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Director General of Energy Section

**MINISTRY OF ECONOMY  
OF THE SLOVAK REPUBLIC**

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Bratislava: 10 October 2011  
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Dear Director-General,

In your letter from 11 April 2011 the Commission requested The Slovak Republic to submit a report based on Article 6 paragraph 3 of the 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.

Please find attached the requested Report on progress towards increasing the share of high-efficiency cogeneration in the annex of this to this letter.

Best regards

CC: H.E. Mr. I. **Korčok**, Ambassador, Permanent Representation of the Slovak Republic  
to the European Union

Mr. Philip Lowe  
Director-General  
Directorate-General Energy  
European Commission  
Brussels  
Belgium

# Report on progress towards increasing the share of high-efficiency cogeneration

Article 6 paragraph 3 of Directive 2004/8/EC

# **1. Transposition of Directive 2004/8/EC into Slovak law**

## **1.1. Completing the transposition of the Directive**

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 (OJ Special Edition 12/vol. 003, p 3) has now been fully transposed into Slovak law.

The first draft of the transposition of the Directive was approved under Resolution No 811 of the Government of the Slovak Republic of 26 September 2007 and presented for debate to the National Council of the Slovak Republic (hereinafter the “NCSR”). After the first reading of the government bill for the Act and subsequent discussion in committees, the following committees of the NCSR agreed to the submitted government bill:

- Constitutional Committee of the National Council of the Slovak Republic (Resolution No 285 of 14 November 2007),
- Committee of the National Council of the Slovak Republic for Agriculture, the Environment and Nature Conservation (Resolution No 197 of 20 November 2007),
- Committee of the National Council of the Slovak Republic for Public Administration and Regional Development (Resolution No 124 of 20 November 2007)
- Committee of the National Council of the Slovak Republic for Finance, the Budget and the Currency Resolution No 223 of 21 November 2007).

The Committee of the National Council of the Slovak Republic for Economic Policy (Resolution No 244 of 26 November 2007) recommended that the NCSR return the bill for further completion. On the basis of this Resolution, the Government of the Slovak Republic withdrew the bill on the grounds that the bill to support high-efficiency combined production would be submitted together with a bill to support renewable energy sources.

Resolution No 208 of the Government of the Slovak Republic of 18 March 2009 approved the government bill on supporting renewable energy sources and high-efficiency combined production and amending certain other acts, which was passed by the NCSR on 19 June 2009. Act No 309/2009 on support for renewable energy sources and high-efficiency combined production and amending certain other acts and Decree No 599/2009 of the Ministry of Economy implementing certain provisions of the Act on support for renewable energy sources and high-efficiency combined production fully implemented Directive 2004/8/EC.

## **1.2. Timetable for the measures based on Commission Decision 2008/952/EC**

Since 1 January 2010, the calculation of the amount of electricity produced through the high-efficiency combined production has been determined by Decree No 599/2009 of the Ministry of Economy implementing certain provisions of the Act on support for renewable energy sources and high-efficiency combined production. In its approach to the calculation, the Decree refers directly to Commission Decision 2008/952/EC establishing detailed guidelines for the implementation and application of Annex II to Directive 2004/8/EC of the European Parliament and of the Council. For the purposes of setting the actual ratio of electricity to heat, a balance period of at least one hour is specified. For calculating the overall amount of electricity produced through high-efficiency combined production, a balance period of one year is used. The Decree

specifies a long-term average annual air temperature of +9°C.

### **1.3. Level of implementation of the Directive**

The Slovak Republic has implemented Directive 2004/8/EU in full. As of 1 January 2010, all of the implemented provisions are applied in practice.

### **1.4. Alternative method of calculation**

Since 1 January 2011, the Slovak Republic has not used the alternative method of calculation under Article 12(2) of Directive 2004/8/EC.

### **1.5. Threshold values and harmonised reference values**

On the basis of practical experience in calculating the overall efficiency of combined production plants, there is a need to justify why the overall efficiency values stated in Annex II to Directive 2004/8/EC, i.e. 80% or 75%, are set without regard to the type of fuel used. It is also necessary to justify why, for combined production plants with a steam condensing extraction turbine, the same value (80%) has been set as for plants with a combustion (gas) turbine with a combined cycle and heat recovery.

In connection with setting the actual power to heat ratio ( $C_{\text{actual}}$ ), it would be useful from a practical standpoint to provide a clear definition of combined production. For practical purposes, it is not clear from the present definition whether full combined production involves achieving the threshold values for overall efficiency of a combined production plant (75% - 80%), or involves cases where it is possible to supply the maximum amount of usable heat, limited by the heat production of the combined production plant, or by the input of the heat pipes into which the usable heat is supplied.

In 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, it is stated in the explanatory statement that “By contrast, the analysis showed that concerning the harmonised efficiency reference values for separate production of heat a distinction relating to the year of construction was not necessary as the net energy efficiency of boilers has hardly improved in the period covered by the analysis”, but in such a case it is necessary to explain why the efficiency values are the same (86%) for the separate production of heat for lignite/lignite pellets, peat/peat pellets and “wood fuel”, while a distinction (of 41.8% - 33%) is drawn for the separate production of electricity, depending on the type of fuel used and the year of production. Since overall efficiency is influenced considerably by the efficiency of the combustion equipment, it is at first sight illogical to specify efficiency simply in relation to the production of electricity. If, when setting reference values for the separate production of electricity, the best available technology was used, with low input steam parameters, the possibility should be considered of establishing reference values for the separate production of electricity that depend on the heat cycle used, i.e. for example the Clausius-Rankine cycle or ORC.

With respect to the fuel types listed in Commission Decision 2007/74/EC, and the possibility of splitting a plant into two virtual parts pursuant to Commission Decision 2008/952/EC in cases where the threshold values for the overall efficiency of a combined production plant (75% - 80%) are not achieved, it is not possible to determine in practical terms whether steam condensing extraction turbines involving the use of nuclear fuel constitute an example of high-efficiency combined production. Since this technology is used in the Slovak Republic, it is necessary to specify the harmonised reference values for separate production of electricity based on nuclear fuel and separate heat production based on nuclear fuel. At present, the Slovak Republic uses the reference values specified for waste heat in the calculation.

## **2. National potential for increasing the share of high-efficiency combined production**

### **2.1. Progress in the area of high-efficiency combined production resulting from the introduction of support mechanisms**

Although support for combined production was not guaranteed in advance until 2010, a specific form of support was applied in practice from 2005. The support was applied on the basis of the following generally binding legal documents:

- Act No 656/2004 on energy,
  - Government Regulation No 124/2005 laying down rules for the functioning of a market in electricity,
  - Government Regulation No 317/2007 laying down rules for the functioning of a market in electricity,
  - Office for Network Industries Order No 2/2005, 2006, 2007, 2008, determining the scope of price regulation in electricity generation and the method of its implementation, scope and structure of legitimate costs, the method of determining the level of adequate profit and the supporting documents for price proposals,
- Act No 657/2004 on heat energy,
  - Decree No 136/2005 of the Ministry of Economy of the Slovak Republic setting out rules for the production of heat and electricity through combined production of heat and electricity.

Where the technical conditions of the system made it possible, on the basis of the aforementioned regulations, a preferential right to the transmission of electricity or the distribution of electricity was accorded to combined production plants with an installed output of

- up to 5 MW, applying to all the electricity produced in such plants,
- over 5 MW, applying only to electricity produced together with usable heat.

Under Government Regulation No 317/2007, for covering losses in the transmission and distribution of electricity, system operators gave preference to the purchase of electricity produced

- from renewable energy sources,
- in combined production plants,
- from domestic coal.

Government Regulation No 317/2007 specified in more detail the purchase of electricity to cover losses in the distribution of electricity in a distribution system. It applied only to distribution systems in which the annual distribution was greater than 1 500 GWh. A regulated purchase price was also introduced for electricity produced by combined production.

An overview of the regulated purchase prices of electricity produced by combined production is provided in Annex No 1. Until 2010, regulated prices were amended annually, always applying for just one calendar year. The price of primary energy sources was also taken into account in the regulated price.

In 2010, since a reduction was considered in the prices of some primary energy sources, in particular natural gas, the Regulatory Office for Network Industries in some cases set a lower price than was set in previous years for electricity produced by high-efficiency combined production.

The proportion of electricity produced by high-efficiency combined production determined by individual combined production plants recorded in the database on total electricity produced is shown in fig 2.1-1.

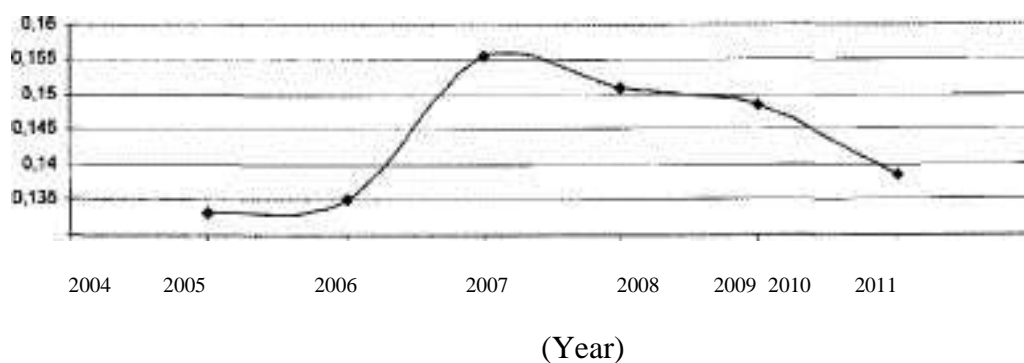


Fig.: 2.1-1: Electricity produced by high-efficiency combined production as a proportion of total electricity produced – by individual plant

The proportion of electricity produced by high-efficiency combined production, as determined by statistical calculations according to the pre-selected ratio of electricity to heat to total electricity produced is shown in fig. 2.1-2.

[see table]



Fig.: 2.1-2: Electricity produced by high-efficiency combined production as a proportion of total electricity produced – using pre-selected values for the ratio of electricity to heat

On the basis of the foregoing it can be stated that the Slovak Republic achieved progress in the area of high-efficiency combined production in 2005-2007, which can be judged by national legislation and the support programme.

## 2.2. Assessing progress in the area of high-efficiency combined production

The proportion of individual types of fuel used for combined production remains almost unchanged. Since 2007, there has been a gradual increase in the proportion of wood chips,

which is mainly due to the environmental policy of reducing emissions of sulphur oxides, but also due to the national requirement to support the production of electricity from biomass only in combined production plants.

[see table]

Natural Gas - Black Coal - Brown Coal – Wood – Heavy Fuel Oil – Biogas - Black Liquor – Dense Gases – Refined Gas - Nuclear

Fig.: 2.2-1: Proportion of individual fuel types used for combined production

Savings in primary energy sources are gradually increasing, but the reduction in emissions of carbon dioxide is not copying the curve of reduction from savings in primary energy sources. This is influenced particularly by the proportion of gas, nuclear fuel and biomass in the total savings in primary energy sources.

[see table]

(Year)

Savings in primary energy sources

Reduction in CO<sub>2</sub> emissions

Fig.: 2.1-4: Savings in primary energy sources and reduction in CO<sub>2</sub> emissions

Despite the progress in the area of high-efficiency combined production up to 2007, the proportion of electricity produced by high-efficiency combined production fell after 2007, mainly for the following reasons:

- the consumption of usable heat is falling through application of the energy efficiency policy, particularly in the municipal housing sector and in industry, and the need for cooling is increasing only minimally;
- the heat distribution systems for centralised supplies of heat are physically and technically decrepit;
- in view of the extensive network of gas pipelines in the Slovak Republic, the favourable prices for natural gas and the availability of high-efficiency boilers, a trend towards disconnection from centralised heat supply systems is beginning to set in, thereby reducing the potential of usable heat from high-efficiency combined production;
- increased use of renewable energy sources in heating and in the preparation of hot water (heat pumps, solar collectors) reduces the potential of usable heat from high-efficiency combined production;
- increased use of renewable energy sources for the production of electricity increases demand for regulated electricity, which is provided mainly by combined production plants, as a result of which, however, overall efficiency declines, and the proportion of electricity produced by high-efficiency combined production falls;
- the economic crisis and the subsequent gas crisis have also negatively affected the proportion of electricity produced by high-efficiency combined production (during the economic crisis 4 KVET power sources were decommissioned, representing a total installed output of 87 MW<sub>e</sub> and 271 MW<sub>t</sub>).

### **3. Obstacles in the area of high-efficiency combined production**

#### **3.1. Administrative procedures**

— construction of combined production plants

Under Act No 656/2004 on energy, it is possible to build electrical energy plants, including combined production plants, only on the basis of a certificate confirming that the investment plan conforms to the long-term energy policy concept issued by the Ministry of Economy of the Slovak Republic. Such certificates do not apply to the construction of facilities with a total installed output of less than 1 MW<sub>e</sub>. This procedure gives an advantage to plants with a low output. No special advantages have been put in place for combined production plants.

Since combined production plants also produce heat, the construction of such plants is also subject to Act No 657/2004 on heat energy. Heat plant systems or parts thereof with a total installed heat output of 10 MW<sub>t</sub> or more can be constructed only on the basis of a certificate confirming that the planned construction of the heat plant systems or parts thereof conforms to the long-term energy policy concept of the Slovak Republic. The certificates are issued by Ministry of Economy of the Slovak Republic. Certificates for the construction of heat production plants with a heat output of up to 10 MW<sub>t</sub> are issued by local authorities. No special advantages have been put in place for combined production plants.

The construction of combined production plants with an output of up to 1 MW<sub>e</sub> is subject to an approval process only at the level of the local authority, which issues a certificate on the basis of an approved Municipal Development Plan for the area of heat energy.

— doing business in energy and in heat energy

Doing business in energy, including the production of electricity by combined production, is possible only on the basis of a permit (Act No 656/2004) issued by the Regulatory Office for Network Industries. When doing business in energy, there is a requirement to have a professionally competent person who meets the prescribed qualification requirements, including education, practical experience and graduation in examinations of professional competence. The requirement for a professionally competent person does not apply to plants with a total installed output of up to 1 MW<sub>e</sub>. The requirement to obtain a permit also does not apply to such plants, but they do have an obligation to notify such an activity to the Regulatory Office for Network Industries.

Doing business in heat energy, including the production of heat from combined production, is possible only on the basis of a permit (Act No 657/2004) issued by the Regulatory Office for Network Industries. When doing business in heat energy, there is a requirement to have a professionally competent person who meets the prescribed qualification requirements, including education, practical experience and graduation in examinations of professional competence. There are no exemptions from these obligations for business entities.

One of the measures for reducing the administrative burden on combined production plants with a total installed output of less than 1 MW<sub>e</sub> is the establishment of exemptions in the Act on heat energy in relation to business permits and the requirement to have a professionally competent person.

### **3.2. Electricity distribution system, tariff-setting**

— preferential connection of plants to the distribution system

Under Act No 309/2009, the preferential connection of electricity production plants to the distribution system, preferential access to the system, and preferential transmission, distribution and supply of electricity are obligations applying equally to all combined production plants and to plants for the production of electricity from renewable sources. In practice, this is handled on the basis of the order of submission of applications for connection



to the system. In the case of a large number of applications being submitted (e.g. in relation to the frequent construction of photovoltaic power plants in 2010) the deadline for preferential connection to the system is extended.

Since the EU supports not only high-efficiency combined production, but also the production of electricity from renewable sources, and a binding target has been set for the use of renewable sources (14% of gross final consumption in 2020) it would be unrealistic at the national level to give priority to combined production plants with small and very small outputs in terms of system connection ahead of plants for the production of electricity from renewable sources.

#### — tariffs

On the basis of Act No 309/2009 and Act No 267/2001 on regulation in network industries, the Regulatory Office for Network Industries sets a fixed price for electricity produced by high-efficiency combined production for a given period through a generally binding law and along with this issues authorised entities with individual price decisions for each calendar year. Combined production plant operators are obliged to submit applications every year for the issuance of a price decision prior to the issuance of the price decision.

Under Act No 267/2001, the price of heat is also regulated. Heat prices applied by operators of heat production plants and therefore also combined production plants are assessed individually by the Regulatory Office for Network Industries. The benefits arising from the sale of electricity produced by high-efficiency combined production must, under the procedures set out in the implementing regulations for Act No 267/2001, be taken into account by the operator in a heat price proposal, which is approved by the Office through the issuance of a decision.

Measures to eliminate obstacles in the area of tariff-setting and price-setting for electricity and heat produced by combined production may be implemented through a change in the approach of the Regulatory Office for Network Industries at least for combined production plants with small and very small outputs.

### **3.3. Other obstacles**

#### — relevant information on combined production

Information on combined production plants is collected mainly by the Statistical Office of the Slovak Republic (SOSR). This information, however, is also limited by the fact that the obligation to provide information applies only to plants with an installed heat output of 300 kW. In view of staffing levels at the SOSR, it is unrealistic to assess the relevance of the information provided.

Under Act No 309/2009, information on combined production is routinely provided to the Regulatory Office for Network Industries and to the Ministry of Economy of the Slovak Republic (MESR) only by entities that are claiming support under this Act. An amendment to Act No 657/2004 on heat energy introduced the obligation to provide information on combined production also for entities doing business in the area of heat energy that are not claiming any support.

In all cases, the situation has been complicated in particular by introduction of the calculation of the amount of electricity produced by combined production within the meaning of Commission Decision 2008/952/EC, since the operators of combined production plants have yet to master these calculations sufficiently.

In order to eliminate these factors, a section for providing information on combined

production has also been incorporated into the system for monitoring the efficient use of energy which is operated by the Slovak Agency for Innovation and Energy on the basis of an authorisation from the MESR. The employees of the agency have practical experience with the new calculation methods in the area of combined production, and there is a substantially greater expectation that the relevant data will be provided and processed. In order to simplify the method of providing information, the generally binding legislation must be amended in such a way that the entities in question provide the required information to the monitoring system only once.

#### — technical obstacles

The technical potential of high-efficiency combined production is reduced particularly by the:

- reduced heat consumption resulting from application of the energy efficiency policy,
- increased use of renewable energy sources in the heating and the preparation of hot water (heat pumps, solar collectors),
- increased use of renewable energy sources for the production of electricity (growth of demand for regulated electricity, which is provided mainly by combined production plants, as a result of which, however, overall efficiency declines, and the proportion of electricity produced by high-efficiency combined production falls);

There are no measures for eliminating the aforementioned technical obstacles at present. The negative effects can be partly eliminated by obtaining money (e.g. from the Structural Funds) for the reconstruction and modernisation of heat distribution pipes in centralised heat supply systems, in order at least to maintain the current proportion of combined production.

## **4. Guarantees of origin and support programmes**

### **4.1. Guarantees of origin**

Guarantees of the origin (confirmations of the origin) of electricity produced by high-efficiency combined production are issued on the basis of Act No 309/2009 by the Regulatory Office for Network Industries on the basis of applications submitted together with the required attachments. The confirmations are issued in the form of a decision of the Office on a printed form. The Office keeps a record of the confirmations issued.

At present no control mechanism is established for checking confirmations issued in respect of the origin of electricity produced by high-efficiency combined production.

### **4.2. Support programmes for high-efficiency combined production**

#### — operational assistance

Act No 309/2009 on support for renewable energy sources and high-efficiency combined production and amending certain other acts establishes support for high-efficiency combined production with effect from 1 January 2010 as follows:

1. preferential connection of electricity production plants (hereinafter “plants”) to the distribution system, preferential access to the system, preferential transmission, distribution and supply of electricity;

- applies to all electricity produced by high-efficiency combined production in plants, without restriction on the installed output, throughout the lifetime of the plants.
- 2. collection of electricity at a loss-making electricity price by the operator of the regional distribution system to which a plant is connected, directly or via a local distribution system;
  - applies to all of the electricity produced by high-efficiency combined production in plants with a total installed output of up to 125 MW or up to 200 MW where the energy share for renewable energy sources in the fuel is higher than 20%. The support can be applied to plants with a total installed output of up to 1 MW throughout the lifetime and to other plants for 15 years from the year in which the plant is brought into operation or from the year of reconstruction or modernisation of the mechanical part of the plant.
- 3. supplement, i.e. the difference between the fixed set price (tariff) and the loss-making price of electricity;
  - applies to all of the electricity produced by high-efficiency combined production in plants with a total installed output of up to 10 MW and up to 125 MW or 200 MW, where the proportion of usable heat supplied to the industrial sector is no more than 40%. In the case of a higher proportion of usable heat supplied to the industrial sector it is possible to apply the supplement only to the amount of electricity which corresponds to a plant with a total installed output of up to 10 MW. The support may be applied for 15 years from the year in which the plant is brought into operation or from the year of reconstruction or modernisation of the mechanical parts of the plant. The supplement may also be applied to plants in respect of which the electricity produced is consumed directly at the place of production, therefore without being supplied to the distribution network.
- 4. assumption of responsibility for deviations by operators of regional distribution systems;
  - applies to plants with a total installed output of up to 4 MW with effect from 1 April 2011 and, where appropriate, only to plants with a total installed output of up to 1 MW. The support may be applied to plants with a total installed output of up to 1 MW throughout their lifetime and to other plants for 15 years from the year in which the plants were brought into operation or from the year of reconstruction or modernisation of the mechanical parts of the plants.

The price of electricity produced by high-efficiency combined production is set by an Order (e.g. Order No 7/2009, No 02/2010, ...) of the Regulatory Office for Network Industries (hereinafter the “Office”) for specific kinds of combined production technology and different types of fuel. The price is made up of the loss-making price of electricity and the supplement. It is set in such a way as to ensure a return on investment within about 12 years. A combined production electricity producer that supplies electricity to a distribution network applies both elements of the price, i.e. the loss-making price of electricity and also the supplement. A combined production electricity producer that consumes the electricity it produces itself, applies only the supplement. During the period of support (usually 15 years) the fixed price of electricity produced by high-efficiency combined production remains at least at the level set for the year in which the plant was brought into operation or the year of reconstruction or modernisation of the plant. The loss-making price of electricity may change, however, and the supplement will change with it automatically. The loss-making price of electricity comprises the arithmetical average of prices of electricity for the purposes of covering the losses of all regional distribution system operators. The electricity prices for covering the losses of regional distribution system operators are approved or determined by the Office.

A compensation mechanism covering increased costs for the production of electricity by high-efficiency combined production as well as for the production of electricity from renewable sources is implemented through the tariff for operating the system.

Electricity produced by high-efficiency combined production is exempt from the excise duty on electricity (Act No 609/2007 on excise duty on coal, electricity and natural gas as amended) where it is supplied directly to the end consumer of electricity or is consumed by the producer.

— investment assistance

In order to support high-efficiency combined production, investment assistance was also provided through the use of money from the Structural Funds for the 2004-2006 programming period, in particular for industry through the Sectoral Operational Programme Industry and Services. In the 2007-2013 programming period, it was possible to draw on funds for high-efficiency combined production through the following operational programmes:

- Operational Programme Competitiveness and Economic Growth (particularly industry),
- Operational Programme Environment (particularly for plants supplying heat for local authority housing, only together with a change to the fuel base in existing heat production plants),
- Operational Programme Bratislava Region (small projects in the Bratislava region),
- Rural Development Programme (particularly in agriculture in relation to the use of biogas).

#### **4.3. Funds for supporting high-efficiency combined production**

— operational assistance

Funds provided in the form of operational assistance for electricity produced by combined production prior to 1 January 2010 are not monitored separately. They form part of the assistance provided for supporting the production of electricity from renewable sources and from domestic brown coal.

The funds provided in the form of operational assistance after 1 January 2010 have not yet been calculated. It can be expected that operational assistance amounting to about EUR 20 million was provided on the basis of Act No 309/2009 in 2010.

The future level of operational assistance depends on developments in the prices of primary energy sources as well as on the amount of electricity produced by high-efficiency combined production. It is provisionally expected to be EUR 20 million annually.

— investment assistance

Investment assistance from the Structural Funds that is provided for high-efficiency combined production plants through individual operational programmes cannot be established clearly, since these are projects involving other activities as well as the construction or reconstruction of combined production plants.

Clearly identifiable assistance for high-efficiency combined production plants was provided in 2007-2010 from the Operational Programme Competitiveness and Economic Growth, amounting to EUR 10.67 million.

The provision of investment assistance for high-efficiency combined production plants is not envisaged until the end of 2013.

In order to maintain the proportion of electricity produced by high-efficiency combined production it is essential to include in future programming periods sufficient funding for the reconstruction of heat distribution pipes. If this does not happen, it can be expected that the proportion of electricity produced by high-efficiency combined production will fall.

# Annex No 1: Regulated prices of electricity produced by combined production

	2006 [EUR/MWh]	2007 [EUR/MWh]	2008 [EUR/MWh]	2009 [EUR/MWh]	2010 [EUR/MWh]	2010 - 2009 [%]
combined cycle combustion turbine, P <sub>c</sub> £50 MW, commissioned by 1.1.2005	59.749	73.027	73.027	83.981	81.870	-2.51
combined cycle combustion turbine, P <sub>c</sub> £50 MW, commissioned after 1.1.2005	64.728	79.002	79.002	90.951	81.870	-9.98
combined cycle combustion turbine					81.870	
combined cycle combustion turbine	59.749	73.027	73.027	83.981	75.590	-9.99
combustion engine - natural gas	68.048	82.985	82.985	95.433	85.890	-10.00
combustion engine – heating oil	68.048	82.985	82.985	95.433	83.650	-12.35
combustion engine - natural gas commissioned after 1.1.2007 in existing heat plant		88.960	88.960	102.403		
combustion engine – mixture of air and methane	68.048	69.707	71.367	82.155	73.940	-10.00
combustion engine – waste processed catalytically					149.000	
combustion engine – biogas	82.985					
steam backpressure turbine and steam- condensing extraction turbine - natural gas	59.749	73.027	73.027	92.943	83.650	-10.00
steam backpressure turbine and steam- condensing extraction turbine – heating oil	59.749	73.027	73.027	92.943	83.650	-10.00
steam backpressure turbine and steam- condensing extraction turbine – brown coal	63.068	66.388	69.707	89.624	88.720	-1.01
steam backpressure turbine and steam- condensing extraction turbine – black coal	54.770					
steam backpressure turbine and steam- condensing extraction turbine – black coal, Q <sub>t</sub> >50 MW, in 2010 P <sub>c</sub> >50 MW		56.098	57.425	79.665	78.870	-1.00
steam backpressure turbine and steam- condensing extraction turbine – black coal, Q <sub>t</sub> £50 MW, in 2010 P <sub>c</sub> £50 MW		64.728	66.388	82.985	82.150	-1.01
steam backpressure turbine and steam- condensing extraction turbine – communal waste					80.000	
Micro-turbines	99.582	121.490	124.477	136.925		
Stirling motor	99.582	121.490	124.477	136.925		
Fuel cell	99.582	121.490	124.477	136.925		
Organic Rankine cycle	116.179	119.498	122.817	136.925	123.240	-9.99



EUROPEAN COMMISSION  
DIRECTORATE-GENERAL FOR ENERGY

Table for facilitating the submission of personal data in support of an assessment of progress towards increasing the share of high-efficiency cogeneration under Article 6(3) and Article 10(2) of the 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 market

Note:

All cells highlighted in pale yellow must be filled in.





2008	electricity	capacity output	[GW] [TWh]
	heat	capacity output	[GW] [TWh]
	fuel	total natural gas black coal lignite renewables oil and oil products biomass biogas waste incineration landfill gas other fuels	[PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ]
2009	electricity	capacity output	[GW] [TWh]
	heat	capacity output	[GW] [TWh]
	fuel	total natural gas black coal lignite renewables oil and oil products biomass biogas waste incineration landfill gas other fuels	[PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ]
2010	electricity	capacity output	[GW] [TWh]
	heat	capacity output	[GW] [TWh]
	fuel	total natural gas black coal lignite renewables oil and oil products biomass biogas waste incineration landfill gas other fuels	[PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ] [PJ]

See original for numbers.

<sup>1</sup> Only in connection with high-efficiency CGUs within the meaning of Article 3 and Annex III to Directive 2004/3/EC

<sup>2</sup> All types of unit producing electricity and heat

<sup>3</sup> Compared to the specific production of electricity and heat

Sheet 2 Sector				TOTAL	Industry	Residential, commercial and other services				Other
						Municipal heating	Other heating	Micro CGU	Municipal cooling	
2005	Electricity	capacity output	[GW] [TWh]	2.6055 4.1881	1.1464 1.8428					1.4591 2.3453
	Heat	capacity output	[GW] [TWh]	7.2058 13.1520	0.5764 1.0520	6.0804 11.0979				0.5490 1.0021
	Fuel	input	[PJ]	86.8620	14.5011	55.5926				16.7684
2006	Electricity	capacity output	[GW] [TWh]	2.6088 4.2486	1.1348 1.8481					1.4740 2.4005
	Heat	capacity output	[GW] [TWh]	7.2255 13.2665	0.5403 0.9920	6.2205 11.4213				0.4647 0.8533
	Fuel	input	[PJ]	87.6642	14.2148	57.1643				16.2851
2007	Electricity	capacity output	[GW] [TWh]	2.6791 4.3692	1.1520 1.8787					1.5271 2.4904
	Heat	capacity output	[GW] [TWh]	7.2575 13.2684	0.5608 1.0253	6.1478 11.2396				0.5489 1.0034
	Fuel	input	[PJ]	87.8912	14.4713	56.0093				17.4106
2008	Electricity	capacity output	[GW] [TWh]	2.6446	1.1372					1.5074
				4.3722	1.8801					2.4922
	Heat	capacity output	[GW] [TWh]	7.1796	0.6462	5.9957				0.5377
				12.8637	1.1578	10.7425				0.9634
	Fuel	input	[PJ]	86.0714	15.1702	53.6451				17.2560
2009	Electricity	capacity output	[GW] [TWh]	2.5468 3.8870	1.0824 1.6520					1.4644 2.2350
	Heat	capacity output	[GW] [TWh]	7.0408 11.8034	0.7087 1.1881	5.8522 9.8107				0.4799 0.8045
	Fuel	input	[PJ]	79.3093	14.3555	49.5899				15.3640
2010	Electricity	capacity output	[GW] [TWh]	2.6090 3.7984	1.0958 1.5953					1.5132 2.2031
	Heat	capacity output	[GW] [TWh]	7.0989	0.7145	5.9005				0.4839
				10.9979	1.1070	9.1413				0.7496
	Fuel	input	[PJ]	75.1637	13.7276	46.4367				14.9995

Sheet 3 Technology				TOTAL	Combined cycle gas turbines (CCGT) with recovery	Steam backpressur e turbines	Steam condensing extraction turbine	Gas turbines with heat recovery	Combustion engines	Micro turbines	Stirling motors	Fuel cells	Steam engines	Organic Rankine cycles	Other
2005	Electricity	capacity	[GW]	See original for numbers											
	output	[TWh]													
	Heat	capacity	[GW]												
2006	output	[TWh]													
	Fuel	input	[PJ]												
	Electricity	capacity	[GW]												
2007	output	[TWh]													
	Heat	capacity	[GW]												
	output	[TWh]													
2008	Fuel	input	[PJ]												
	Electricity	capacity	[GW]												
	output	[TWh]													
2009	Heat	capacity	[GW]												
	output	[TWh]													
	Fuel	input	[PJ]												
2010	Electricity	capacity	[GW]												
	output	[TWh]													
	Heat	capacity	[GW]												
2010	output	[TWh]													
	Fuel	input	[PJ]												

\*within the scope of Directive 2004/8/EC