to ISO 9000 and 14000 at the enterprises.

The implementation of the above named standards, catalogues and classifiers of coal products shall allow in 2009 to start the development of the technical regulations for coal mining industry and the manufacturing of safe products, to implement quality management and environmental management systems according to the international standards.
7.6 Environmental laws

As coal mine methane is a greenhouse gas, economic and other activity is fulfilled in Kazakhstan with observation of environmental laws and other regulatory documents governing GHG emissions into the atmosphere, namely:


This Code governs the relations in the sphere of environmental protection, rehabilitation and preservation, utilization and restoration of natural resources in the process of economic and other activity connected with utilization of natural resources and environmental impacts on the territory of the Republic of Kazakhstan.

Assessment of the environmental impact represents a procedure used to assess possible impacts of the economic and other activity for the environment and the human health, to develop measures preventing from negative impacts (destruction, degradation, damage and depletion of natural ecological systems and resources) and enhancing the environment according to the requirements of the Environmental Laws of the Republic of Kazakhstan.

Therefore it is obligatory for all types of economic and other activity, which can cause either direct or indirect influence to the environment and people's health.

It is forbidden to develop and to implement economic and other projects influencing the environment without the assessment of the environmental impact. The results of the impact assessment constitute an integral part of all types of PINs and PDDs.

The assessment of the environmental impact shall be performed for future activities of designed and existing projects according to the requirements of the denoted Code.

The customer (initiator) and the project developer must take into account the results of the environmental impact assessment and approve the variant that is the list harmful to environment and people's health.

The assessment of environmental impact includes assessment of impacts to:

- ambient air;
- surface and ground waters;
- bottom surface of water basins;
- landscapes;
- land resources and soil mantle;
- flora;
- fauna;
- state of ecological systems;
- state of population's health;
- social sphere (employment, education, transport infrastructure).

Economic and other activity assessed towards the environmental impact is classified into 4 categories according to significance and assessment volume – I, II, III, IV.
Category I comprises activities of the 1st and 2nd hazard class according to the sanitary classification of produced items and exploration and extraction of commercial minerals, excl. common commercial minerals.

Emission permits stay in force until the applied technologies and extraction conditions stipulated in the valid permit change, but not longer than 3 years for the sites of category I.

Climate and ozone layer protection bases on the following main principles:
- prevention and mitigation of the irreversible effects of climate change (including global) and degradation of the ozone layer;
- obligatory state control of emissions of greenhouse gases and ozone depleting substances;
- publicity, completeness and reliability of the information on climate change and ozone layer depletion;
- scientific substantiation, systematic and package approach to the protection of climate and ozone layer.

Aimed at the state control of GHG emissions and consumption of ozone depleting substances (ODS) the limits (allowances) of maximum permissible GHG emissions and ODS consumption are determined.

Maximum permissible GHG emissions are determined for separate emissions sources by the responsible state environmental protection authority.

Legal entities possessing GHG emissions sources and consuming ozone depleting substances are subject to state recording as stipulated by the Government of Republic Kazakhstan.

### 7.6.1 Environmental requirements to the land use

When developing minerals, performing geological exploration, construction and other works, mineral developers are bound:
- to maintain the occupied land plots in the suitable state for further intended use;
- to remove and/or preserve the top soil layer when performing works connected with soil disturbance;
- to revalidate the disturbed soil.

### 7.6.2 Environmental requirements to the discharge of sewage waters

Sewage waters can be discharged into surface water objects and into the interior only having the relevant environmental emission permits, at that the discharge of sewage into surface water objects involves the permission of the responsible state authority for use and protection of water resources, and the discharge of sewage into the interior – positive conclusion of an examination according to the laws of the Republic of Kazakhstan on mineral resources and its development;

a mineral developer cannot exceed the approved standards for the concentration of pollutants in sewage waters;
the discharged waters should not include aggressive substances attacking concrete and metal.

Inventory rules for emissions of greenhouse gases and consumption of ozone depleting substances – Order of the Minister of Environmental Protection of RK No. 348-p dated December 13, 2007

Inventory rules for emissions of greenhouse gases and ozone depleting substances (hereinafter “Rules”) have been developed according to the Environmental Code of the Republic of Kazakhstan and stipulate the order of inventory of GHG emissions and ODS consumption.

The inventory of GHG emissions and ODS consumption is generally aimed at the following:
collection of initial data for the assessment of the impact of greenhouse gas and ozone depleting emissions to the ambient air and determination of maximum permissible GHG emission standards for the enterprise as a whole and for separate sources;
determination of quantitative and qualitative features of GHG and ODS emissions;
state record;
evaluation of efficiency of the raw materials use and waste utilization at the enterprise;
planning of the ambient air protection.

Legal entities possessing sources of GHG and ODS emissions make an annual inventory of emissions of greenhouse gases and ozone depleting substances and provide the report to the responsible state environmental protection authority not later than the thirtieth of March of the year that follows the reported year.

Rules of development and approval of maximum permissible standards for emissions of greenhouse gases and consumption of ozone depleting substances - Order of the Minister of Environmental Protection of RK No. 350-p dated December 13, 2007

Rules of development and approval of maximum permissible standards for emissions of greenhouse gases and consumption of ozone depleting substances (hereinafter “Rules”) have been developed according to the Environmental Code of the Republic of Kazakhstan and stipulate the order of development and approval of maximum permissible GHG emissions and ODS consumption standards.

Standardization of GHG emissions shall apply after the Republic of Kazakhstan ratifies the Kyoto Protocol.

The rules are valid for legal entities and natural persons involved in the business activity connected with emissions of greenhouse gases and consumption of ozone depleting substances (hereinafter “mineral developers”).

The approved maximum permissible GHG emissions limit represents the limited amount of GHG emissions permitted to be discharged to the atmosphere within a unit of time (year, second).

Rules of state recording of the sources of greenhouse gas emissions into the atmosphere and of consumption of ozone depleting substances (hereinafter “Rules”) have been developed according to the Environmental Code of the Republic of Kazakhstan.

They stipulate the order of state recording of GHG emissions sources (excluding GHG absorption) and ODS consumption.

The state recording of GHG emissions sources and ODS consumption represents a systematic and regularly updated database composed into the State Registry of Greenhouse Gases and the State Registry of Ozone Depleting Substances Consumption.

Binding for legal entities possessing the sources of GHG emissions, as well as for natural persons and legal entities performing the activity involving the consumption of ODS (hereinafter “mineral developers”).

---

**Tab 7-13  Greenhouse gas emissions sources**

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Greenhouse gas</th>
<th>Chemical formula</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carbon dioxide (CO2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Methane (CH4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Nitrogen oxide (N2O)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HFC-23</td>
<td>CHF3</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>HFC-32</td>
<td>CH2F2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>HFC-41</td>
<td>CH3F</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>HFC-43-lOmee</td>
<td>C2H5F10</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>HFC-125</td>
<td>C2HF5</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>HFC-134</td>
<td>C2H2F4(CHF2CHF2)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>HFC-134a</td>
<td>C2H2F4(CH2FCF)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>HFC-152a</td>
<td>C2H4F2(CH3CHF2)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>HFC-143</td>
<td>C2H2F3(CHF2CH2F)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>HFC-143a</td>
<td>C3H3F3(CF3CH3)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>HFC-227ea</td>
<td>C2HF7</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>HFC-236fa</td>
<td>C3H2F6</td>
<td></td>
</tr>
</tbody>
</table>
Mineral developers possessing GHG emission sources annually submit GHG inventory certificates to the responsible environmental protection authority not later than June 30 of the year that follows the reported year according the order stipulated by the responsible environmental protection authority.

The responsible environmental protection authority enters the data of GHG inventory certificates and the information on the annual ODS consumption to the State Registry of Greenhouse Gases and the State Registry of Ozone Depleting Substances Consumption.


These Rules of limitation, suspension and reduction of emissions of greenhouse gases (hereinafter “Rules”) have been developed according to the Environmental Code of the Republic of Kazakhstan and stipulate the order of limitation, suspension and reduction of GHG emissions into the atmosphere.

The Rules apply for natural persons and legal entities irrespective of the pattern of ownership, whose activity involves GHG emissions to the atmosphere (hereinafter “mineral developers”) and corresponds to a type of activity mentioned below:

- Energy industry:
  fuel combustion plants with capacity of more than 20 MW (excluding household and hazardous waste combustion plants);
  power and heat generation by fuel combustion with the amount of 0.5 thousand tons of equivalent fuel per year (excluding the activity involving the combustion of solid household and hazardous waste).

Ore mining industry:
  methane emissions during coal mining;
  combustion of associate gases during oil extraction.

GHG emissions into the atmosphere out of stationary sources are calculated for each GHG source separately with respect to its relative share in the increase of the greenhouse effect.
To limit GHG emissions the responsible environmental protection authority annually stipulates allowances (quota) of the maximum permissible GHG emissions into the atmosphere for separate types of emissions sources (hereinafter “quota”) for mineral developers who do not exceed the level of GHG emissions in the base year* (year of first limitation) determined according to the results of the state recording of GHG emissions sources.

To obtain a quota mineral developers annually submit their applications to the responsible environmental protection authority.

The quota application of a mineral developer must be accompanied by a project of maximum permissible emissions of greenhouse gases into the atmosphere for the implemented activity.

The quota application of a mineral developer must be submitted not later than two months prior to the expiry of the previous quota or to the setting into operation of the new project (new type of activity).

The responsible environmental protection authority considers the quota application within maximum one month of the application registration. After this term the responsible environmental protection authority renders a quota to the mineral developer or resolves to refuse the quota assignment.

Note:

* The base year for the limitation of GHG emissions into the atmosphere discharged by mineral developers is the year of the introduction into effect of the present Government Order of the Republic of Kazakhstan.


No. 107 dated February 06, 2008

The Rules of emissions trading (hereinafter “Rules”) have been developed according to the Environmental Code of the Republic of Kazakhstan.

The emissions trade assumes the transfer of a part of the unused emissions allowance provided to the mineral developer in terms of the environmental license to another mineral developer(s).

In order not to exceed the obtained emissions allowance and to comply with emissions reduction commitments within a definite period of time according to the environmental license the mineral developer can purchase the lacking part of the emission quota and a part of the emissions reduction commitment from another mineral developer having surplus emissions allowance.

If a mineral developer has an unused emissions credit according to his limits and commitments stipulated by the environmental license, he has the right to offer for sale a part of his emissions quota and a part of the emissions reduction commitment to other mineral developers.

The emissions trade can take place between mineral developers if the distance between the sources of emission/discharge of pollutants, industrial and household waste storage sites does not exceed the ten-fold sum of radii of sanitary protection zones set for these mineral developers.

The transaction of sale (purchase) of an emission quota and an emission reduction commitment requires the conclusion of a sales contract.
On the basis of the contract the authority issuing environmental licenses reissues the relevant environmental licenses for each contract party.

If the reissue of environmental licenses is refused a substantiated written response is provided within ten days.


This law stipulates legal, economic and social basis of environmental protection for the sake of the present and the next generations and is aimed at the environmental safety, at the prevention of negative impacts to the natural ecological systems from economic and other activity, at preservation of biological diversity and organization of the reasonable exploitation of natural resources.

The pattern of ownership for natural resources is determined by the Constitution of the Republic of Kazakhstan.

The users of natural resources are divided into legal entities and natural persons, state-owned and private, national and foreign.

National users of natural resources include the citizens of the Republic of Kazakhstan and Kazakh legal entities, including those with foreign participation, and the foreign users of natural resources – foreign citizens, foreign legal entities, foreign states, international alliances and organizations.

The exploitation permit represents a document issued for the users of natural resources by the responsible environmental protection authority and certifying the right of the user of natural resources for the exploitation of natural resources, for emission and discharge of pollutants into the environment, right for disposal of production and consumption waste with determination of the period of time and volume (limits), exploitation conditions and applied technology.

The contract (agreement) of exploitation of natural resources is concluded between the user of natural resources and executive bodies and the Government of the Republic of Kazakhstan as stipulated by the laws.

The contract (agreement) of exploitation of natural resources is invalid without the license previously received by the user of natural resources, in case the exploitation of natural resources and the performance of separate types of economic activity demand obligatory state licensing.

The exploitation of natural resources is imposed by the fees in form of taxes, levies and payments stipulated by the Tax Code of the Republic of Kazakhstan.

Environment pollution fee is paid by organizations and citizens for emission and/or discharge of pollutants, disposal of production and consumption wastes.

Over limit environmental pollution fee is imposed in increased amount stipulated by the Tax Code of the Republic of Kazakhstan.

Aimed at the prevention of environmental pollution and with due respect to all sources and volumes of pollution at the respective territory, their complex influence to the health of population, fauna and flora, allowed emission and discharge limits are set for each source of pollution.
Aimed at the prevention of the harmful environmental influence and the preservation of items subject to special protection buffer, sanitary protection and other protection zones are established.

Sizes and exploitation rules of buffer, sanitary protection and other protection zones are set according to the laws.

According to sanitary and epidemiological rules and standards “Sanitary and epidemiological requirements to the design of production facilities”:

underground coal gasification stations (degassing of coal mines) pertain to class II according to the sanitary classification of production facilities – sanitary protection zone min. 500 m;

places of transshipment and storage of liquid chemical cargos and liquefied gases (methane, propane, etc.) – sanitary protection zone 1000 m.

Heat and power generation through the combustion of mineral fuel:

to set the minimum size of a sanitary protection zone for boiler houses with thermal output less than 200 Gcal using solid, liquid and gas fuel, it is necessary to determine the potential concentration in the ground layer and vertically with respect to the height of residential buildings in the zone of the maximum air pollution near the boiler house (10-40 heights of boiler house chimneys), and to make an acoustic design. When using potential values of the expected air pollution within the maximum concentration limit in the ground layer and at different heights of the neighbour residential area the sanitary protection zone should be min. 50 m, if the acoustic design does not demand its increase;

if multi-storey buildings are situated in the maximum pollution zones of boiler houses, the height of a chimney shaft should be at list 1.5 m higher than the roof ridge of the highest residential building.

Environmental requirements to the use of land, mineral resources, waters, ambient air, forests and other flora, fauna, environmental protection items of special environmental, scientific or cultural value, extra protected natural areas and areas with disadvantaged ecological state are determined by legal and other regulatory acts.

Enterprises, facilities and other sites are put into operation at the condition of observation in full of all environmental requirements stipulated by the project according to the protocols of inspection boards with participation of the responsible environmental protection authority or its local divisions and local executive bodies of regions (cities of republican status, capital city).

Emissions and discharge of pollutants into the environment, disposal of production and consumption wastes without permission of the responsible environmental protection authority are forbidden.


The water law is aimed at the achievement and maintaining of environmentally safe and economically effective level of water utilization and water protection for preservation and improvement of living conditions of the population and the environment.

Water objects of the Republic of Kazakhstan include water masses in surface reliefs and in the interior having boundaries, volume and water relationships. Those are seas, rivers,
similar to them channels, lakes, glaciers and other surface water objects and interior parts containing ground waters.

Water objects are divided into:

- surface water objects;
- underground water objects, etc.
- Underground water objects include:
  - water bearing zones, aquifers and rock units;
  - groundwater basin;
  - accumulations of ground waters;
  - yields of ground waters to the surface;
  - watered interior parts.

Enterprises and other facilities influencing the state of water objects are located under the observation of conditions and rules of environmental protection, interior protection, sanitary and epidemiological and industrial safety, reproduction and reasonable use of water resources, as well as taking into account environmental impact of the activity of denoted objects.

The state of surface and ground waters is maintained in correspondence with environmental and sanitary and epidemiological requirements by observation of maximum permissible harmful impact standards for water objects stipulated by the responsible water use and protection authority with the approval of the responsible state environmental protection authority, responsible interior survey and use authority, responsible authority for sanitary and epidemiologic safety of the population and the responsible state industrial safety authority.

Standards of maximum permissible harmful impacts are set according to:

- maximum permissible anthropogenic load, which long-term influence does not change the ecological system of a water object;
- maximum permissible weight and concentration of harmful substances, which can intrude into the water object and its watershed area.

If ground waters occasionally extracted with other minerals constitute a danger for people’s health and for the environment, it is subject to mandatory disposal.

Natural persons and legal entities, whose production activity can cause harmful influence to the ground waters, are bound to monitor the ground waters and to take timely measures aimed at prevention of pollution and depletion of water resources and of negative water impact.

If in the course of drilling or other mining activities a natural person or a legal entity taps up an aquifer, they are bound to equip flowing and exploratory wells with adjustment and control devices, to take other measures aimed at the protection of ground waters according to the PDD approved by the responsible state environmental protection authority, responsible
interior survey and use authority, responsible authority for sanitary and epidemiologic safety of the population and the responsible industrial safety authority.

During the geological study of subsurface resources, exploration and extraction of commercial minerals, construction and operation of underground facilities not connected with mineral extraction, the mineral developers are bound to take measures aimed at prevention of pollution and depletion of ground waters.

Construction, dredging and blasting operations, extraction of commercial minerals and other resources, routing of cables, pipelines and other services, forest felling, drilling and other works at water objects or water protection areas require an approval of a responsible water use and protection authority, responsible state environmental protection authority, responsible authority for sanitary and epidemiologic safety of the population, local executive bodies of the region (city of republican status or capital city).

The estimated time needed to acquire all environmental permits comprises approximately 6 months.

Today Kazakhstan has no extra regulations for ground waters, soil and air protection during CMM extraction and utilization.

## 7.7 Energy laws


By this law the state regulation of the energy industry is implemented, which includes:

- licensing;
- state regulation of rates (prices, rates of charges);
- demonopolization and privatization of electric power industry facilities;
- government supervision of reliability, security and efficiency of power generation, transfer, technical scheduling and consumption;
- technical regulation in the electric power industry.

According to the Law on Licensing the license is required for the following activities: generation, transfer and distribution of power and heat, operation of power stations, networks and substations.

This kind of activity includes the following subspecies:

- power generation from power sources with voltage 35 kV (kilovolt) and higher;
- transfer and distribution of power to consumers;
- operation of power stations, networks and substations of all kinds (transformer substations, switchgears, relay protection and automation), used at hazardous production facilities,
except energy supply facilities of public purpose as well as energy supply facilities used in the integrated technological process;

heat generation for the heat supply of populated areas, production areas and facilities, except heat generation for own needs;

services for heat transfer and distribution to populated areas, production areas and production facilities.

License and (or) appendix to license is issued at the place of registration of the natural person or the legal entity by the Committee of government supervision of power industry of the Ministry of Energy and Mineral Resources of the Republic of Kazakhstan.

License and (or) appendix to license is issued by the licensor not later than thirty working days and for small business enterprises not later than ten working days after submitting of the application with appropriate documents.

According to the Law on Licensing during the required period of time the Licensor shall issue the license or an appendix to the license or give a written answer explaining reasons for not issuing the license or an appendix to the license.

However the actual procedure takes about 6 months due to receiving of conclusions in authorities of environmental protection, industrial and fire safety as well as government supervision of power industry.

State regulation of rates (prices, rates of charges) for products and services of natural monopoly holders is implemented by the state authority controlling and regulating activities in the natural monopoly area in the order determined by the laws of the Republic of Kazakhstan.

Power transfer companies calculate their expenditures for power transfer separately from expenditures of other kinds of activities in the order determined by the state authority controlling and regulating activities in the natural monopoly area.

Control and regulation of the electric power industry is implemented by the state authority for government supervision of power industry.

The authority for government supervision of power industry implements supervision for:

meeting technical requirements of regulatory acts of the Republic of Kazakhstan in the electric power industry;

operation and technical condition of power stations equipment, power and heat networks as well as power and heat-using facilities of consumers.

Facilities under technical regulation are electric equipment, power and heat networks, consumer’s facilities intended for generation, transfer and consuming of power and heat energy, power and heat energy themselves.

By designing and operation of power networks the execution of technical requirements determined for the electric power industry according to the Law and technical regulations shall be provided.

Equipment of power substations, power and heat networks, and consumer’s facilities intended for generation, transfer and consuming of power and heat energy shall correspond to the technical requirements determined by technical regulations.
Manufactured in the Republic of Kazakhstan and imported electric equipment and materials shall correspond to the technical regulations, and in cases foreseen by the laws of the Republic of Kazakhstan they shall receive corresponding confirmation.

Electric equipment and materials shall correspond to the requirements providing safety for lives and health of population and environment.

Commissioning of equipment of power substations, power and heat networks, and consumer’s facilities subject to confirmation of requirements correspondence determined by technical regulations is not allowed without a corresponding confirmation.

Power supply in the Republic of Kazakhstan is implemented in terms of power and heat energy markets operation. According to the Law “On Energy Industry” power and heat energy are market products.

The power energy market consists of two levels: bulk and retail power markets, the heat energy market consists of one level - retail market.

Energy generating and supplying companies, guarantee suppliers of power energy and companies buying power energy for further sale shall buy and sell power energy at centralized markets in accordance with procedures determined by the state authority, which controls and regulates activities in the natural monopoly area.

System operator, regional electric grid companies owing power networks, provide free access to the power energy market for all market participants in accordance with procedures determined by the state authority, which controls and regulates activities in the natural monopoly area.

Power transfer company has no right to refuse the connection to power and heat networks for energy generating and energy supplying companies and consumers, as well as power and heat energy transfer under the condition of meeting all the requirements determined by regulations of the Republic of Kazakhstan.

Relations arising by generating, transfer and consumption of power and heat energy are regulated in the electric power industry by appropriate agreements.

According to the Law “On Energy Industry” cap, constructed and individual rates are defined in accordance with procedures determined by the Government of the Republic of Kazakhstan.

Energy generating company independently sets transfer price for power energy, but not higher than cap rates of the corresponding energy generating companies group.

The cap rate is approved for each group of energy generating companies for the period not less than seven years with breakup for each year and annual adjustments taking into account necessity of industry investment attractiveness support.

Cap rate for the first effective year is based on the maximum actual price resulting in the appropriate energy generating companies group during the year preceding the year of cap rates introduction.

In order to sell the power energy at the prices not exceeding cap rates, the energy generating company signs an agreement with the authorized body in accordance with the established procedure.

The agreement provides investment obligations of the energy generating company for activities directed to create new assets, expansion, renovation, support, reconstruction and technical re-equipment of existing assets.

Energy generating company independently determines its investment obligations.
In case investment obligations cannot be implemented at the expense of assets received from power energy sale within cap rates, the energy generating company has a right to apply a constructed or individual rate for investment program implementation under condition of approval of technical specification by authorized body and signing of the investment contract.

Based on the investment program the energy generating company signs an investment contract with the state authority controlling natural monopoly area and regulated market in accordance with the established procedure.

Constructed rate shall not exceed the power price determined in the feasibility study of the investment program developed and approved in accordance with the laws of the Republic of Kazakhstan.

Constructed rate is applied by energy generating company since the signing of the agreement and is effective during the period of implementation of investment obligations foreseen in the investment contract.

Constructed rate can exceed the power price determined in the feasibility study of the investment program after approval of changes in the design estimate documentation in accordance with the procedure established by the laws of the Republic of Kazakhstan.

Energy generating company can apply individual rates at any stage of the investment program implementation.

Energy generating company applies individual rates based on the decision of the state authority controlling natural monopoly and regulated market areas taking into account the investment program and design estimate documentation parameters.

Individual rate cannot be lower than the constructed rate during the implementation by the energy generating company of its investment obligations regarding commissioning of facilities foreseen in the investment contract.

Individual rate higher than constructed rate is approved in case the investment program costs increase. Furthermore, the increase of investment program costs shall be agreed with the state authority controlling natural monopoly and regulated market areas.

Energy generating company is forbidden to sell power energy to natural persons and legal entities not being wholesale and (or) retail market participants except the cases of power energy export.

Law of the Republic of Kazakhstan “On energy saving” dated December 25, 1997 regulates public relations in the energy saving area in order to create economic and organizational conditions for the effective use of fuel and energy resources of the Republic of Kazakhstan and environmental protection.

One of the principal directions of energy saving is the development of renewable energy sources.

Use of renewable energy sources is a priority direction in working out of power industry development programs and resolution of environmental problems of Kazakhstan.

In the Republic of Kazakhstan required judicial and economical conditions for the involvement of renewable energy sources to the energy balance as well as for the development of energy facilities are provided.

Coordination and responsibility for renewable energy sources involvement in energy balance are assigned on the authorized body.

International cooperation in the energy saving area is implemented for common energy saving projects, exchange of energy-efficient technologies, and correspondence of energy-
efficient characteristics with international standards as well as mutual recognition of certification results.

In case an international contract ratified by the Republic of Kazakhstan stipulates regulations otherwise than foreseen in the laws of the Republic of Kazakhstan, regulations of the international contract shall be applied.

The Governmental Order of the Republic of Kazakhstan No. 1044 dated October 08, 2004 approved the “Regulations for connection of additional capacity and costs compensation for reconstruction and expansion of power units” setting connection procedure of additional capacity and costs compensation for reconstruction and expansion of sites.

Additional capacity connection procedure:

- technical conditions for additional capacity connection to a power and (or) heat network are issued by the energy transmission company under the written application of a consumer and are based for the development of project documentation regarding consumers connection to power and heat networks;
- expansion, reconstruction of existing and construction of new power and heat energy sources are implemented at the cost of own and (or) loan funds of the energy generating company, as well as at the cost of other funds according to the regulations of the Republic of Kazakhstan;
- expansion and reconstruction of energy transfer networks are implemented at the cost of own consumer means securing to them the right of property. On account of additional capacity connection the energy transfer company can charge energy transfer networks (including equipment) constructed by the consumer at the price confirmed by an independent estimator;
- scope of works to be made by the consumer in the energy transfer networks of private consumption for additional capacity connection to energy transfer company network is set according to the technical requirements issued by the energy transfer company;
- energy transfer company signs a contract with the consumer for additional capacity connection, where volume, terms of payment for connected facility and procedure of money reimbursement to consumer are set.

This Order foresees the procedure of costs compensation, namely:

- costs for natural capacity increase are covered at the cost of own funds of the energy transfer company;
- energy consumer provides costs compensation for expansion and reconstruction of energy transfer networks of general consumption to the energy transfer company according to the procedure established by the state authority controlling natural monopoly area;
- energy generating and energy transfer company can reimburse budgetary funds invested in expansion, reconstruction of existing and construction of new power and heat sources and energy transfer networks in its stocks at the nominal price or by other means according to the laws of the Republic of Kazakhstan;
- price for a unit of connected power and heat capacity (1 Gcal/h or 1 kW) is set based on the approved Development plan for city, district and regional heat and power networks;
- the plan is agreed with authorized bodies in power industry, activity control and regulation in natural monopoly area and is approved by the local executive body;
price for a unit of connected power and heat capacity (1 Gcal/h or kW) is common for all consumers challenging for additional capacity connection within the territory (city, district) set by the Plan;

the Plan can be developed by industry project institutes having license of the authorized power industry body;

price of additional capacity connection for building owners is not charged irrespectively of the pattern of ownership. The costs of building owners for expansion and reconstruction of energy generating company networks are charged to local executive bodies;

in case the funds are assigned from the state budget to energy generating and (or) energy transfer companies for expansion, reconstruction of existing and construction of new power and heat energy sources, energy transfer networks, the price for new capacity connecting is nor charged to consumers implementing projects financed at cost of the state budget, grants of foreign countries and international organizations, as well as to diplomatic missions of foreign countries on approval of the responsible foreign policy authority.

At present the power in Kazakhstan is not generated from coal mine methane, as a result we do not have fixed price rates for 1 kWh. Taxation of the power generated from coal mine methane is set according to the standard procedure of the Tax Code of the Republic of Kazakhstan.

Potential of renewable energy sources usage in the Republic of Kazakhstan:

- Development Program of Kazakhstan until 2030.

“The scheme of development and location of productive forces of the Republic of Kazakhstan for the period until 2015” (hereinafter referred to as “Scheme…”), which was developed in 2002 by the Economic Research Institute of the Ministry of Economics and Budget Planning of RK.

“The Strategy of Industrial Innovation Development of Kazakhstan for 2003 – 2015” (hereinafter referred to as “Strategy…”), Ministry of Economics and Budget Planning,

“Development Program of Unified Energy System of Kazakhstan for the period until 2010 with perspective view until 2015", which was developed by the group of scientific-research and project institutes under general supervision of “KazNIPlenergoprom Institute” LLP,

National Action Plan on Environmental Protection, NAPEP

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7.8 References

[7-1] World Bank country brief (Kazakhstan) http://www.worldbank.org.kz 17.11.09


[7-4] KPMG country profiles

[7-5] M2M Global report, Kazakhstan

[7-6] Potential of renewable energy sources usage in the Republic of Kazakhstan


[7-8] M2M

[7-9] Coalbed Methane Outreach Program (CMOP)
http://www.epa.gov/coalbed/networkcontacts.html
8 United Kingdom

8.1 Economic situation

The major fact about the United Kingdom are given in the table below.

Tab. 8-1 Characteristics of United Kingdom [2-1]

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Full name:</td>
<td>United Kingdom of Great Britain and Northern Ireland</td>
</tr>
<tr>
<td>Population:</td>
<td>61 million (UN, 2008)</td>
</tr>
<tr>
<td>Area:</td>
<td>242,514 sq km (93,638 sq miles)</td>
</tr>
<tr>
<td>Major language:</td>
<td>English</td>
</tr>
<tr>
<td>Monetary unit:</td>
<td>1 pound sterling = 100 pence</td>
</tr>
<tr>
<td>Main exports:</td>
<td>Manufactured goods, chemicals, foodstuffs</td>
</tr>
<tr>
<td>GNI per capita:</td>
<td>US $42,740 (World Bank, 2007)</td>
</tr>
<tr>
<td>GDP (billion 2000 US$)</td>
<td>1,684.70</td>
</tr>
<tr>
<td>GDP (PPP) (billion 2000 US$)</td>
<td>1,748.59</td>
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<tr>
<td>Energy Production (Mtoe)</td>
<td>186.62</td>
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<tr>
<td>Net Imports (Mtoe)</td>
<td>49.15</td>
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<tr>
<td>TPES (Mtoe)</td>
<td>231.13</td>
</tr>
<tr>
<td>Electricity Consumption* (TWh)</td>
<td>374.85</td>
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<tr>
<td>CO2 Emissions **(Mt of CO2)</td>
<td>536.48</td>
</tr>
</tbody>
</table>

The United Kingdom is the sixth largest in the world in purchasing power. It is partner and member of the European Union G7, G8 and G20 and the Commonwealth, but not the European Monetary Union. The city of London is regarded as the most important and biggest financial center of the global economy.

During the current world economic crisis the country has been hit hard and undergoes a severe recession. As in the United States, banks and property prices have suffered badly and the general expectation is that unemployment will rise sharply. There is not much room for manoeuvring since the political rate is already close to zero. Interbank lending is still impaired, the financial system is stabilized, but not yet back to normal.

Sentiment about the economic situation in the UK has begun to turn from negative to slightly more positive as quantitative easing, now totalling £200 billion, circulates more money into the economy. Growth in the economy is currently negative but the decline has slowed and is expected to turn positive in the first half of 2010. In spite of the huge increase in money circulated by the Bank of England in the economy, loan financing is still proving difficult for many companies as banks continue to build their balance sheets and loan money only to companies with virtually no risk profile. Many profitable and successful companies have closed as a result of their inability to raise sufficient working capital.
Sterling has continued to weaken over the past two years against both the Euro and the dollar and £1.00 is now valued at around €1.10 and $1.60. This is good for manufacturing exports but as most of the large capital equipment, such as containerised generating sets, is imported from the Eurozone it has slightly reduced the rates of return on CMM projects which use this equipment. The increase in Euro denominated prices has been ameliorated somewhat by the need for European companies to remain competitive and they have tended to compensate by a reduction in their own margins to keep price increases as low as possible for the CMM, landfill gas and cogeneration markets in the UK.

8.1.1 The financial Country Rating and outlook

The financial Country Rating and outlook is very good:

<table>
<thead>
<tr>
<th>Rating Agency</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard and Poor’s</td>
<td>AAA</td>
</tr>
<tr>
<td>Moody’s and Fitch</td>
<td>AAA</td>
</tr>
</tbody>
</table>

After the financial crisis 2008 the outlook has changed from stable to negative in May 2009

8.1.2 Local currency situation.

The changes of GBP to Euro rate during the last several years are given in the

![Fig. 8-1 Exchange rate of GBP versus Euro [2-7]](image)

8.1.3 Ability to raise project financing for the specific country:

The reduction in bank lending even to profitable SME’s has made for difficulties in many sectors of the economy but fortunately most CMM companies use their own capital, raised from the stock markets or privately venture capital groups, to explore for new CMM reserves. At the gas production phase, containerised power generation systems can be leased on 5 or 7 year contracts with equipment financing companies or the banks.
The negative side of this state of affairs for CMM companies is that the riskier elements of 
exploration and appraisal programs cannot be financed through bank debt but must be paid 
for by the company itself from its internal sources. Those with strong balance sheets have 
little problem with this but others must raise equity funding through the stock market or via 
venture capital funds. Project costs that cannot be bank financed include:

desktop investigations into the geology and hydrology of each coal mine
purchase and interpretation of digital mine information and mine plans held as the Coal 
Authority
Planning applications
Environmental impact reports
Directional drilling of boreholes into mine roadways
Casing and completion equipment for gas production
civil engineering at production site, including fencing, CCTV, landscaping etc.
connections to the local electricity distribution network ranging from £0.1 to £0.75 million

When a project has moved to drilling and successful testing of gas production, the next 
problem phase is to estimate the probable flow rates and the longevity of the CMM reserves. 
This has proved to be problematic in some cases as estimates of the rate of flooding of old 
workings are difficult to get right as few current data are available. Coal Authority monitoring 
boreholes and the rate of influx of water from old mine records give a fair indication of the 
rate of flooding. In the UK the average life of CMM reserves is expected to be in the range 
10 to 15 years but this depends not only on the rate of flooding but also on the rate of gas 
extraction. Additional data on the projected life of the CMM reserves can be obtained from 
original data on the methane emitted during mining operations and held by the Coal 
Authority.

However, no matter how good these estimates, based on all the known information relevant 
to coal mine methane, the only sure way to evaluate the potential for commercial mine gas 
production is drill a borehole into the old workings and extract the gas using containerised 
pumping systems over a period of 10 to 14 days. Estimates of the size of the mine void and 
the steady gas production rate can then be made and the electricity generators sized to 
match the flow of gas.

Once a plant is constructed which takes about 18 months from obtaining planning 
permission to first power exports, it quickly becomes a strong cash flow generator and the 
companies with a portfolio of projects are then able to self finance most of the riskier front 
end elements themselves.
8.1.4 Price situation and outlook for competing products

The market prices for the above products were highly volatile in the past and it may be predicted that they will also be highly volatile in the future. The price for carbon credits ranged between less than 10 euro/unit to more than 25 euro/unit in less than 12 month.

The price of crude oil a leading benchmark for all primary energy sources fluctuates between 40 and 150 US-Dollar per barrel on world markets trading. In some countries the prices for primary energy fuels are still regulated and below world market prices. Different taxes maybe implied on different sources of primary energy or subsidies might be given to some sources like renewable energies or power/fuels based on CMM.

Electricity trading takes place on the wholesale market on the basis of bilateral contracts concluded between energy generators, trading companies or consolidators and end users. Power prices are freely set by supply and demand in the wholesale market and power purchase contracts are usually set for periods between 6 and 24 months. A spot market also exists for non-contracted power generation plants, which balances the system but here the price can fluctuate wildly depending on supply and demand during each half hour period during the day.

After the introduction in March 2001 of the New Electricity Trading Arrangements (NETA) which opened up the market to competition the UK electricity price began to fall steadily. In addition, falls in the international and UK price of gas and the extra "dash for gas" power generation capacity coming rapidly on line added to the downward pressure. During 2002/3 the wholesale electricity price reached its lowest point at around £13/MWh. This price was almost equivalent to the operating costs of a mine gas plant and was not high enough to justify new investment. The CMM companies thus kept their existing plants running but slowed or stopped their project development programmes.

The situation up to 2003/4 was that most CMM was sold direct to third party power generators to keep down their project capital costs down. The price gradually rose through 2003 and towards the end of 2004 as the market for electricity began to firm up prices rose to more than £30/MWh. As a consequence, the rates of return on CMM projects rose to acceptable levels and the companies changed strategy to take the full value chain from CMM by becoming power generators themselves.
This trend was also helped by local council planning committees allowing containerised power generation plants to be used for the first time instead of fixed plants in large buildings. This initial firming of prices signalled the beginning of a rapid rise in the power price towards a record peak of around £100/MWh reached in Summer 2008. Since then as shown in the graph below, the price fell to a low of around £35/MWh in October 2009 but has since recovered to nearer £45/MWh.

![UK Electricity Prices](image)

**Fig. 8-3 UK Electricity Prices**

8.1.5 **Tax situation.**

The main rate of corporate tax is 28% and will be the same in 2010, the standard current rate for VAT is 15% till 31. December 2009 and 17.5% from January 1st until further notice (source HM revenue and customs).

CMM companies in the UK pay taxes in the same way as other businesses as there are no special rates applying. The UK system consists of:

- Corporation tax on company profits
- Income taxes – on individual persons
- National Insurance Contributions payable on employees salaries
- Goods and services taxes – VAT on goods and services
- Local council and municipal taxes including business rates

Any company that has its base of operations in the UK is liable for the corporation tax. Non-resident companies may also be liable for this tax when they do business in the UK with a permanent establishment. UK employees are liable for National Insurance Contributions (NICS).

Corporation tax at present is:

- 0% - 0 - £10,000
- Marginal relief - £10,000 - £50,000
- 19% - £50,001 - £300,000
- Marginal relief - £300,000 - £1.5 million
- 30% - £1.5 million and above
Some companies may qualify for different reliefs to help them reduce the amount of corporation tax they have to pay. Each case is unique and depends on the size of the company. Some of these rules are:

Small and medium size companies can deduct 150% of the amount they spend on research and development from their taxable profits.

Large companies can deduct 125% of the research and development expenditure from their taxable profits.

The corporate venturing scheme allows companies to deduct 20% of the cost incurred in subscribing to shares in unquoted companies.

If a company has intangible assets, it can claim 4% or the rate of depreciation for the year – whichever is greater.

Losses that a company sustains can be used to reduce the income and gains of the same period or the previous year. They can also be carried forward to use for the next three years if needed.

Full details of UK corporate tax can be found on [8-3].

8.2 Implementation status of Kyoto protocol

<table>
<thead>
<tr>
<th>Date of signature:</th>
<th>29 April 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of ratification:</td>
<td>31 May 2002</td>
</tr>
<tr>
<td>Date of entry into force:</td>
<td>16 February 2005</td>
</tr>
</tbody>
</table>

However, more important, than these official dates is the fact how Joint Implementation projects are actually handled by the local governments.

The United Kingdom has a good potential for CMM projects, there are more than 1,000 abandoned deep coal mines.

There is an estimated potential for > 60 plants averaging 3MW, equivalent to 150MW by 2012.

These could capture 2.5 million tpa of CO2e [8-4].

() Still, since there is no support from the UK government, probably nothing will happen.

The Kyoto Protocol allows carbon emissions reduction projects to be carried out in various countries, resulting in carbon credits for the corresponding reductions or limitations. These Kyoto Mechanisms are based on the fact that emissions of greenhouse gases contribute equally to global warming wherever they come from, so companies can choose to reduce emissions where it is cheapest for them to do so. Information on the current status of the Kyoto Protocol can be found on the UN website.

In developing countries without a Kyoto target projects operate under the Clean Development Mechanism.

In countries with a target, projects operate under a process known as Joint Implementation.
The Department of Energy and Climate Change (DECC) reported in 2009 that the UK remains on track to achieve almost double its greenhouse gas obligations under the Kyoto Protocol on climate change. The report shows that UK greenhouse gas emissions are expected to be about 23% below 1990 levels by 2010 – well in advance of the target of 12.5% set out under the Kyoto agreement.

### 8.2.1 Joint Implementation and the UK DFP

DECC is the UK’s Designated Focal Point (DFP) for Joint Implementation (JI). The Government does not approve JI projects in the UK, but can issue letters of approval to UK companies wishing to participate in JI projects overseas.

In the UK, coalmine methane contains approximately 70% methane, 15% CO2 and 15% N2. In CDM or JI projects, to reduce one ton of methane may get from 18-23 CERs depending on the methodologies. Internationally, CMM could provide a huge amount of energy with potential in excess of 1 GW of power generation.

Coalmine methane power to date has reached more than 250 MW worldwide in response to renewable energy laws and CDM/JI project developments. There are about 25 coalmine methane projects currently in operation in the UK but more than 1,000 abandoned coalmines. Thus, there is a great potential to use coalmine methane as a strategic local source of clean energy and to save up to 4.5 million tons of CO2 emissions per annum. Ten years ago, there were 20 deep working coalmines in the UK but this number is now reduced to five. There are two other companies in addition to Alkane operating and constructing CMM electricity generation plants in the UK. In 2004/5, the wholesale electricity price in the UK fell to about £15 per MWh and only the CCM projects already operating were economically attractive. The typical production costs of power from coalmine methane including capital costs are around £13 per MWh but from 2005 as electricity prices began to rise more and more projects became economically viable. By February 2008, the electricity price had risen to over £50 per MWh giving a strong impetus to build more CMM plants. In order to get projects up and running, the economics must be underlined by firm electricity prices, a clear regulatory and legal framework, premium prices for renewable energy and helpful policies such as feed-in-tariffs and easy-connection-to-grid rules for methane power plants [8-5].

### 8.3 Energy politics (preferences for sources of primary energy)

The electricity generation mix in the UK consists of gas, coal, oil derived and associated fuels and others including renewable energy sources. However many of the UK’s older power stations dating from the 1960’s and 1970’s – coal, oil and nuclear powered - are due to close by 2015. The coal and oil-fired stations will be closed in response to increasingly stringent European air quality requirements and the nuclear plants because they will have reached the end of their working life. By 2020, all but one of the UK’s existing nuclear power stations will have to close and a large proportion of the coal fired plants. Press reports suggest that there may be an energy gap for 2 or 3 years after 2015 as new build power stations will not be completed in time to fill the gap left by the closure of old fossil fuel and nuclear plants. Carbon capture and storage (CCS) is a potential solution to high emissions from new coal fired power stations.

The UK has been energy self sufficient since time immemorial as a result of wood and charcoal burning, domestic coal mining and latterly oil and gas production. This has caused a shock to the system as the UK has become a net energy importer since the middle of the current decade as indigenous oil and gas production from the North Sea decreased more rapidly than expected. Even so, domestic energy reserves still account for about two-thirds
of all the UK’s primary energy needs, but reliance on politically sensitive foreign imports will increase over the next decade and it will be important to exploit all possible local sources of energy.

Thus it will be important that, in addition to new nuclear, coal and renewable energy plants, all indigenous energy resources should be fully exploited. CMM, although small, could contribute up to 150MW of installed capacity in the period up to 2015 and thus help to ease the power generation gap. Capture and use of this damaging greenhouse gas, 21 times more potent than carbon dioxide, reduces the carbon dioxide equivalent emissions from the UK by around an estimated 1.5 million tonnes per annum. CMM in abandoned coal mines is strategically located onshore, underneath industrial regions of the UK and ideal for decentralized power generation. These reserves could be fully exploited if the industry can get support from government incentives in the same way that landfill gas use for power generation was supported by the non-fossil fuel obligation (NOFFO) and the renewable obligation (RO).

The objective of these incentives was to increase the proportion of renewable electricity being generated in the UK, meet Kyoto targets and to reduce emissions to atmosphere of methane from landfill and sewage treatment plants. Unlike landfill methane, CMM was not included in the RO but with the implementation of the upcoming feed-in tariff (FIT), due in 2010, there is an opportunity to include this gas so that it will be fully exploited for its energy content rather than allowed to add to greenhouse gas emissions from the UK.

The UK government does not support CMM projects and does not recognize emission credits from this source. Therefore the probability of projects being initiated is low to zero.

---

**Fig. 8-4 UK 2007 Energy consumption**

![Energy Consumption Pie Chart](chart.png)

- **Gas**: 55.41%
- **Oil**: 53.21%
- **Solid fuels**: 26.17%
- **Nuclear**: 10.99%
- **Renewables**: 3.50%

**Source**: Statistical pocketbook 2010, Part 2 - Energy
Ambitious plans to generate one third of UK electricity from renewables by 2020 form the centerpiece of government plans for a low carbon future [8-7].

Coal production in the UK was rising over the last decade due to the fact that coal was cheaper than gas. Now coal production is falling, the reason is that some deep mines have come to the end of their economic lives. New surface and deep mine projects are underway and there is renewed interest in this energy source. Unfortunately many opencast mine projects meet resistance from environmentalists and the government is promoting renewable energy production detrimental to coal mining.

**Tab. 8-2: Potential UK Coal Production [8-8]:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Low (mt)</th>
<th>High (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>21.05</td>
<td>28.75</td>
</tr>
<tr>
<td>2010</td>
<td>21.05</td>
<td>28.75</td>
</tr>
<tr>
<td>2011</td>
<td>19.00</td>
<td>24.65</td>
</tr>
<tr>
<td>2012</td>
<td>17.75</td>
<td>23.70</td>
</tr>
<tr>
<td>2013</td>
<td>16.55</td>
<td>22.90</td>
</tr>
<tr>
<td>2014</td>
<td>15.80</td>
<td>21.95</td>
</tr>
<tr>
<td>2015</td>
<td>15.30</td>
<td>21.10</td>
</tr>
</tbody>
</table>
The long-term trend is negative, coal production will decline.

<table>
<thead>
<tr>
<th>Year</th>
<th>Transport</th>
<th>Residential</th>
<th>Energy Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>14.80</td>
<td>21.10</td>
<td></td>
</tr>
</tbody>
</table>

Source: Statistical pocketbook 2010, Part 2- Energy

Fig. 8-6 Development of Greenhouse Gas Emissions (GHG)* by Sector in the United Kingdom compared to the year 1990 (1990=1) [8-6].

"As UK mine methane emissions are not yet included in the EU ETS, they have no current value in the international carbon market and therefore generate no funds for mine methane project development." [8-9]. The Government's international and domestic policy is a response to two main challenges:

cutting carbon emissions to tackle global warming

ensuring secure, clean and affordable energy as imports replace declining production from North Sea oil and gas

It seeks to do this in a way that is consistent with its four energy policy goals:

cutting the UK’s carbon dioxide emissions by 60% by about 2050, with real progress by 2020

maintaining the reliability and security of energy supplies promoting competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and to improve productivity and ensuring that every home is adequately and affordably heated.

The energy sector as a whole is covered by a series of Energy Acts, the latest of which it the Energy Act 2008 (see Chapter 8.4.2)

UK power generation is supplied from a diverse mix of fuels as shown above but the proportion of electricity from natural gas has risen to just over 40% since the “dash for gas” in the early 1990’s when a number of old coal fired and nuclear power stations were replaced by Combined Cycle Gas Turbine (CCGT) power stations running mainly on North Sea gas
from the UK continental shelf. Since the completion of this phase of the gas fired power stations, the energy mix has remained relatively steady apart from the slow growth of renewables and a brief increase in the coal fired segment in 2007/8. The table below shows the technologies and fuels used in power stations and details numbers for conventional stations over 1 MW in capacity and renewables accredited under the Renewables Obligation (RO).

Tab. 8-3 UK 2007 Consumption of Primary Fuels [8-6]

<table>
<thead>
<tr>
<th>UK Consumption of Primary Fuels</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid fuels</td>
<td>3.12%</td>
</tr>
<tr>
<td>Oil</td>
<td>44.44%</td>
</tr>
<tr>
<td>Gas</td>
<td>31.11%</td>
</tr>
<tr>
<td>Electricity</td>
<td>19.88%</td>
</tr>
<tr>
<td>Renewables</td>
<td>0.69%</td>
</tr>
<tr>
<td>Derived heat &amp; Industrial waste</td>
<td>0.76%</td>
</tr>
<tr>
<td>Solid fuels</td>
<td>3.12%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Sources classified as “renewables” such as landfill gas and onshore wind supported by the RO make up the bulk of new renewable sources but large hydro which was mainly built before the 1980’s is an important part of the mix as well.

In the past three years the Government has become more aware and concerned about the UK’s reliance on imported natural gas as the North Sea reserves have declined more steeply than was expected earlier in the decade. It has also realised that an energy gap might be opening up around 2015-18 as the large combustion plant directive forces old coal fired power stations to be shut down and several of the older nuclear power stations reach the end of their working life.

The pessimists have suggested that if these predictions are correct there may be an “energy gap” and “brown outs” or even rolling blackouts as electricity production fails to meet projected demand. The probable outcome will be that new gas fired power stations will fill the gap, a compromise will be worked out to allow old coal stations to continue and the life of the old nuclear plants will be extended. The Government is fast tracking new nuclear build and any new coal fired power stations may be allowed to retrofit carbon capture and storage plants. The outlook is unpredictable but no doubt can be managed with cooperation between the main power industry players and the Government. Renewables such as offshore wind will gradually take up some of the slack but progress on planning and an offshore power transmission grid is proving to be slower than expected.

Tab. 8-4 Number of Power Stations Operating (2004) [8-10]

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Number of stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>14</td>
</tr>
<tr>
<td>Gas (including CCGT)</td>
<td>46</td>
</tr>
<tr>
<td>Nuclear</td>
<td>12</td>
</tr>
<tr>
<td>Coal/oil, oil, kerosene, diesel, gas oil</td>
<td>35</td>
</tr>
<tr>
<td>Hydro</td>
<td>73</td>
</tr>
</tbody>
</table>
At the third quarter of 2009, there were twenty two coal mine methane power stations capturing gas emissions from disused coal mines including those from the old British Coal Selby mine complex in Yorkshire. The installed capacity is c. 90MW and there are additionally four 6MW mine gas plants capturing methane from operating coal mines in the East Midlands and Yorkshire. The total of mine gas power generation stations in the UK is therefore twenty-six with an installed capacity of around 114MW.

The view of the Association of Coal Mine Methane Operators (ACMMO) was that the available gas reserves in abandoned coal mines could potentially extend this figure to around 150MW if CMM were to be included by the government incentive schemes such as the new feed in tariff (FIT) for green power generation or cogeneration plants of less than 5MW export capacity.

8.4 Mining and mine safety laws

Methane is owned by the UK government. Ownership changes to the licensee once the gas is captured.

“The rights to the methane gas are regulated by the Department of Business Enterprise & Regulatory Reform under the Petroleum Act of 1998 (Coal Authority, 2007). Petroleum Exploration and Development Licenses (PEDLs) are awarded in a series of “rounds,” the most recent being the 13th Landward Licensing round, which accepted applications on February 6, 2008 (Oil and Gas, 2007). The results of the 12th round were issued on March 20, 2004 (Parliament, 2004). Methane Development Licenses (MDLs) are used primarily for operating mines. An MDL grants permission to get gas “in the course of operations for making and keeping safe mines whether or not disused.” It grants no exclusive rights, so it can overlap geographically with one or more PEDLs. MDLs generally cover much smaller areas than PEDLs; typically each covers one mine, although the Coal Authority holds a license that covers the whole country (Oil and Gas, 2008). Coal licensing, and through it the responsibility for environmental and safety standards, is handled by the Coal Authority.

CMM currently enjoys an exemption from the UK Climate Change Levy (CCL), a tax on fossil fuels that have not otherwise been taxed (as is the case with oil) (OPSI, 2003). When used for power generation, it currently represents an incentive of 4.41 £ per MWe (Customs, 2007). The CCL was indexed to inflation starting April 1, 2007 (Deloitte, 2006).These savings are shared with the distribution company that accepts the power into its system; the net benefit to the generator is likely being closer to 3.0 £ per MWe and is realized by the sale of CCL Certificates. With the exception of this benefit, power from CMM must compete equally with that from all other generators in the electricity market. This has proved difficult in recent times due to the low price of electricity on the wholesale market. Recently, however, prices have risen, generating increased interest in CMM projects.

CMM projects are normally developed by private capital. Recent conditions have meant a downturn in activity due to poor projected returns. Future development may be fueled by EU trading. At least one UK carbon credit trading company has started work on identifying sources that would be suitable for power generation.” [8-11]

8.4.1 Current law and revisions

“Legislation has been introduced in Finance Bill 2008 to remove coal mine methane from the list of sources of electricity regarded as renewable for CCL purposes. Electricity generated
from most renewable sources is eligible for the CCL exemption scheme for such electricity. The impact of this change is that electricity generated from coal mine methane will no longer qualify for the CCL exemption scheme.

Paragraph 19(4A) of Schedule 6 to the Finance Act (FA) 2000 and regulation 47(2A) of the Climate Change Levy (General) Regulations 2001 require coal mine methane to be regarded as a renewable source (rather than a fossil fuel) for the purposes of the CCL exemption. Legislation will be included in Finance Bill 2008 to provide for the removal of both requirements. The legislation will also remove section 126 of FA 2002 (which inserted sub-paragraph (4A) (coal mine methane to be regarded as renewable source) into FA 2000).  

The CMM sector is regulated and licensed by DECC (Department of Energy and Climate Change) in conjunction with the Coal Authority (CA). Environmental laws are enforced by the Environment Agency and municipal, county and regional authorities. CMM from working coal mines is controlled under mining law and safety regulations. The CA issues permits to access the coal for mining operations and is paid via a levy on each tonne of coal produced. The liabilities from former mining operations relating to subsidence, CMM emissions and mine water discharges are the responsibility of the CA.

Extraction of CMM from disused mines on the other hand is licensed under the Petroleum Regulations rather than mining laws. The main reason for this is that petroleum exploration and development licenses (PEDLs) covering geographic blocks of 100 km² give the right to “bore for and get” oil, natural gas and CMM. The reason for this apparently anomalous situation was because it proved impossible to set up a system based on individual disused mines as mine workings frequently extend over and under each other and are often connected by underground roadways and workings. Therefore mine based licenses would have proved difficult to delimit a mine area and the pragmatic decision was taken by the DECC and ACMMO, the CMM industry body, to use the petroleum licensing legislation. CMM operators also pay a small annual license fee to the CA for the use of the mine shaft and surrounding area.

Legislation covering all aspects of coal mining including CMM in the UK has been in operation since the mid-19th century but the laws, regulations and practice have been updated many times with many amendments and new legislation at various intervals since then. Some of the early legislation was passed in order to enhance safety in mines following mine explosions and fatalities.

The legislation currently in effect is as follows:

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Year No.</th>
<th>S.I. (UK General)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Coal Mining Subsidence (Subsidence Adviser) (Revocation) Regulations 2004</td>
<td>2004 No. 2241</td>
<td>S.I. (UK General)</td>
</tr>
<tr>
<td>The Coal Industry (Coal Mining Successor Companies Target Investment Limit) Order 1995</td>
<td>1995 No. 1477</td>
<td>S.I. (UK General)</td>
</tr>
<tr>
<td>The Coal Mining Subsidence (Subsidence Adviser) Regulations 1994</td>
<td>1994 No. 2563</td>
<td>S.I. (UK General)</td>
</tr>
<tr>
<td>The Coal Mining Subsidence (Blight and Compensation for Inconvenience During Works) Regulations 1994</td>
<td>1994 No. 2564</td>
<td>S.I. (UK General)</td>
</tr>
<tr>
<td>The Coal Mining Subsidence (Provision of Information) Regulations 1994</td>
<td>1994 No. 2565</td>
<td>S.I. (UK General)</td>
</tr>
<tr>
<td>The Coal Mining Subsidence (Arbitration) Regulations 1994</td>
<td>1994 No. 2566</td>
<td>S.I. (UK General)</td>
</tr>
</tbody>
</table>
8.4.2 Energy Act 2008

The Energy Act 2008 was given Royal Assent on 26 November 2008. It implements the legislative aspects of the Energy white paper 2007: ‘Meeting the energy challenge’.

This Energy Act updates energy legislation to:

- reflect the availability of new technologies (such as Carbon Capture & Storage (CCS) and emerging renewable technologies
- correspond with the UK’s changing requirements for secure energy supply (such as offshore gas storage)
- protect our environment and the tax payer as our energy market changes

Along with the Planning Act 2008[external Link] and Climate Change Act 2008, the Energy Act ensures that our legislation underpins our long-term energy and climate change strategy.

The Act covers:

- offshore gas supply infrastructure: strengthening regulation to allow for private sector investment to help maintain the UK’s reliable energy supplies. This is crucial, as we expect to have to rely on imported gas to meet up to 80 percent of our energy demands by 2020
- Carbon Capture & Storage (CCS): creating regulation that enables private sector investment in CCS projects. CCS has the potential to reduce the carbon emissions from fossil fuel power stations by up to 90 percent
- renewables: strengthening the Renewables Obligation to increase the diversity of our electricity mix, improve the reliability of our energy supplies and help lower carbon emissions from the electricity sector
- feed-in tariffs: enabling the Government to offer financial support for low-carbon electricity generation in projects up to 5 megawatts (MW). The aim is for generators to receive a guaranteed payment for generating low-carbon electricity
decommissioning offshore renewables and oil and gas installations: strengthening our statutory decommissioning requirements to minimise the risk of liabilities falling to the Government

improving offshore oil and gas licensing: improving licensing to respond to changes in the commercial environment and enable DECC to carry out its regulatory functions more effectively

nuclear waste and decommissioning costs: ensuring new nuclear power station operators build up funds to meet the full costs of decommissioning and their share of waste management costs

offshore transmission: amending powers so that Ofgem is able to run offshore transmission licensing more effectively

smart metering: allowing the Secretary of State to modify electricity and gas distribution and supply licences, so the licence holder has to install, or help install, smart meters to different customer segments, including private households

Renewable Heat Incentive: allowing the Secretary of State to establish a financial support programme for renewable heat generated anywhere, from large industrial sites to individual households

housekeeping: various other points covering nuclear security and the transfer of some regulatory functions to DECC

CMM exploration and production licences are awarded during competitive onshore licensing rounds at intervals of between two and three years. There is no premium to be paid for the licences during the bidding process but the criteria on which awards are based are as follows:

Technical competence

Operational capability

Ability to finance the work programme

The permits for which annual rentals are paid to DECC are known as Petroleum Exploration and Development Licences (PEDLs) and are the work programme committed to must be carried out during the various periods of the licence. The periods are as follows:

- Exploration: 6 years
- Appraisal: 5 years
- Production: 20 years

If CMM production is proven and the gas field continues to produce for 31 years, there is an option to extend subject to DECC approval.

Legislation covering the exploration and production of petroleum in the UK was first enacted in 1928 but since then the laws and regulations have been updated many times. There have been many amendments at various intervals since then but the legislation currently in effect and relevant to CMM is listed on the next page.

UK petroleum legislation relevant to CMM operations is as follows:

<table>
<thead>
<tr>
<th>The Petroleum Licensing (Exploration and Production) (Seaward and Landward Areas) (Amendment) Regulations 2006</th>
<th>2006 No. 784</th>
<th>S.I. (UK General)</th>
</tr>
</thead>
</table>
## 8.5 CMM Mining in the UK

It is essential that uncertainty in the planning of a project is kept to a minimum and the following are the important factors required for successful national CMM capture programmes.

- Clear legal framework
- Petroleum or CMM licences allocated by Government
- Gassy coal seams
- Abandoned deep coal mine workings
- Electricity prices >£30/MWh depending on location
- Low cost power grid connections
- Clear planning law and regulations
- Support from local communities
Coal mine methane or mine gas has been used in the UK for more than 100 years as fuel for lighting or to heat pithead baths and offices. In the 19th and early 20th Century it was known as firedamp, an explosive mixture of air and methane, which caused many mine accidents with accompanying loss of many miners lives up until the mid 20th century.

The UK’s private coal mines were nationalised in 1947 when there were over 1,000 collieries operating in coal fields in England, Wales and Scotland. Mine safety become even more important as standardised national mining, ventilation and safety regulations were put in place. The result was a significant reduction in firedamp and other mine accidents and fatalities. The safety record improved continually as the less efficient smaller coal mining operations were shut down and regulations were tightened and strictly enforced.

The 1950’s saw the closure of large numbers of uneconomic pits and the merger of smaller ones into large regional groupings as economies of scale were sought. Mine ventilation systems improved but in the gassier coal areas they had to be augmented by underground methane drainage systems which actively extracted methane from advancing coal faces via boreholes. The gas was piped to the surface mostly for use as fuel in heating systems as a replacement for saleable coal more of which could then be exported.

In the 1970’s and 1980’s a small proportion of this gas was captured and used in small containerised power generation systems to replace electricity imported from the national grid. However the emphasis was on coal production to meet national targets rather than on improving the profitability of individual coal mines by reducing costs through reduced electricity imports. It became clear to British Coal during this period that discharging large quantities of gas to the atmosphere was not only wasteful commercially but was also a major pollution hazard. It therefore issued a policy statement that “wherever possible, methane extracted from mines for safety reasons will be treated as a resource to be used and not wasted”.

The largest CMM power generation plant was built by British Coal at the Harworth mine in the Nottinghamshire coalfield, one of the gassiest mines in Europe. After successful testing of a 500kW engine/generator package a decision was made to build a full scale power station. A cogeneration plant consisting of 2 x 4MW gas turbines and a 10MW steam turbine utilising the high temperature exhaust output was brought into production in 1996 with a gross power output of 18MW and a net exportable power of around 14MW. This power station was housed in a large fixed building but in the late 1990’s more flexible generation systems using containerised packages began to be introduced. The Harworth plant ran successfully until 2005 when, as a result of falling coal prices the mine was put on a care and maintenance basis and the station was mothballed.

From 1994, partly as a result of the initiation of this power generation project at an operating coal mine, Alkane Energy speculated that similar technology could be applied to the CMM reserves which remained in disused coal mines in the UK. The company lobbied the Government successfully to grant licences to exploit this gas. British Coal had by that time adopted the conclusion of the Watt Report (1989) that no recoverable or substantial reserves of methane remained underground following the closure and sealing of a coal mine. British Coal was privatised soon afterwards and the Department of Trade and Industry adopted the same position until lobbying from the potential new industry, local MPs and the House of Lords persuaded them that there were sufficient gas reserves to consider the licensing of these potential reserves using the Petroleum Regulations (1995).

Two years after the initial approach to the DTI, a licensing round was held in 1996 (7th Round of Onshore Licensing) and several companies successfully applied for and were awarded licences over the South Wales, Cheshire, Staffordshire, East Midlands and Yorkshire coalfields in 1997. Following the award of PEDL1 in Nottinghamshire, Alkane started a test programme more or less immediately and proved to the satisfaction of a
venture capital investor that there were sufficient gas reserves in disused mines to justify the construction of decentralised power plants using CMM as fuel.

Within the next three years Steetley, Wheldale, Shirebrook and Hickleton (Octagon Energy) CMM power stations were built in the Nottinghamshire, Derbyshire and South Yorkshire. The total installed generating capacity was 32MW. An additional plant was built at Markham near Bolsover to supply around 6MW of gas for process heating at the local Coalite Chemicals refinery via a 500 metre pipeline. The gas was extracted from the sealed Markham 4 mine shaft but this proved problematic as air influx caused severe dilution of the mine gas. Eventually this pilot project was shut down when rising mine water sealed off the gas emitting from the mine workings nearest the surface.

In the period following the construction and start of operations of these gas extraction and power plants, the UK electricity price began to fall steadily. In 2002/3 the price reached its lowest point in many years at £13.50/MWh which was broadly equivalent to the operating cost of a mine gas plant. All the companies involved kept their existing plants running but slowed or stopped their project development programmes. Towards the end of 2004 market for electricity began to firm up and signalled the beginning of a rise in the power price towards a peak of around £80/MWh reached in Summer 2008.

During the late 1990s, the CMM licence holders, all SMEs, extracted the gas using vacuum pumps and sold it on as fuel to third party generators or industrial gas consumers. This meant that the power generation plants could be built and financed by the third parties reducing the need for the SMEs to raise extra capital for this most expensive part of the project.

A new phase of coal mine methane developments post-2004 was marked by the licensees building their own containerised power generation plants and funding them via lease financing. The exploration/appraisal risk continued to be the same as before but the companies now took the whole value chain from mine to electricity customer. The second innovation was the decision by the licensees not to extract CMM from leaky mine shafts but to drill directly into mine roadways using directional drilling techniques developed in the North Sea.

Coal mines had been mapped with great accuracy and detail under the National Coal Board and British Coal and therefore it was a relatively straightforward task to find the surface geographic locations from which to drill 150 – 750 metre depth boreholes into the metro-like mine tunnels underground. Using this technique and building the power stations at the borehole location, often remote from the mine shaft itself, proved to be a major step in improving the economics of mine gas power generation. This development and an easing of the planning regulations allowed project developers to move generators from concrete cells in large fixed buildings into transportable containerised power plants. The generator packages were built by several companies including Pro2 Anlagentechnik and GAS in Germany based mainly on Deutz (MWM), Jenbacher and Caterpillar engines. Gas extraction and plant control systems were designed and developed by Alkane Energy engineers.

As a result of this new strategy, the quality of the CMM improved substantially from the range 40%-50% to as high as 72% because the vacuum was now applied in the underground roadway at the base of the borehole rather than at the top of the mine shaft. Air influx became a thing of the past and power generation became more stable as the gas quality remained steady over long periods.

Power prices continued to rise until the summer of 2008 when some companies managed to set one year and eighteen month contracts at prices over £70/MWh. This rapid increase in price provided very attractive rates of return and short payback periods and licensees were spurred to increase the rate of development of their project pipelines. The installed CMM
generation capacity rose to around 90MW by mid-2009. In addition to the CMM plants operating on disused mines there is around 26MW of installed capacity using gas from four working collieries bringing the total to more than 116MW.

Since the heady days of 2008, wholesale power prices have halved to around £45/MWh and the development of new projects has once again slowed to a steadier pace reflecting longer payback periods. In the medium term the installed capacity could potentially reach 150MW even allowing for reducing output from older projects which have been running since the late 1990’s. Where CMM volumes fall to uneconomic levels, containerised power generation plants can be moved to new projects or used in situ for electricity generation for peak lopping or tolling using natural gas.

In conclusion, the UK CMM industry has thrived over the past decade and should continue to add to the UK’s strategic power generation capacity albeit on a small scale for many years to come.

8.6 Barriers to Development of CMM

CMM development has progressed rather slowly in the UK as a result of barriers to development the principal one being lack of Government support for prices through the renewable obligation unlike landfill methane which was classified as renewable and as a result grew much more rapidly. In spite of the lack of support CMM plant numbers and installed capacity at disused and working coal mines have grown to 26 and 116MW respectively.

The barriers identified are as follows

Risk capital required from stock market (IPO) or venture capital funds
Few unlicensed areas in coalfields for new entrants
Volatile electricity prices
Costly, difficult to obtain grid connections via monopoly network operator
Complex and long-winded planning consents and regulations
Firmly enforced noise regulations – 24 hour drilling difficult
Nimbyism and emotional campaigns against development - fortunately rare
No development grants available for this innovative technology

The Government has the opportunity to support the industry through the FIT for >5MW power generation in 2010.[8-13]
Fig. 8-7 Typical UK CMM Power Generation Plant
8.7 References

[8-1] IEA 2006
[8-4] Presentation to UNECE 4th Session Ad Hoc CMM Group by Dr. Cameron Davies, CEO
http://www.unece.org/energy/se/pdfs/cmm/4ahge_cmm/6_Davies.pdf 19.10.09 08:44 h
[8-5] Summary of Dr. Davies’ presentation, Written by Dr. Ming Yang, International Energy Agency, 9, rue de la Federation, F-75739 Paris Cedex 15, France Ming.Yang@iea.org, 07 April 2008
[8-6] Statistical pocketbook 2010 Part 2 Energy, online version
[8-10] Source: Digest of Energy Stats.OFGEM
[8-13] Presentation to UNECE 4th Session Ad Hoc CMM Group by Dr. Cameron Davies, CEO http://www.unece.org/energy/se/pdfs/cmm/4ahge_cmm/6_Davies.pdf 20.10.09 16:22