

Letter from: Christian Braun, Permanent Representative of Luxembourg to the EU

To: Philip Lowe, Director-General, DG ENER

Date: 20 June 2012

Ref.: 17.1.51-E.17.01.104-ss

**Subject: Report on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC**

Referring to your letter ref. 317626 of 4 April 2012 I am sending you herewith the Luxembourg Government's report on progress towards increasing the share of high-efficiency cogeneration in accordance with Article 6(3) and Article 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.

[Complimentary close]

**Report on progress towards increasing the share of high-efficiency cogeneration in accordance with Article 6(3) and Article 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**

**May 2012**

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Directorate-General for Energy  
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## 1. Introduction

The Grand Duchy of Luxembourg has fully transposed Directive 2004/8/EC. Notification of the transposition was sent by letter dated 20 May 2009 (ref. 0194-E09) to the Minister for Foreign Affairs of the Grand Duchy of Luxembourg, who forwarded the letter to the Permanent Representative of Luxembourg to the European Union on 29 May 2009 (ref. 2-UE-2006-1493) for forwarding to the relevant departments of the European Commission.

Article 6(3) and Article 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 (hereinafter 'Directive') provide as follows:

### 'Article 6(3):

*Member States shall for the first time not later than 21 February 2007 and thereafter every four years, following a request by the Commission at least six months before the due date, evaluate progress towards increasing the share of high-efficiency cogeneration.*

### Article 10(2):

*Member States shall not later than 21 February 2007 and thereafter every four years, following a request by the Commission at least six months before the due date, publish a report with the result of the evaluation referred to in Article 6(3).'*

This report, together with the annexed table, evaluates progress towards increasing the share of high-efficiency cogeneration.

## 2. Progress towards increasing the share of high-efficiency cogeneration

Long experience with supporting high-efficiency cogeneration in recent years based on the legislation and regulations currently in force has ensured constant development of cogeneration and efficient use of the useful heat from cogeneration. Luxembourg has long followed a cogeneration policy in line with the principles of high-efficiency cogeneration. At the national level, cogeneration production as identified by the method currently used broadly fulfils the criteria set out in Annex III(a), which provide as follows:

*'(...) high-efficiency cogeneration shall fulfil the following criteria:*

*— cogeneration production from cogeneration units shall provide primary energy savings calculated according to point (b) of at least 10 % compared with the references for separate production of heat and electricity,*

*— production from small scale and micro cogeneration units providing primary energy savings may qualify as high-efficiency cogeneration.'*

Article 2 of the amended Grand-Ducal Regulation of 30 May 1994 concerning the production of electrical energy based on cogeneration provides that:

*« (...) cogeneration installations must reach an average operating time of at least 2 500 hours per year and an overall efficiency of at least 80 per cent. »*

Furthermore, licences issued under the amended Act of 10 June 1999 concerning classified establishments limit the amount of heat that can be removed by an emergency cooling system to 0.1% of the amount of heat produced by a cogeneration plant. This guarantees that the cogeneration installations authorised in Luxembourg are governed by heat demand rather than by power-grid requirements, thereby ensuring that the installations are highly efficient and there is a considerable primary energy saving compared with centralised energy production based on condensing power plants and decentralised heat production via conventional boilers.

Luxembourg's main legislative framework for the licensing of cogeneration plants consists of the amended Act of 10 June 1999 concerning classified establishments and the procedures relating thereto. That Act provides for plant licensing procedures which differ according to certain technical parameters such as in particular the rated electrical output of the installations or the fuel used in the cogeneration process. The licensing procedure is under the aegis of the Minister responsible for environmental affairs and the dossiers are followed up and analysed by the Administration for the Environment.

It can be concluded from the experience of recent years that the present framework is perfect for stimulating the design of cogeneration plants meeting economically justifiable useful heat demands and avoiding the production of heat surplus to useful heat. There are therefore no direct regulatory barriers to the development of cogeneration. Furthermore, the rules applied are considered to be transparent and non-discriminatory objectives and take account of the peculiarities of the different cogeneration technologies.

As regards financial incentives, there are several factors worth mentioning:

Luxembourg has a full range of laws and regulations governing systems of support for high-efficiency cogeneration:

- amended Act of 5 August 1993 on the rational use of energy (Article 14(2)(b));
- amended Grand-Ducal Regulation of 30 May 1994 concerning the production of electrical energy based on cogeneration;
- Grand-Ducal Regulation of 20 April 2009 setting up a system of aid for promoting the rational use of energy and developing renewable energy.

By way of these laws and regulations, Luxembourg is giving various forms of aid to the development of high-efficiency cogeneration on its territory.

Luxembourg therefore considers that an appropriate framework of financial incentives exists which over recent years has made it possible to promote the development of high-efficiency cogeneration in the Grand Duchy.

It should still be noted however, that in Luxembourg the development of cogeneration based on fossil energy sources leads to an increase in CO<sub>2</sub> emissions in the country's carbon balance due to the carbon emissions accounting system. This means that Luxembourg will either have to buy emission rights to compensate for the extra emissions from cogeneration installations on its territory, or reduce the national emissions in other sectors, the cost of this operation being added to the present costs of supporting cogeneration.

In the future, this accounting system must be considered the biggest barrier to the national development of high-efficiency cogeneration based on fossil energy sources, mainly due to the decisions recently adopted by the European Parliament and the Council on reducing greenhouse gas emissions. Luxembourg therefore has to reduce its CO<sub>2</sub> emissions (outside the Emissions Trading Scheme – ETS) by 20% compared with 2005 and only has very limited recourse to flexible mechanisms. This is why Luxembourg will find it more and more difficult to support the development of cogeneration outside ETS.

Besides these aspects, Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC provides for a target of 11% for the share of energy from renewable sources in Luxembourg's final consumption of energy in 2020. The National Action Plan approved by the Government Council in July 2010 fleshes out this target and provides for a consequent increase in national energy production of renewable energy.

Cogeneration based on renewable energy sources reduces national CO<sub>2</sub> emissions. It will also be possible to do the heat and power accounting for these installations in the context of the 11% target for renewable energy by 2020.

On the basis of the above, the focus in future will no longer be on cogeneration based on fossil energy sources but on cogeneration based on renewable energy sources, reflected in a reform of the Grand-Ducal Regulation of 8 February 2008 on electricity based on renewable energy sources.

## 2,1 Electrical capacity of high-efficiency cogeneration

Table 1 shows the development of installed capacity of high-efficiency cogeneration from 2004 to 2010. Installed generating capacity rose from 104 to 121 MW between 2004 and 2010, a rise of around 16%. This increase is essentially due to the development of small cogeneration plants with internal combustion engines. The share of cogeneration output in total electricity production is about 13.6% in 2010.

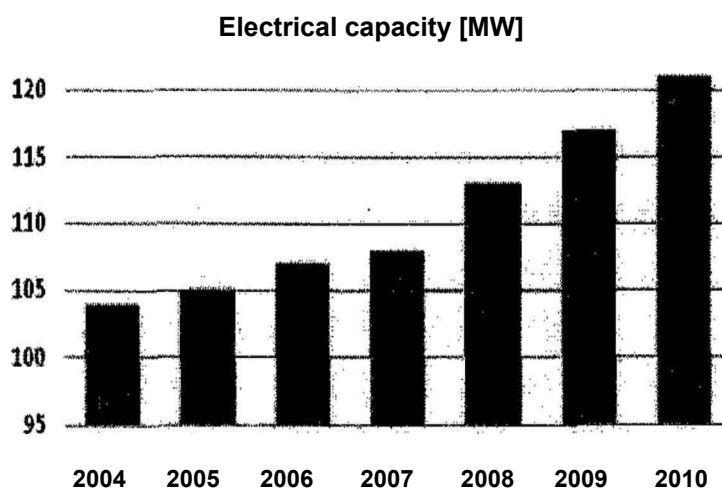


Table 1 – Development of electrical capacity [MW] of high-efficiency cogeneration

Table 2 shows the development of installed capacity of high-efficiency cogeneration in the different sectors. 'Industry', the largest sector, saw an increase of about 26% (23 MW in 2004 and 29 MW in 2010). The 'Residential, trade and services' sector increased by about 8% (77 MW in 2004 and 83 MW in 2010) and all the other sectors (basically agriculture) increased by around 80% (5 MW in 2004 and 9 MW in 2010) of installed electrical capacity between 2004 and 2010.

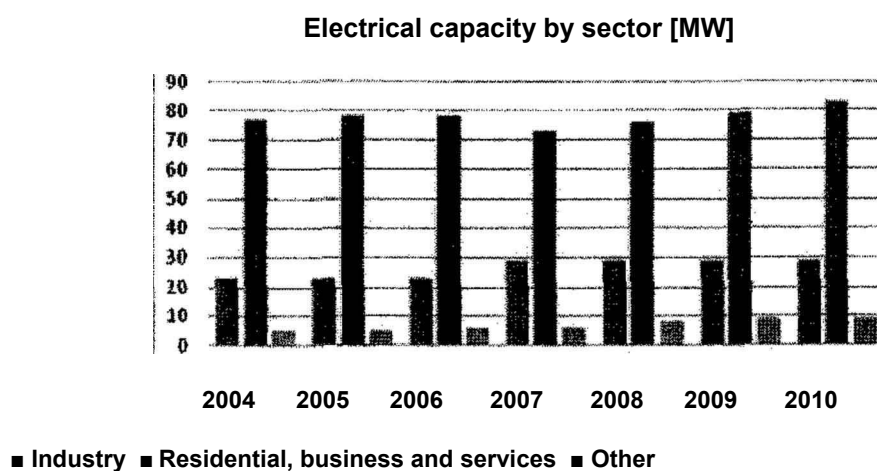


Table 2 – Development of electrical capacity [MW] of high-efficiency cogeneration by sector

## 2.2 Electrical output of high-efficiency cogeneration

Table 3 traces the development of electrical output of high-efficiency cogeneration from 2004 to 2010. In spite of an increase in installed electrical capacity from 2004 onwards, electricity generation stayed more or less constant in the period from 2004 to 2010 with values between 390 and 471 GWh produced and a downward trend after 2007.

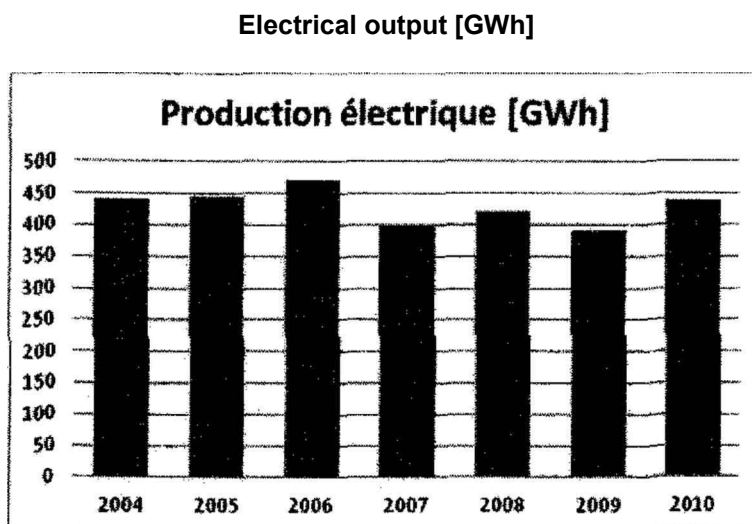


Table 3 – Development of electrical output [GWh] of high-efficiency cogeneration

## 2.3 Fuel use of high-efficiency cogeneration

Table 4 shows the development of fuel use of high-efficiency cogeneration from 2004 to 2010. On average it used natural gas almost entirely (93%). Use of natural gas was greatest between 2004 and 2006. Use of biogas for cogeneration almost tripled in the period from 2004 to 2010. From 2009 onwards, cogeneration also made very limited use of landfill gas.

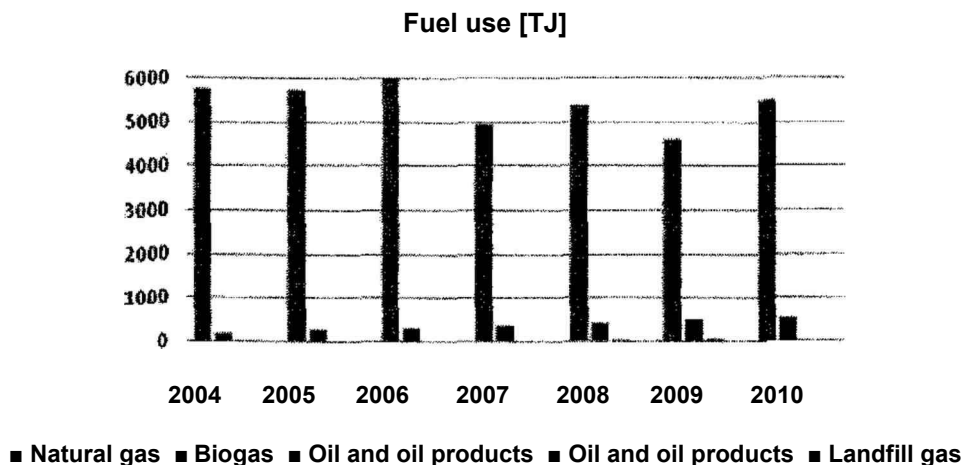


Table 4 – Development of fuel use of high-efficiency cogeneration

### **3. Conclusions**

Luxembourg's regulatory and legislative framework has favoured an increase in the installed capacity of high-efficiency cogeneration. Due to the problems attached to the system of accounting for CO<sub>2</sub> emissions, the development of high-efficiency cogeneration will in future focus on plants exploiting renewable energy sources.





EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR ENERGY

Spreadsheet to facilitate the communication of specific data supporting the evaluation of progress towards increasing the share of high-efficiency cogeneration in accordance with Article 6(3) and Article 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 highlighted in light yellow must be completed.

[FOR FIGURES SEE ORIGINAL]

Sheet 1			Electricity from CHP <sup>1</sup> : production, capacity, fuel consumption	Main Activity Producer: production, capacity, fuel consumption	Auto-producers: production, capacity, fuel consumption	Share of CHP in total electricity production	Heat produced by CHP	Main Activity Producer	Auto-producers	Share of CHP in total heat production	Newly built CHP installations	Modernisation of existing CHP installations	Total of installations (CHP and non-CHP) <sup>2</sup>	PES <sup>3</sup>	Avoided CO2 emissions					
Overview																				
2000	Electricity	Capacity	Heat	Production	Fuel	Capacity	Total	Natural gas	Hard coal	Lignite	Renewable energy	Oil and oil products	Biomass	Biogas	Waste incineration	Landfill gas	Other fuels			
		Production		Production																
		Capacity		Capacity																
		Electricity	Capacity	Heat	Production	Fuel	Production	Total	Natural gas	Hard coal	Lignite	Renewable energy	Oil and oil products	Biomass	Biogas	Waste incineration	Landfill gas	Other fuels		
			Production		Production															
			Capacity		Capacity															
			Electricity	Capacity	Heat	Production	Fuel	Production	Total	Natural gas	Hard coal	Lignite	Renewable energy	Oil and oil products	Biomass	Biogas	Waste incineration	Landfill gas	Other fuels	
				Production		Production														
				Capacity		Capacity														
				Electricity	Capacity	Heat	Production	Fuel	Production	Total	Natural gas	Hard coal	Lignite	Renewable energy	Oil and oil products	Biomass	Biogas	Waste incineration	Landfill gas	Other fuels
					Production		Production													
					Capacity		Capacity													
					Capacity		Capacity													

Landfill gas  
Other fuels

2005	Electri-	Capacity
	city	Production
	Heat	Capacity
		Production
	Fuel	Total
		Natural gas
		Hard coal
		Lignite
		Renewable
		energy
		Oil and oil
		products
		Biomass
		Biogas
		Waste
2006		incineration
		Landfill gas
		Other fuels
	Electri-	Capacity
	city	Production
	Heat	Capacity
		Production
	Fuel	Total
		Natural gas
		Hard coal
		Lignite
		Renewable
		energy
		Oil and oil
		products
	Biomass	
	Biogas	
	Waste	
	incineration	
	Landfill gas	
	Other fuels	

<b>2007</b>	Electri- city	Capacity
		Production
		Capacity
	Heat	Production
		Total
		Natural gas
	Fuel	Hard coal
		Lignite
		Renewable energy
		Oil and oil products
		Biomass
		Biogas
		Waste incineration
		Landfill gas
		Other fuels
<b>2008</b>	Electri- city	Capacity
		Production
		Capacity
	Heat	Production
		Total
		Natural gas
	Fuel	Hard coal
		Lignite
		Renewable energy
		Oil and oil products
		Biomass
		Biogas
		Waste incineration
		Landfill gas
		Other fuels
<b>2009</b>	Electri- city	Capacity
		Production
		Capacity
	Heat	Production
		Total
		Natural gas
	Fuel	Hard coal
		Lignite
		Renewable energy
		Oil and oil products
		Biomass

		Biogas
		Waste
		incineration
		Landfill gas
		Other fuels
2010	Electri-	Capacity
	city	Production
	Heat	Capacity
		Production
	Fuel	Total
		Natural gas
		Hard coal
		Lignite
		Renewable
		energy
		Oil and oil
		products
		Biomass
		Biogas
		Waste
		incineration
		Landfill gas
		Other fuels

<sup>1</sup> This only concerns high-efficiency cogeneration (CHP) in accordance with Article 3 of and Annex III to Directive 2004/8/EC.

<sup>2</sup> All types of units that produce electricity and heat.

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

Sheet 2 Sector				Residential, trade and services sector					
TOTAL				Industry	District heating	Non-district heating	Micro-CHP	District cooling	Other
2000	Electricity	Capacity	[GW]						
		Production	[TWh]						
	Heat	Capacity	[GW]						
		Production	[TWh]						
	Fuel	Consumption	[PJ]						
2004	Electricity	Capacity	[GW]						
		Production	[TWh]						
	Heat	Capacity	[GW]						
		Production	[TWh]						
	Fuel	Consumption	[PJ]						
2005	Electricity	Capacity	[GW]						
		Production	[TWh]						
	Heat	Capacity	[GW]						
		Production	[TWh]						
	Fuel	Consumption	[PJ]						
2006	Electricity	Capacity	[GW]						
		Production	[TWh]						
	Heat	Capacity	[GW]						
		Production	[TWh]						
	Fuel	Consumption	[PJ]						
2007	Electricity	Capacity	[GW]						
		Production	[TWh]						
	Heat	Capacity	[GW]						
		Production	[TWh]						
	Fuel	Consumption	[PJ]						
2008	Electricity	Capacity	[GW]						
		Production	[TWh]						
	Heat	Capacity	[GW]						
		Production	[TWh]						
	Fuel	Consumption	[PJ]						
2009	Electricity	Capacity	[GW]						
		Production	[TWh]						
	Heat	Capacity	[GW]						
		Production	[TWh]						
	Fuel	Consumption	[PJ]						
2010	Electricity	Capacity	[GW]						

	Production	[TWh]
	Capacity	[GW]
Heat	Production	[TWh]
Fuel	Consumption	[PJ]





<b>2010</b>	Electricity	Capacity	[GW]
		Production	[TWh]
	Heat	Capacity	[GW]
		Production	[TWh]
	Fuel	Consumption	[PJ]

<sup>4</sup> Covered by Directive 2004/8/EC.