MINISTRY OF ENERGY OF THE REPUBLIC OF LITHUANIA

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To: the European Commission
Directorate-General for Energy
B-1049 Brussels
Belgium

O/R of 10 January 2012 No (9.3-11)-3-107
Y/R of 11 April 2011 No ENER/PL/jma/pc/S-309427

RE: REPORT ON THE PROGRESS TOWARDS INCREASING THE SHARE OF HIGH-EFFICIENCY COGENERATION

Referring to your letter No ENER/PL/jma/pc/S-309427 of 11 April 2011 and implementing the requirements laid down in Articles 6(3) and 10(2) of Directive 2004/8/EC of the European Parliament and of the Council on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EC, the Ministry of Energy of the Republic of Lithuania, having assessed the progress made so far in increasing the share of high-efficiency cogeneration, prepared and hereby submits the report on the progress towards increasing the share of high-efficiency cogeneration.

ENCLOSED: 15 pages.

Vice-Minister for Energy Arvydas Darulis

REPORT OF THE REPUBLIC OF LITHUANIA
IN ACCORDANCE WITH ARTICLES 6(3) AND 10(2) OF DIRECTIVE 2004/8/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL ON THE PROMOTION OF COGENERATION BASED ON A USEFUL HEAT DEMAND IN THE INTERNAL ENERGY MARKET AND AMENDING DIRECTIVE 92/42/EEC

1. Transposition/implementation of the legal text of Directive 2004/8/EC

Question 1. What is the level of transposition of the Directive in your country? What is the timeline for the remaining parts of the transposition of the Directive, if any?

The provisions of the Directive have been transposed into national law and are implemented by the following legal acts of the Republic of Lithuania:

- Resolution No X-1046 of the Seimas of the Republic of Lithuania of 18 January 2007 on the approval of the National Energy Strategy (*Valstybės žinios* (Official Gazette) 2007, No 11-430).
- Law No IX-2307 amending the Law on Electricity of the Republic of Lithuania (Official Gazette 2004, No 107-3964).
- Law No X-1329 amending the Law on Heat Sector of the Republic of Lithuania (Official Gazette 2007, No 130-5259).
- Resolution No 665 of the Government of the Republic of Lithuania of 9 July 2008 on the amendment of Resolution No 307 of the Government of the Republic of Lithuania of 22 March 2004 on the approval of the directions of the heat sector development (Official Gazette 2008, No 82-3244).
- Order No 1-174 of the Minister for Energy of the Republic of Lithuania of 22 June 2010 on the approval of the Cogeneration Development Plan (Official Gazette 2010, No 75-3829).
- Order No 4-206 of the Minister for the Economy of the Republic of Lithuania of 19 May 2008 on the approval of the Rules for issuing guarantees of origin certificates for electricity produced from high efficiency cogeneration (Official Gazette 2008, No 59-2254).
- Order No 1-26 of the Minister for Energy of the Republic of Lithuania of 8 April 2009 on the amendment of Order No 4-206 of the Minister for the Economy of the Republic of Lithuania of 19 May 2008 on the approval of the Rules for issuing guarantees of origin certificates for electricity produced from high efficiency cogeneration (Official Gazette 2009, No 42-1636).
- Order No 1-214 of the Minister for Energy of the Republic of Lithuania of 24 November 2009 on the setting of the list of public service obligations in the electricity sector (Official Gazette 2009, No 140-6158; 2010, No 122-6226).
- Order No 1-219 of the Minister for Energy of the Republic of Lithuania of 24 November 2009 on the approval of the Rules for purchasing power from combined heat and power generators (Official Gazette 2009, No 140-6160; 2010, No 122-6228).
- Order No 1-246 of the Minister for Energy of the Republic of Lithuania of 9 December 2009 on the approval of the procedure and conditions for the connection of energy facilities (networks, installations, systems) of electricity consumers and producers to the operating facilities (networks, installations, systems) of energy companies (Official Gazette 2009, No 149-6678).
- Order No 1-115 of the Minister for Energy of the Republic of Lithuania of 10 July 2009 on the implementation of Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC (Official Gazette 2009, No 85-3605).

Question 2. What is the timeline for implementing measures based on the Commission Decision of 19 November 2008 establishing detailed guidelines? Please indicate how this has taken place (revision of a general energy law, a specific law, decree, regulation…).

Having regard to Commission Decision No 2008/952/EC of 19 November 2008 establishing detailed guidelines for the implementation and application of Annex II of Directive 2004/8/EC of the European Parliament and of the Council, the Rules for issuing guarantees of origin certificates for electricity produced from high efficiency cogeneration were revised by Order No 1-26 of the Minister for Energy of the Republic of Lithuania of 8 April 2009 on the amendment of Order No 4-206 of the Minister for the Economy of the Republic of Lithuania of 19 May 2008 on the approval of the Rules for issuing guarantees of origin certificates for electricity produced from high efficiency cogeneration (Official Gazette 2009, No 42-1636).

Question 3. To what extent do you consider your country to have already significantly implemented the Directive?

The Directive has been already implemented in full.

Question 4. Is your country using the alternative calculation method according to Article 12(2)?

The alternative calculation method is not used.

Question 5. Is there any need for your country to review in accordance with Article 13 the threshold values used for calculation of electricity from cogeneration and/or the threshold values used for calculation of efficiency of cogeneration production and primary energy savings?

Having regard to the Commission Decision which amended Commission Decision 2007/74/EC of 21 December 2006 establishing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2004/8/EC of the European Parliament and of the Council and defined new threshold values to be used for calculation of primary energy savings, relevant amendments will be made in Order No 4-206 of the Minister for the Economy of the Republic of Lithuania of 19 May 2008 on the approval of the Rules for issuing guarantees of origin certificates for electricity produced from high efficiency cogeneration (Official Gazette, 2008, No 59-2254; 2009, No 42-1636) and harmonised efficiency reference values for production of electricity and heat for 2012-2015 will be added to Annex 2 ‘Methodology for determining the efficiency of the cogeneration’ to the aforementioned Order.

2. National potential to increase the share of high-efficiency cogeneration

Question 6. Can your country already show progress in high-efficiency cogeneration since the last report on national potential?

Progress has been made in increasing the share of high-efficiency cogeneration. further details are presented in the answer to Question 7.

Question 7**.** What is your evaluation of the progress towards increasing the share of high-efficiency cogeneration in your country? Your assessment should be based on the specific figures to be included in the attached spreadsheet (Excel file) designed to facilitate the submission of your data?

Our evaluation of the progress made is positive. This is evidenced by the data displayed in the spreadsheet:

<u>Changes in installed electrical and heat capacities in cogeneration plants in 2004–2010</u>

In 2004, energy in combined heat and power (high-efficiency cogeneration) systems was produced by nine cogeneration units (CU) with a total installed electrical capacity of 556 MW and heat capacity of 1117 MW. In 2010, the number of high-efficiency CUs grew up to 32 with an increase in the total electrical capacity up to 777 MW and heat capacity up to 1809 MW, i.e., the number of high-efficiency CUs more than tripled from 2004 to 2010, demonstrating an increase in electrical capacity of up to 221 MW and in heat capacity of up to 692 MW. Changes in the installed electrical and heat capacities in high-efficiency cogeneration plants in Lithuania in 2004–2010 are displayed in Figure 1.

Galia, MW – Capacity, MW
Metai - Year
DEK būdu veikusių KB elektrinė galia, MW – Electrical capacity of high-efficiency cogeneration plants, MW
DEK būdu veikusių KB šiluminė galia, MW – Heat capacity of high-efficiency cogeneration plants, MW
Figure 1. Changes in the installed electrical and heat capacities in high-efficiency cogeneration plants in 2004–2010

Cogeneration development by the types of cogeneration technologies in 2004–2010

In Lithuania, steam condensing extraction turbine-based cogeneration (combined-cycle) units account for the greatest share of high-efficiency CUs by installed capacities. This technology has been used in the biggest CUs in Vilnius, Kaunas and Mažeikiai. In 2004, installed electrical and heat capacities of high-efficiency CUs using this technology in Vilnius and Kaunas power plants amounted to 530 MW and 997 MW, respectively. In 2007, generation of electricity from high-efficiency cogeneration was started in two more, previously insufficiently efficient, cogeneration units in Mažeikiai with a total installed electrical capacity of 160 MW and heat capacity of 560 MW. In 2007-2010, installed electrical and heat capacities of high-efficiency CUs using the aforementioned technology amounted to 690 MW and 1555 MW, respectively.

There were minor changes in the number of electricity production capacities and installed capacities of high-efficiency cogeneration units using the steam back pressure turbine technology: from two CUs of this type with a total installed electrical capacity of 24.75 MW and heat capacity of up to 118 MW in 2004 up to five CUs of the aforementioned type with a total installed electrical capacity of 36 MW and heat capacity of up to 202 MW in 2010.

In Lithuania, the first cogeneration unit with 35 MW electrical capacity and 34 MW heat capacity, based on combined cycle gas turbine with heat recovery, was constructed in Panevėžys in 2008.

Internal combustion engine appears to be the most developed cogeneration technology by electricity production capacities and installed capacities in 2004–2010. This technology has been mostly used by small electricity and heat producers. In 2004, there were 3 high-efficiency internal combustion engine-based cogeneration units with a total installed electrical capacity of 0.52 MW and heat capacity of 0.86 MW. In 2010, this technology was used by 20 CUs with installed electrical and heat capacities of 15.53 MW and 18.27 MW respectively, i.e., electrical capacity increased by more than 30 times and heat capacity – by more than 20 times, as compared to 2004. The dynamics of the development of high-efficiency cogeneration plants with different technologies is shown in Figure 2.

Galia, MW – Capacity, MW
Metai – Year
GKT įrengtoji elektrinė galia , MW el– GKT installed electrical capacity, MWel
GKT įrengtoji šiluminė galia, MW šil – GKT installed heat capacity, MWh
PGT įrengtoji elektrinė galia, MWel – PGT installed electrical capacity, MWel
PGT įrengtoji šiluminė galia, MWšil – PGT installed heat capacity, MWh
KCDT įrengtoji elektrinė galia , MWel– KCDT installed electrical capacity, MWel

KCDT įrengtoji šiluminė galia, MWšil – KCDT installed heat capacity, MWh
VDV įrengtoji elektrinė galia, MWel – VDV installed electrical capacity, MWel
VDV įrengtoji šiluminė galia, MWšil – VDV installed heat capacity, MWh

Figure 2. Electrical and heat capacities of high-efficiency cogeneration plants by cogeneration technologies in 2004–2010

Note: cogeneration technologies used in the figure: GKT – steam condensing extraction turbine, PGT – steam back pressure turbine, KCDT – combined cycle gas turbine with heat recovery, VDV – internal combustion engine. MW_{el} – installed electrical capacity, $MW_{šil}$ – installed heat capacity.

Main types of fuels used by cogeneration units in 2004-2010

The main type of fuels used in CUs has remained the same, i.e., natural gas.

In 2004, the aforementioned type of fuel accounted for some 97 % in the structure of fuels used by high-efficiency power generation capacities; oil and petroleum products represented 2.1 % and biogas accounted for a tiny share of 0.04 %.

In 2010, natural gas represented about 70.8 % in the structure of fuels used by high-efficiency power generation capacities; oil and petroleum products accounted for 19.7 %, solid biomass – for 8.5 % and biogas – for almost 1 %.

The balance of the types of fuels used by high-efficiency power generation capacities in 2004–2010 is illustrated in Figure 3.

Metai – Year
Gamtinės dujos, TWh – Natural gas, TWh
Nafta ir naftos produktai, TWh – Oil and petroleum products, TWh
Biomasė, TWh – Biomass, TWh
Biodujos, TWh – Biogas, TWh

Figure 3. Types of fuels used by high-efficiency power generation capacities in 2004-2010

High-efficiency cogeneration development by sectors from 2004 to 2010

A comparison of the number of, and capacities installed in, CUs of high-efficiency cogeneration plants operating in the industrial sector and in the district heat supply (DHS) sector in 2004–2010 demonstrates a considerable increase in the capacities of power plants of industrial undertakings in the total balance and as relatively compared to the heat supply sector.

In 2004, two cogeneration units in high-efficiency cogeneration plants in the industrial sector had an installed electrical capacity of 1.5 MW and installed heat capacity of 1.9 MW only. In 2010, the number of CUs in industrial sector's high-efficiency cogeneration plants reached 11 and installed electrical and heat capacities reached 172.1 MW and 643 MW, respectively. The biggest contribution to the development of high-efficiency CUs in the industrial sector was from a cogeneration plant owned by the oil refinery. This cogeneration plant, which began operating efficiently in 2007, had an installed electrical capacity of 160 MW and installed heat capacity of 560 MW. The development of high-efficiency cogeneration plants in the industrial sector ranged from 1.5 MW electrical capacity and 1.9 MW heat capacity in 2004 up to 12.1 MW electrical capacity and 83 MW heat capacity in 2010. The dynamics of installed electrical and heat capacities in high-efficiency cogeneration plants in the DHS and industrial sectors are shown in Figure 4.

Galia, WW – Capacity, MW
Metai – Year
CŠT sektorius, MWel. – DHS sector, MWel
CŠĮ sektorius, MWšil. – DHS sector, MWh

Pramonės sektorius, MEel _ industrial sector, MWel
Pramonės sektorius, MWšil. - Industrial sector, MWh

Figure 4. Electrical and heat capacities in high-efficiency cogeneration power plants in the DHS and industrial sectors in the period 2004-2010

Share of electricity and thermal energy produced from high-efficiency cogeneration in 2004–2010

The share of electricity produced from high-efficiency cogeneration has increased in the overall electricity generation balance of the country from 9.91 % in 2004, when electricity generated by way of high-efficiency cogeneration was 1.91 TWh and country's total electricity generation from all sources was 19.27 TWh, up to 31.04 % in 2010, when electricity generated by way of high-efficiency cogeneration was 1.77 TWh and country's total electricity generation from all sources was 5.7 TWh.

The share of thermal energy produced from high-efficiency cogeneration has increased in the overall heat generation balance of the country from 34.16 % in 2004, when heat generated by way of high-efficiency cogeneration was 4.01 TWh and country's total heat generation from all sources was 11.73 TWh, up to 38.98 % in 2010, when thermal energy generated by way of high-efficiency cogeneration was 4.29 TWh and country's total heat generation from all sources was 11.0 TWh.

The percentage shares of electricity and heat produced from high-efficiency cogeneration per year are illustrated in Figure 5 in comparison to electricity and heat generated from all sources.

Metai - Year

DEK būdu pagamintos electros energijos dalis, lyginant su visų šalies elektros energijos gamybos šaltinių pagaminta energija, % – Share of electricity produced by high-efficiency power generation capacities, as compared to the total electricity produced by the country's electricity generation sources, %

DEK būdu pagaminta šilumos energijos dalis, lyginant su visų šalies šilumos energijos gamjybos šaltinioų pagaminta energija, % – Share of heat energy produced by high-efficiency power generation capacities, as compared to the total heat energy produced by the country's heat energy generation sources, %

Figure 5. Shares of electricity and heat energy produced by high-efficiency power generation capacities, as compared to electricity and heat produced by country's power generation capacities in total in the period 2004–2010

As we can see in Figure 5, the big increase in the percentage share of electricity produced by way of high-efficiency cogeneration (from 11.5 % in 2009 up to 31 % in 2010) was a result of the shutdown of the then largest electricity producer, Ignalina Nuclear Power Plant, at the end of 2009.

Primary energy savings and avoided CO_2 emissions through the use of cogeneration to produce energy in 2004–2010

In 2004, generation of electricity and heat energy in CHP plants led to primary energy savings of 1.219 TWh, as compared to non-CHP energy generation (i.e., generation of electricity in a condensing cycle of a power plant, and generation of heat in separate water boilers). This savings indicator kept regularly growing from 2004 to 2010 and reached 1.41 TWh primary energy savings of CHP electricity and heat in 2010.

The amount of fuel or primary energy saved in the generation of energy by way of high-efficiency cogeneration also means reduced emissions. In 2004, production of CHP energy resulted in 232.7 thousand tonnes reduction in carbon dioxide emissions. The indicator for primary energy savings kept regularly growing from 2004 to 2010 as did CO_2 savings. In 2010, 246 thousand tonnes reduction in carbon dioxide emissions was achieved in the production of CHP energy. Changes in the amounts of primary energy used and saved by high-efficiency CUs, as well as avoided CO_2 emissions, in 2004–2010 are reflected in Figure 6.

Metai - Year
Energijai gaminti DEK būdu sunaudotas pirminės energijos kiekis, TWh – Amount of primary energy used by high-efficiency CUs for energy generation, TWh
Sutaupytas pirminės energijos kiekis, TWh – Primary energy amount saved, TWh
Sutaupytas CO_2 kiekis, 100 tūkst. tonų CO_2 – CO_2 amounts avoided, CO_2 /100 thou tonnes

Figure 6. Amounts of primary energy used and saved by high-efficiency CUs, as well as avoided CO_2 emissions, in 2004–2010

3. Barriers to high-efficiency cogeneration

Question 8. Please give your views on the current barriers to high-efficiency cogeneration in your country:

- barriers in relation to administrative procedures (authorization, coordination among competent authorities, streamlined simplified procedures, etc.);

There are no fundamental barriers.

- barriers in relation to electricity grid system and tariff issues (including specific measures for small scale and micro cogeneration units);

There are no fundamental barriers.

- other barriers (internalisation of external costs, energy prices, financial & technical barriers, etc.) in accordance with Articles 6 and 9 of the Cogeneration Directive 2004/8/EC.

Natural gas, which is the main type of fuel used in cogeneration plants, is supplied from a single source – Russia. This makes it difficult to forecast natural gas price variations and poses the risk of disruptions in supplies. It is a factor impeding the development of natural gas-fired cogeneration plants. There are several alternatives for ensuring reliable gas supplies, of which the construction of a liquefied natural gas terminal in Klaipėda constitutes the most economically advantageous alternative. Another weighty alternative, which has a strategic importance in regional terms, includes a gas link to Poland enabling the connection of Baltic States' gas grids to Poland and Western Europe.

One more barrier to cogeneration is that a natural gas transmission system is underdeveloped in the western part of the country and this has negative implication for cogeneration developments in the region. To overcome this barrier, a new gas pipeline from Jurbarkas to Klaipėda is planned to be built by 2014 to connect the future liquefied natural gas terminal to the Lithuanian natural gas transmission system and thus form a natural gas transmission circle system. This would create more favourable conditions for the development of cogeneration in the western region of Lithuania.

4. Guarantees of origin and support schemes

Question 9. Article 5 of the Directive requires Member States to ensure that accurate and reliable guarantees of origin are issued according to objective, transparent and non-discriminatory criteria. Please indicate what is the situation concerning the implementation of this measure in your country (information on primary energy savings, type of registration system).

The Rules for issuing guarantees of origin certificates for electricity produced from high efficiency cogeneration (hereinafter referred to as 'the Rules') were approved by Order No 4-206 of the Minister for the Economy of the Republic of Lithuania of 19 May 2008 (Official Gazette 2008, No 59-2254). The Rules stipulate that an undertaking transacting the functions of an electricity transmission system operator (TSO) is a body responsible for the issue and withdrawal of guarantees of origin certificates for electricity produced from high efficiency cogeneration (hereinafter referred to as 'guarantees of origin certificates'). The TSO keeps a register of entities managing cogeneration plants. Information on the registered guarantees of origin certificates, the quantities of electricity produced from high-efficiency cogeneration and the amounts of primary energy savings are available on TSO's website http://www.litgrid.eu/go.php/Efektyv_kogener.

Question 10. Does your country have support schemes for cogeneration/CHP based on Directive 2004/8/EC (operational and/or investment aid)? What kind of support is provided (feed-in tariffs, certificates and quota, priority access to the grid…)? Are they designed to provide stable long-term investment conditions? Which sectors will be targeted (agricultural and/or industrial and/or heating cogeneration)?

In Lithuania, cogeneration (combined heat and power) plants are supported under the mechanism of public service obligations (PSO). The support is granted to the power plants supplying heat to heating systems (district heat supply systems). The support is targeted towards heat cogeneration based on a useful demand of heat. The scopes of production of electricity from cogeneration and electricity feed-in tariffs are approved on an annual basis.

Article 4 of Law No X-1329 amending the Law on Heat Sector of the Republic of Lithuania (Official Gazette 2007, No 130-5259) stipulates that cogeneration of heat and electricity shall be a public service obligation.

The Law on Electricity of the Republic of Lithuania defines the services provided by electricity undertakings the list of which shall be set by the Government of the Republic of Lithuania or a body authorised by it with account of public interests in the electricity sector as the compatible with the public service obligations. Order No 1-214 of the Minister for Energy of the Republic of Lithuania of 14 November 2009 on the setting of the list of public service obligations in the electricity sector (Official Gazette 2009, No 140-6158) defines electricity generation in cogeneration plants which supply heat to heating systems as the public service obligation in the electricity sector.

Application of support for heat cogeneration is governed by the Rules for purchasing power from combined heat and power generators, as approved by Order No 1-219 of the Minister for Energy of the Republic of Lithuania of 24 November 2009 (Official Gazette 2009, No 140-6160; 2010, No 122-6228). The Rules regulate the establishment of annual purchase quotas for electricity generated in cogeneration plants using non-renewable energy sources and the ways of purchasing such electricity. For cogeneration plants, the ratio of rated electric and thermal input shall be at least 0.45 and total efficiency in electricity generation shall be at least 75 %. Basing on the total estimated amount of electricity sales, actual supplies of electricity over the past three years and the forecast for electricity demands as well as having regard to point 25 of the National Energy Strategy approved by Resolution No X-1046 of the Seimas of the Republic of Lithuania of 18 January 2007 (Official Gazette 2007, No 11-430), stipulating that the share of the electricity generated in cogeneration plants should account for at least 35 % in the electricity generation balance by 2025, the Minister for Energy of the Republic of Lithuania sets the annual scope for purchasing electricity from cogeneration and the three-year purchase forecast. The rules and conditions for the purchase, calculation and compensation of price differences are established in the Procedure for the fulfilment of public service obligations, as approved by an order of the Minister for Energy of the Republic of Lithuania.

The National Control Commission for Prices and Energy (hereinafter referred to as the VKEK Commission), acting in compliance with the Rules for the establishment of prices for the buying-up of electricity from cogeneration electricity producers, sets the price for the electricity that must be purchased on a mandatory basis. The Rules do not specify the feed-in price in respect of each power plant separately. The feed-in (purchase) price is a product of basic electricity price, which is the same for all power plant groups, and a ratio categorising a capacity value. On the basis of installed electrical capacity, power plants are attributed to one of the following 3 groups: group I – electrical capacity of more than 50 MW, group II – electrical capacity of 5 to 50 MW, group III – electrical capacity of up to 5 MW. The basic electricity price is subject to recalculation on an annual basis, taking into account changes in natural gas prices. The average natural gas price is calculated in accordance with futures assessments for the 1 % sulphur content of fuel oil and 0.2% sulphur content of gasoil published by international information agency Platts and the exchange rate between the euro and the U.S. dollar published by the Chicago Stock Exchange.

Question 11. How much money on a yearly basis has been provided in this way in the past years to the promotion of high-efficiency cogeneration in particular? And how much money is expected to be made available on a yearly basis to the promotion of high-efficiency cogeneration in the coming years?

Support for high-efficiency cogeneration plants using fossil fuel

Support funds for cogeneration plants using fossil fuel, from which electricity output was purchased at premium prices in accordance with the electricity generation volumes established by the Minister for Energy of the Republic of Lithuania, are indicated in Table 1.

Table 1. PSO funds appropriated for cogeneration plants (data provided by the VKEK Commission)

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
Funds, mio. LTL	**85.3**	**91.5**	**98**	**162.4**	**160.4**	**301.3**	**35.7**	**85.7**	**117.6**

The amount of PSO funds payable to electricity producers for 1 kw-hr of supported electricity supplied to the network is defined as the difference between the buying-up (feed-in) price established by the VKEK Commission and the forecast market price. The shutdown of the Ignalina Nuclear Power Plant, which was the largest producer of electricity consumed in the country, at the end of 2009 resulted in a more than double increase in the electricity generation price in 2010. The difference between the feed-in price set by the VKEK Commission and the market price has dramatically shrunk. This resulted in a more than eight-fold reduction in support funding for cogeneration plants in 2010, as compared to 2009.

Metai - Year

Figure 7. Quantities of supported electricity purchased and estimated from cogeneration plants

Figure 7 illustrates the quantities of supported electricity purchased from cogeneration plants in 2004–2010 and purchase estimates for 2011 and 2012. In the future, it is planned to follow the principle of gradual reduction of support for heat cogeneration using fossil fuels by establishing a gradual reduction in the annual quantities of supported electricity from this type of cogeneration: 900 GWh in 2012, 800 GWhin 2013, 700 GWh in 2014 and 600 GWh in 2015.

Support for power plants using biomass for electricity generation

Support for cogeneration using biomass is to be gradually increased in the future. Figure 8 illustrates the development of power plants using biomass for electricity generation up to 2020, as forecast in the National Renewable Energy Development Strategy approved by Resolution No 789 of the Government of the Republic of Lithuania of 21 June 2010.

Figure 8. Anticipated development of total electrical capacities in biomass power plants in 2010–2020

The Law on Renewable Energy was adopted by the Seimas of the Republic of Lithuania on 12 May 2011 (Official Gazette 2011, No 62-2936. The Law provides for even greater development of biomass power plants – it is planned to increase installed electrical capacities by up to 355 MW by 2020.

Electricity from biomass, same as in case of electricity from any other renewable sources, is promoted under the Procedure for the fulfilment of public service obligations established by the Government. The procedure provides for promoted quotas and fixed tariffs. The fixed tariff shall be applied to electricity generated from renewable sources in respect of which a guarantee of origin has been issued in the statutory procedure.

The fixed tariffs shall be set and promotion quotas shall be established by auctions. The promotion quotas and auction regions shall be defined and approved by the Government. The auctions shall be held in the regions where power plants are connected to the networks, in respect of each group of electricity producers, by the time limits set by the VKEK Commission.

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR ENERGY

Spreadsheet designed to facilitate the submission of specific data and the assessment of the progress made towards increasing the share of high-efficiency cogeneration in accordance with Articles 6(3) and 10(2) of Directive 2004/8/EC of the European Parliament and of the Council on the promotion of cogeneration based on a useful heat demand in the internal energy market

Note.
All cells in light yellow must be filled in.

Page 1 Review				Production of electricity from cogeneration [1], capacity and quantities of fuel used	Production, capacity and quantities of fuel used by main activity producers	Production, capacity and quantities of fuel used by autoproducers	Share of cogeneration, as compared to aggregate electricity generation	Cogeneration heat production*	By main activity producers*	By autoproducers *	Share of cogeneration, as compared to aggregate heat generation	New cogeneration facilities [1]	Modernisation of existing cogeneration facilities [1]	Total facilities (CHP and non-CHP) [2]	PES [3]	Avoided C02 emissions
2000**	electricity	capacity	[GW]											6.158	0.000 PJ	tC02
		production	[TWh]											11.420		
	heat	capacity	[GW]											11.884		
		production	[TWh]													
	fuel	total	[PJ]											0.000		
		natural gas	[PJ]													
		anthracite	[PJ]													
		lignite														
		renewable energy sources	[PJ]													
		oil & petroleum products	[PJ]													
		biomass	[PJ]													
		biogas	[PJ]													
		waste combustion	[PJ]													
		landfill gas	[PJ]													
		other fuels**	[PJ]													
2004	electricity	capacity	[GW]	0.556	0.555	0.00147	9.91%					0.0000440		6,127	4.354 PJ	232.692 tCO2
		production	[TWh]	1.910	1.9C4	0.00582						0.0001970		10270		
	heat	capacity	[GW]					1.117	1.115	0.00190	34.16%	0.0000900		8.041		
		production	[TWh]					4.008	4.003	0.00485		0.0004410		11.734		
	fuel	total	[PJ]	25.044	24.984	0.05962						0.0026188		240.691		
		natural gas	[PJ]	24.497	24.447	0.04963						0.0026188		54.192		
		anthracite	[PJ]													
		lignite														
		renewable energy sources	[PJ]											1.641		
		oil & petroleum products	[PJ]	0.537	0.537	0.00000						0.0000000		7.129		
		biomass	[PJ]	0.000	0.000	0.00000						0.0000000		6.451		
		biogas	[PJ]	0.000	0.000	0.00999						0.0000000		0.033		
		waste combustion	[PJ]													
		landfill gas	[PJ]													
		other fuels***	[PJ]											171.245		
2005	electricity	capacity	[GW]	0.557	0.057	0.00015	13.20%					0.00169		4,557	4.543 PJ	241.344 tC02
		production	[TWh]	1.951	1.950	0.00070						0.00479		14,780		
	heat	capacity	[GW]					1.118	1.118	0.00020	34.94%	0.00239		8.056		
		production	[TWh]					4.083	4.082	0.00106		0.00659		11.684		
	fuel	total	[PJ]	25.476	25.459	0.00710						0.04757		191.096		
		natural gas	[PJ]	25.238	25.231	0.00710						0.03044		57.134		
		anthracite	[PJ]													
		lignite														
		renewable energy sources	[PJ]											1.754		
		oil & petroleum products	[PJ]	0.221	0.221	0.00000						0.00000		6.058		
		biomass	[PJ]	0.000	0.000	0.00000						0.00000		6.337		
		biogas	[PJ]	0.017	0.017	0.00000						0.01713		0.042		
		waste combustion	[PJ]													
		landfill gas	[PJ]													
		other fuels***	[PJ]											119.770		
2006	electricity	capacity	[GW]	0.560	0.556	0.00345	11.24%					0.00021		4.962	3.551 PJ	184.191 tCO2
		production	[TWh]	1.401	1.396	0.00479						0.00136		12.460		
	heat	capacity	[GW]					1.163	1.102	0.06070	25.47%	0.00033		9.778		
		production	[TWh]					3.153	3.114	0.03942		0.00212		12.380		
	fuel	total	[PJ]	19.039	18.870	0.16872						0.01499		171.533		
		natural gas	[PJ]	18.245	18.089	0.15615						0.01499		53.699		
		anthracite	[PJ]													
		lignite														
		renewable energy sources	[PJ]											1.553		
		oil & petroleum products	[PJ]	0.262	0.262	0.00000						0.00000		7.263		
		biomass	[PJ]	0.490	0.490	0.00000						0.00000		7.332		
		biogas	[PJ]	0.042	0.029	0.01257						0.00000		0.042		
		waste combustion	[PJ]													
		landfill gas	[PJ]													
		other fuels***	[PJ]											101.644		

2007	electricity	capacity	[GW]	0.722	0.556	0.16535	12.29%					0.00190	4.960		
		production	[TWh]	1,720	1.466	0.25431						0.00649	14.000		
	heat	capacity	[GW]					1.723	1.102	0.62110	35.95%	0.00240	9.480	4.569 PJ	243.834 tC02
		production	[TWh]					4.015	3.239	0.77582		0.00647	11.169		
	fuel	total	[PJ]	24.274	19.762	4.51240					185.688	0.06981	179.926		
		natural gas	[PJ]	18.180	17.920	0.25973						0.06426	50.044		
		anthracite	[PJ]										0.246		
		lignite													
		renewable energy sources	[PJ]										1.959		
		oil & petroleum products	[PJ]	4.781	0.546	4.23504						0.00000	3.919		
		biomass	[PJ]	1.263	1.263	0.00000						0.00000	7.615		
		biogas	[PJ]	0.051	0.033	0.01764						0.00555	0.048		
		waste combustion	[PJ]												
		landfill gas	[PJ]												
		other fuels***	[PJ]										116.095		
2008	electricity	capacity	[GW]	0.767	0.601	0.16550	12.34%					0.03635	5.030		
		production	[TWh]	1.713	1.539	0.17419						0.10943	13.880	4.451 PJ	234.227 tC02
	heat	capacity	[GW]					1,781	1.160	0.62140	36.35%	0.03559	9.896		
		production	[TWh]					3.827	3.239	0,58844		0.11577	10.526		
	fuel	total	[PJ]	23.550	20.193	3.35782						1.04442	178.120		
		natural gas	[PJ]	17.935	17.766	0.16912						1.02800	45.603		
		anthracite	[PJ]												
		lignite													
		renewable energy sources	[PJ]										1.846		
		oil & petroleum products	[PJ]	4.156	1.001	3.15716						0.00000	5,258		
		biomass	[PJ]	1.389	1.369	0.00000						0.00000	8.987		
		biogas	[PJ]	0.069	0.037	0.03153						0.01642	0.029		
		waste combustion	[PJ]												
		landfill gas	[PJ]												
		other fuels***	[PJ]										116.295		
2009	electricity	capacity	[GW]	0.765	0.597	0.16754	11.50%					0.00065	5.070		
		production	[TWh]	1.761	1.538	0.22331						0.00044	15.320	4.677 PJ	242,948 tC02
	heat	capacity	[GW]					1.780	1.155	0.62412	38.62%	0,00089	9.621		
		production	[TWh]					4,050	3.321	0,72657		0.00065	10,486		
	fuel	total	[PJ]	24.956	20.751	4.20413						0.00452	192.519		
		natural gas	[PJ]	17.088	16.856	0.23210						0.00000	45.208		
		anthracite	[PJ]												
		lignite	[PJ]												
		renewable energy sources	[PJ]										2.306		
		oil & petroleum products	[PJ]	5.820	1.898	3.92185						0.00000	7.041		
		biomass	[PJ]	1.939	1.939	0.00000						0.00000	10.484		
		biogas	[PJ]	0.109	0.059	0.05019						0.00452	0.108		
		waste combustion	[PJ]												
		landfill gas	[PJ]												
		other fuels***	[PJ]										127.372		
2010	electricity	capacity	[GW]	0.777	0.605	0.17212	31.04%					0.00180	3.872		
		production	[TWh]	1.769	1.596	0.17315						0.00492	5.7O0		
	heat	capacity	[GW]					1.809	1.166	0.64325	38.96%	0.01676	8.961	5.037 PJ	246.004 tC02
		production	[TWh]					4.288	3,579	0,70970		0.03789	11.001		
	fuel	total	[PJ]	25.674	21.741	3.93273						0.19689	78.042		
		natural gas	[PJ]	18.178	17.834	0.34328						0.02308	58.189		
		anthracite	[PJ]												
		lignite	[PJ]												
		renewable energy sources	[PJ]										2.939		
		oil & petroleum products	[PJ]	5.051	1.844	3.20770						0.00000	6.134		
		biomass	[PJ]	2.190	2.017	0.17381						0.17381	10.552		
		biogas	[PJ]	0.254	0.046	0.20799						0.00000	0.229		
		waste combustion	[PJ]												
		landfill gas	[PJ]												
		other fuels***	[PJ]												

[1] Only in relation to high-efficiency cogeneration under Article 3 of Directive 2004/8/EC and Annex III thereto.

[2] Electricity and heat generation facilities of all types.

[3] As compared with separate production of electricity and heat.

Notes:

* Total fuel used in the cogeneration process is attributed to electricity generation (column F).

** No detail data are available for 2000.

*** Nuclear power.

Page 2				TOTAL*	Industry	Residential, commercial buildings/installations and services				Other
						District heat supply	Non-district heat supply	Micro cogeneration units	District cooling supply	
2000**	electricity	capacity	[GW]	0.000						
		production	[TWh]	0.000						
	heat	capacity	[GW]	0.000						
		production	[TWh]	0.000						
	fuel	quantities used	[PJ]	0.000						
2004	electricity	capacity	[GW]	0.556	0.0015	0.5550				
		production	[TWh]	1.910	0.0058	1.9043				
	heat	capacity	[GW]	1.117	0.0019	1.1154				
		production	[TWh]	4.008	0.0049	4.0034				
	fuel	quantities used	[PJ]	25.044	0.0596	24.9844				
2005	electricity	capacity	[GW]	0.557	0.0002	0.5568				
		production	[TWh]	1.951	0.0007	1.9502				
	heat	capacity	[GW]	1.118	0.0002	1.1180				
		production	[TWh]	4.083	0.0011	4.0816				
	fuel	quantities used	[PJ]	25.476	0.0071	25.4687				
2006	electricity	capacity	[GW]	0.560	0.0035	0.5563				
		production	[TWh]	1.401	6.0048	1.3959				
	heat	capacity	[GW]	1.163	0.0607	1.1023				
		production	[TWh]	3.153	0.0394	3.1135				
	fuel	quantities used	[PJ]	19.039	0.1687	18.8705				
2007***	electricity	capacity	[GW]	0.722	0.1654	0.5563				
		production	[TWh]	1.720	0.2543	1.4660				
	heat	capacity	[GW]	1.723	0.6211	1.1023				
		production	[TWh]	4.015	0.7758	3.2392				
	fuel	quantities used	[PJ]	24.274	4.5124	19.7617				
2008	electricity	capacity	[GW]	0.767	0.1655	0.6010				
		production	[TWh]	1.713	0.1742	1.5393				
	heat	capacity	[GW]	1.781	0.6214	1.1599				
		production	[TWh]	3.827	0.5884	3.2389				
	fuel	quantities used	[PJ]	23.550	3.3578	20.1927				
2009	electricity	capacity	[GW]	0.765	0.1676	0.5969				
		production	[TWh]	1.761	0.2233	1.5379				
	heat	capacity	[GW]	1.780	0.6241	1.1555				
		production	[TWh]	4.050	0.7286	3.3212				
	fuel	quantities used	[PJ]	24.956	4.2041	20.7514				
2010	electricity	capacity	[GW]	0.777	0.1721	0.6046				
		production	[TWh]	1.769	0.1731	1.5963 .				
	heat	capacity	[GW]	1.809	0.6433	1.1660				
		production	[TWh]	4.288	0.7097	3.5788				
	fuel	quantities used	[PJ]	25.674	3.9328	21.7408				

* Basing on the calculations, technical and production data are presented only in respect of the power plants whose cogeneration process meets the definition of high-efficiency cogeneration set out in Directive 2004/8/EC, i.e.:

High efficiency cogeneration means a cogeneration process providing fuel (primary energy) savings of at least 10% compared with the references for separate production of heat and electricity, or providing fuel savings of at least 0% for a cogeneration unit with a capacity below 1 MW.

** No detail data are available for 2000.

*** The calculation show that electricity production indicators in one large industrial power plant were below the indicators for high-efficiency energy in 2000-2006. From 2007, results of the energy generation in this power plant started meeting the indicators for the high-efficiency process. Therefore, the column for industry reflects an increase in capacities and energy output from 2007.

Page 3 Technologies				TOTAL	Combined cycle gas turbine with heat recovery	Steam back-pressure turbine	Steam condensing extraction turbine	Gas turbine with heat recovery	Internal combustion engine	Micro-turbines	Stirling engines	Fuel cells	Steam engines	Organic Rankine cycles	Any other type [4]
2000"	electricity	capacity	[GW]	0.000											
		production	[TWh]	0.000											
	heat	capacity	[GW]	0.000											
		production	[TWh]	0.000											
	fuel	quantities used	[PJ]	0.000											
2004	electricity	capacity	[GW]	0.556	0.000		0,025	0,530	0.001	0.001					
	heat	capacity	[GW]		0.000		0.148	0.755	0.005	0.002					
	fuel	quantities used	[PJ]	1.117	0.000		0.118	0.997	0.001	0.001					
				4.008	0.000		0.739	3.262	0.003	0.004					
	electricity	capacity	[GW]	25.044	0.000		3.495	21.475	0.050	0.025					
2005	electricity	capacity	[GW]	0.557	0.000		0.025	0.530	0.000	0.002					
		production	[TWh]	1.951	0.000		0.143	1.801	0.000	0.007					
	heat	capacity	[GW]	1.118	0.000		0.118	0.997	0.000	0.003					
		production	[TWh]	4.083	0.000		0.716	3.356	0.000	0.010					
	fuel	quantities used	[PJ]	25.476	0.000		3.407	21.997	0.000	0.071					
2006	electricity	capacity	[GW]	0.560	0.000		0.027	0.530	0.000	0.003					
		production	[TWh]	1.401	0.000		0.126	1.265	0.000	0.010					
	heat	capacity	[GW]	1.163	0.000		0.162	0.997	0.000	0.004					
		production	[TWh]	3.153	0.000		0.600	2.539	0.000	0.014					
	fuel	quantities used	[PJ]	19.039	0.000		2.992	15.941	0.000	0.106					
2007	electricity	capacity	[GW]	0.722	0.000		0.027	0.690	0.000	0.005					
		production	[TWh]	1.720	0.000		0.144	1.559	0.000	0.018					
	heat	capacity	[GW]	1.723	0.000		0.162	1.555	0.000	0.006					
		production	[TWh]	4.015	0.000		0.664	3.328	0.000	0.023					
	fuel	quantities used	[PJ]	24.274	0.000		3.435	20.650	0.000	0.189					
2008	electricity	capacity	[GW]	0.767	0.035		0.030	0.690	0.000	0.012					
		production	[TWh]	1.713	0.107		0.144	1.421	0.000	0.040					
	heat	capacity	[GW]	1.781	0.034		0.178	1.555	0.000	0.014					
		production	[TWh]	3.827	0.113		0.660	3.007	0.000	0.047					
	fuel	quantities used	[PJ]	23.550	1.017		3.502	18.635	0.000	0.397					
2009	electricity	capacity	[GW]	0.765	0.035		0.030	0.690	0.001	0.009					
		production	[TWh]	1.761	0.181		0.145	1.408	0.000	0.028					
	heat	capacity	[GW]	1.780	0.034		0.178	1.555	0.001	0.011					
		production	[TWh]	4.050	0.184		0.799	3.033	0.000	0.034					
	fuel	quantities used	[PJ]	24.956	1.751		3.953	18.943	0.000	0.303					
2010	electricity	capacity	[GW]	0.777	0.035		0.036	0.690	0.000	0.016					
		production	[TWh]	1.769	0.1 80		0.220	1.317	0.000	0.053					
	heat	capacity	[GW]	1.809	0.034		0.202	1.555	0.000	0.018					
		production	[TWh]	4.288	0.172		1.043	3.010	0.000	0.062					
	fuel	quantities used	[PJ]	25.674	1.589		5.186	18.340	0.000	0.580					

* Basing on the calculations, technical and production data are presented only in respect of the power plants whose cogeneration process meets the definition of high-efficiency cogeneration set out in Directive 2004/8/EC, i.e.:

High efficiency cogeneration means a cogeneration process providing fuel (primary energy) savings of at least 10% compared with the references for separate production of heat and electricity, or providing fuel savings of at least 0% for a cogeneration unit with a capacity below 1 MW.

** No detail data are available for 2000.