

Hungary COGENeration Day



The Actual Status of the Cogeneration Directive

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*Based on a Presentation
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New European Energy Strategy (1)

2005-2006	Price of oil
End 2005	Hampton Court summit: call for a EU energy policy
Early 2006	The issue of security of gas supply
08.03.06	Green Paper of the Commission
10.01.07	Integrated energy and climate change package presented

New European Energy Strategy (2)

Priorities of the European energy strategy:

- Completion of the internal energy market
- Security of supply
- Sustainable, efficient, diverse energy mix
- Global warming
- Energy technology plan and innovation
- Common external energy policy



Energy Efficiency Action Plan

- The EU Energy Efficiency Action Plan (EEAP) adopted on 19.10.2006
- Contains about 75 actions
- There will be national EEAPs for 2007 and every 3 years thereafter
- It includes:
 - Dynamic energy performance requirements for energy-using products, buildings and energy services
 - **Energy transformation sector**
 - Transport sector
 - Finance, education energy efficiency, foreign affairs

CHP in Energy Efficiency Action Plan

- CHP is included in the EU EEAP:
 - Improved definitions
 - Requirements
 - Standards
 - Guarantees of Origin
 - Heat demand suitable for CHP
- Also attention for the use of waste heat and for **quality** district heating

The Cogeneration Directive EC/2004/8

- It includes statements about the the need to consider:
 - **Harmonised definitions**
 - **Guarantees of origin**
 - **Support systems for high efficiency CHP**
- Determination of National Potentials in Member States and collection of statistics
- Level playing field and requirement for access to the electricity grid
- Identification and elimination of administrative barriers

High Efficiency Cogeneration: The Technical Issues

Commission wants to encourage development of efficient cogeneration systems -
- but **level playing field** is needed

Energy savings of 10% compared to conventional power generation -
- comparisons with reference plant

Annex II defines how much electricity can be regarded CHP electricity, Annex III checks if it is high efficiency.

Member States Obligations

Member States need to provide:

- National potentials
- Statistical data
- Progress reports
- Reports on Guarantee of Origin schemes
- Reports on administrative procedures and measures to eliminate barriers
- Notifications on state aid (only high efficiency CHP schemes should get support)

Commission Obligations

The Commission:

- Analyses and screens progress
- Reports to Institutions (EP, Council)
- Investigates complaints (important role for industry, consumers, stakeholders)
- **Reviews whether Member State support schemes are in-line with criteria for high efficiency cogeneration**
(in cooperation with DG Competition)
- Develops new initiatives

Comittology Aspects

The Comitology Group consists of delegates from MS Government who review and assist the process of establishing additional Commission legislation required for implementing the Directive

The Committology process is intended to formulate a consensus approach to :

Provision of Guidelines for calculation of energy savings, using reference values for power plant etc.

**These are based on
a standardised calculation methodology
(as required by Annexes II and III)**

**Suggest Guidelines for the determination of
National Potentials of Member States
(as required by Annex IV)**

Detailed work is done by an Advisory Group of CHP Experts who periodically report back to the CHP Committee and produce draft guidelines.

PES* Guideline Aspects

- Need to have guidelines for full implementation of the CHP Directive- These will :
 - State and explain the main definitions of the directive
 - Define the boundaries of CHP units
 - Explain how to implement Annexes II and III
 - Provide details for the determination of electricity from cogeneration (Annex II)
 - Be in line with the Commission Decision with details for the determination of efficiency of the cogeneration process (Annex III)

***PES – Primary Energy Savings from CHP**

Progress to Date

- **Official adoption of the harmonised efficiency reference values by the Commission on 21.12.06**
- Development of a common Guarantee of Origin in cooperation with the Association of Issuing Bodies (AIB)
- Member States are reviewing draft guidelines as part of Commitology activities

Reference Plant Electrical Efficiencies 1994-2011

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006-2011
Solid	Hard coal	39.7%	40.5%	41.2%	41.8%	42.3%	42.7%	43.1%	43.5%	43.8%	44.0%	44.2%
	Lignite	37.3%	38.1%	38.8%	39.4%	39.9%	40.3%	40.7%	41.1%	41.4%	41.6%	41.8%
	Peat	36.5%	36.9%	37.2%	37.5%	37.8%	38.1%	38.4%	38.6%	38.8%	38.9%	39.0%
	Wood fuels	25.0%	26.3%	27.5%	28.5%	29.6%	30.4%	31.1%	31.5%	32.8%	32.9%	33.0%
	Solid waste	20.0%	21.0%	21.6%	22.1%	22.6%	23.1%	23.5%	24.0%	24.4%	24.7%	25.0%
Liquid	Oil	39.7%	40.5%	41.2%	41.8%	42.3%	42.7%	43.1%	43.5%	43.8%	44.0%	44.2%
	Liquid bio fuels	39.7%	40.5%	41.2%	41.8%	42.3%	42.7%	43.1%	43.5%	43.8%	44.0%	44.2%
	Liquid waste	20.0%	21.0%	21.6%	22.1%	22.6%	23.1%	23.5%	24.0%	24.4%	24.7%	25.0%
Gaseous	Natural gas	50.0%	50.4%	50.8%	51.1%	51.4%	51.7%	51.9%	52.1%	52.3%	52.4%	52.5%
	Refinery gas	39.7%	40.5%	41.2%	41.8%	42.3%	42.7%	43.1%	43.5%	43.8%	44.0%	44.2%
	Biogas	36.7%	37.5%	38.3%	39.0%	39.6%	40.1%	40.6%	41.0%	41.4%	41.7%	42.0%
	Coke oven gas	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%

Reference values for Electricity Generation

Fuel	1994	2005
Hard Coal	39.7%	44.0%
Lignite	37.3%	41.6%
Peat	36.5%	38.9%
Wood	25.0%	32.9%
Waste	20.0%	24.7%
Fuel Oil	39.7%	44.0%
Natural Gas	50.0%	52.4%

These are for plants coming into service on the year specified

Reference Values for Power Generation Take Into Account:

- Typical power plant efficiencies in the year commissioned
- Effect of part load operation
- Deterioration in efficiency because of wear and tear

Reference Values for Efficiency of Boilers and Utilisation of Heat in Combustion Products

		Steam [*] /hot water	Direct use of exhaust gases
Solid	Hard coal	88%	80%
	Lignite	86%	78%
	Peat	86%	78%
	Wood fuels	86%	78%
	Solid waste	80%	72%
Liquid	Oil	89%	81%
	Liquid biofuels	89%	81%
	Liquid waste	80%	72%
Gaseous	Natural gas	90%	82%
	Refinery gas	89%	81%
	Biogas	70%	62%
	Coke oven gas	80%	72%

Transmission and Distribution System Losses

Most losses occur in the distribution system



Reference values are reduced by multiplying reference values by the following factors, depending at what voltage the CHP system is connected to the network

Voltage	>200kV	100-200kV	50-100kV	0.4-50kV	0.4 kV
To Grid	1	0.985	0.965	0.945	0.925
On-Site	0.985	0.965	0.945	0.925	0.865

High Efficiency Cogeneration Criteria (1)

The Directive states all electricity is high efficiency CHP power if :

Annual overall efficiency exceeds 75% when the units are:

- Steam back pressure turbine
- Gas turbine with heat recovery
- Internal combustion engine
- Microturbines/Stirling engines/Fuel cells

Annual overall efficiency exceeds 80% when the units are:

- Combined cycle with heat recovery
- Steam condensing turbine with extraction for heating

75% and 80% are “ threshold values ”

High Efficiency Cogeneration Criteria (2)

Can be based on the Primary Energy Saving Formula

$$PES = \left(1 - \frac{1}{\frac{CHP H_{\eta}}{Ref H_{\eta}} + \frac{CHP E_{\eta}}{Ref E_{\eta}}}\right) \cdot 100\%$$

Primary Energy Savings(PES) :

Depends on ratio of efficiencies of **CHP heat** and **CHP electricity** to efficiencies of **heat production** and electricity generation from the reference plants

“CHP Electricity Calculations”

To be used when CHP combined electricity and useful heat **falls below the Threshold Efficiency values**

Revised calculation method is required based on **Annex II plus Guidelines**

Recent Input from Legal Department of Commission with Respect to Calculation Methodologies

- No reference or use must be made of external publications i.e CEN/CWA calculation procedures
- **Threshold values should not** form part of calculation procedures
- The **power-to-heat ratio**, when used in calculations, should in principal be based on **measured values**; if not available design values should be used
- Examples should not be in the legal text, but may be given in a separate Commission document and/or website

Guarantees of Origin (1)

- **Article 5 of the CHP Directive requires Member States to put in place a scheme for Guarantees of Origin of electricity from high-efficiency CHP (CHP-GO)**
- The CHP-GO will be based on the reference values, officially adopted by the Commission on 21.12.06
- Member States have to do it themselves or through bodies independent of generation and distribution (sellers) within 6 months from the official adoption of these reference values
- Schemes for CHP-GO are not necessarily linked to National Support schemes for CHP, but this is allowed



Guarantees of Origin (2)

There is a common model developed by the Commission and the AIB. Communication has taken place with Member States and with stakeholders on results for further fine-tuning of the AIB-Commission text

- Approach by Commission, AIB and stakeholders of Member States to check if they could be interested to participate in this European scheme and whether possible barriers still exist
- Formal adoption by the AIB in March 2007
- Precursor to a harmonised CHP Guarantee of Origin scheme to be introduced in the coming years

It is then up to the Member States and their designated competent bodies to join the AIB CHP-GO system. But there will be a push for harmonisation of CHP-GO in 2007-2009.





Future Information and Guidance is likely to include:

- *A report covering the approach (flow diagram) to the methods of calculation and main definitions (to become the Commission Decision on detailed guidelines)*
- *A separate report with selected examples illustrating how to use the guidelines and the reference matrix.*
- *A web site as an open "best practice" list to include very complex and specific examples if they can be made available for exchange of experiences*

Provisional date: Oct 2007

DG-JRC Cogeneration Enlargement Workshop on National Potentials (A Personal View)

Indicate growth prospects at 2010, 2015 and 2020

If discussing the present focus on what is required to overcome administrative and legislative barriers

- Prospects for cogeneration improving in some New MS
- Need to focus on how fuel changes can influence CHP growth
- Technological developments and improvements to DH systems are critical
- Gas, biofuels and biomass are the fuels of the future

Thinking about National Potentials

**Remember how the Buildings Directive
and the proposed Directive on Energy-End
Use Efficiency and Energy Service could Affect CHP
in Future**

**There are Opportunities for CHP
but there will also
be threats**

Cogeneration in Relation to Current Initiatives and Future Outlook

- Biomass Action Plan
- Grid access: Infringement procedures (RES)
- Other Directives (Buildings, Energy Services)
- Action plans following the Green Paper
- Initiatives for RES-Heating and Cooling and RES-E
- Financing from: IEEA, FP6/7, DG REGIO, EIB, EBRD, World Bank

FP 7 : Energy efficiency and savings

Vast potential to reduce energy demand at low cost through energy savings & improved energy efficiency

New concepts and technologies for optimising community energy systems for buildings, transport, services and industry

Eco-buildings, minimum climate impact buildings

Renewable energy co-generation and poly-generation

Integrated demand management in cities & communities

Large-scale demonstration plus innovative R&D on specific technologies

Staying informed ...



Energy Research web site and Energy Helpdesk

http://ec.europa.eu/comm/research/energy/index_en.html

rd-energy@ec.europa.eu



Energy Policy

http://ec.europa.eu/comm/energy/index_en.html

Calls for proposals



<http://cordis.europa.eu/fp6/dc/>



Towards Seventh Framework Programme

http://ec.europa.eu/comm/research/future/index_en.html

Conferences, proceedings, Newsletter

http://ec.europa.eu/comm/research/energy/gp/gp_events/action/article_2790_en.htm

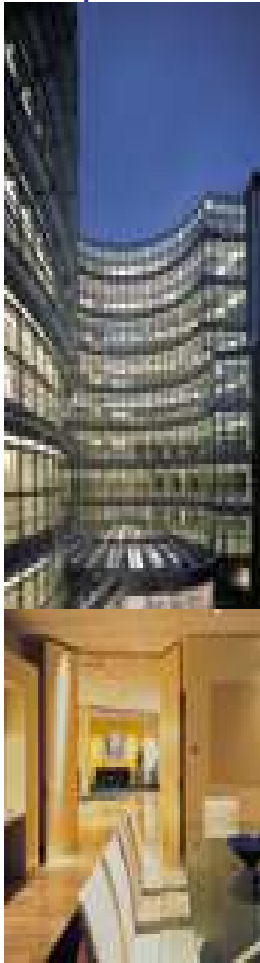
<http://ec.europa.eu/comm/research/energy/pdf/renews4.pdf>



Thank you:

Views expressed in the slide are those of the authors
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or of G. de Wilt

Staying informed...



- **DG TREN Website**

[www.europa.eu.int/comm/energy/demand/
index_en.htm](http://www.europa.eu.int/comm/energy/demand/index_en.htm)

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