

## SUPPORTING WIDER IMPLEMENTATION

**B** Because of its clear advantages, cogeneration technology has spread in Europe. In the EU-25, cogeneration supplies around 13 % of electricity production and 15 % of the heating market. The Commission estimates that CHP could produce 18 % of electricity demand by 2020.

Promoting more cogeneration is important for the Union, as it will help achieve a number of EU policy goals:

- Using energy efficiently is an important element in improving the security of energy supply in Europe. Currently, 50 % of our energy resources are imported and this is likely to rise to 70 % unless energy is used more rationally.
- More efficient energy production requires less fossil fuel and thus reduces greenhouse-gas emissions. So increased use of cogeneration will help the EU meet its Kyoto Protocol commitments on climate change; and it supports sustainable development goals.

However, take-up of cogeneration has stagnated in recent years due to: lack of coherent policies in some Member States, market uncertainties, higher fuel prices for small producers, relatively low prices for generated electricity, barriers to grid access to sell surplus electricity, and relatively high start-up costs. An EU Directive on promoting cogeneration <sup>(1)</sup> aims to help Member States overcome these barriers.

<sup>(1)</sup> 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 (Official Journal L52 of 21.02.2004, p 50), to be implemented by Member States by 21 February 2006.

For further information on the Commission's activities to encourage cogeneration, please see the following website:  
[http://europa.eu.int/comm/energy/demand/legislation/heat\\_power\\_en.htm](http://europa.eu.int/comm/energy/demand/legislation/heat_power_en.htm)

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The European Commission's Directorate-General for Energy and Transport develops and implements policies in these closely linked areas. Energy consumption in the EU is rising, while we are becoming ever more dependent on imported energy sources. Furthermore, the EU's commitments under the Kyoto Protocol make the reduction of greenhouse-gas emissions central to our energy policies. Improving energy efficiency is essential if these goals are to be achieved, and the Commission's 2005 Green Paper on Energy Efficiency, or '**Doing more with less**', underlines the measures that have to be taken in Europe to move towards these goals. Increasing the use of cogeneration – and thereby reducing waste in heat and electricity production – will be a critical factor in improving the Union's overall energy efficiency.

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## COMBINING HEAT AND POWER



Using cogeneration to improve energy efficiency in the European Union

## AN EFFICIENT ALTERNATIVE

**C**ogeneration is the most efficient way of producing electricity and heat simultaneously. By using both the electricity and heat produced together, less energy is wasted in production. Cogeneration – or combined heat and power (CHP) – systems can also be installed close to users, reducing power transmission losses. This makes them even more efficient, and with energy savings, CHP helps reduce both greenhouse-gas emissions and fuel costs.

In contrast, traditional electricity production creates significant unusable heat as an unavoidable by-product, released into the environment. With cogeneration, this is no longer wasted but used to provide heating locally, for example to greenhouses, shopping centres or district-heating systems.

Cogeneration may be applied at a wide range of scales, from one kilowatt in houses to hundreds of megawatts in district heating and industrial schemes. Many types of fuel, such as coal, natural gas and renewable energy sources, may be used so cogeneration is flexible.

In some cases over 90 %, and often over 80 %, of the energy source is converted to a usable output with CHP. In contrast, even the most modern separate production systems for electricity have an overall efficiency of only 50-60 %, and more commonly efficiency is as low as 30-40 %, since the heat produced is not used.

Whilst originally cogeneration meant simultaneous production of electricity and heat, nowadays other outputs, such as mechanical energy instead of electricity, or cooling instead of heating, are quite common. Sometimes three or more simultaneous outputs are delivered, in which case we talk of polygeneration.

## SUPPORTING COGENERATION

**F**or cogeneration to be taken up more widely, it must be economically sustainable. However, as with renewable energy sources, the economics of cogeneration suffers from a lack of integration of the many external costs present in the energy markets. External costs are those that are not included in the price paid by the user; for example, the costs to public health of greenhouse-gas emissions, paid by society at large in higher health costs. As these costs are not factored in, they favour less efficient and more polluting technologies.

Therefore, until the external costs of energy are fully internalised in its price, cogeneration may require government support to encourage take-up. This could be, for example, by subsidising prices, giving tax exemptions, providing investment support or introducing certificate schemes for the electricity produced. The Cogeneration Directive requires Member States to consider giving support to high-efficiency cogeneration schemes within the wider context of other energy-saving measures available to them.

To avoid distortion of competition, and to build knowledge on the effectiveness of national support schemes, the Commission will assess these schemes and review their cost effectiveness and their contribution to a stable cogeneration investment market.

## FACILITATING COGENERATION

**A**s an energy market approach, which in most cases is rather different to the conventional model of heat and electricity provision, cogeneration faces several technical and administrative barriers. Examples of such barriers include the difficulties in accessing the national electricity grid to sell surplus electricity, and the slow approval process for planning applications.

To minimise these barriers the Directive calls on Member States to evaluate their authorisation procedures and, where appropriate, to make changes that encourage the use of cogeneration, reduce regulatory barriers to its implementation, and streamline the administration of applications, including using fast-track procedures if needed.

In addition, Member States must help high-efficiency cogeneration units gain access to the national grid to sell their surplus electricity, as well as ensuring they pay a fair price for any top-up electricity they purchase from the grid. And any rules for grid access must be objective and transparent, and should consider the special needs of the various cogeneration technologies.

## DEFINING HIGH-EFFICIENCY COGENERATION

**T**he Directive defines high-efficiency cogeneration as producing energy savings of over 10 % compared to the separate production of heat and electricity. It proposes a methodology to determine if a cogeneration project – existing or new – meets the ‘high-efficiency’ criterion.

This is to ensure that, where Member States give economic support to cogeneration projects, it is directed only at projects that will result in true energy efficiencies. This is important to avoid distorting competition in the internal electricity market and to maximise the use of cogeneration potential.

However, as cogeneration can be based on diverse technologies, its efficiency depends on many factors, such as the technology and fuel used, and the local climate. So there is a need for various reference values to calculate efficiency savings in order to take such factors into account. For this reason, the European Commission will work together with the Member States in a CHP committee to define, and regularly update, harmonised reference values.

Defining high-efficiency cogeneration on a Europe-wide basis will allow producers to make use of guarantees of origin, thereby widening consumers’ choices to source environmentally friendly electricity.

## MEASURING COGENERATION

**C**ogeneration can be based on a variety of technologies and can be applied in many situations on a range of scales. For example, a medium-sized installation could supply part of a factory’s electricity and heating needs; or a larger district heating installation could supply a town’s domestic and public heating needs while supplying electricity to the national grid. On the smaller scale, hotels or public buildings can use cogeneration efficiently in the right circumstances.

The Directive requires that the Member States investigate the potential for high-efficiency cogeneration in their own countries. Using harmonised guidelines based on scientific data, these investigations will take into account the national context, including factors such as the availability of fuels, industrial infrastructure and the demand for heating.

Once the potential in each Member State has been assessed and reported to the Commission, each one is obliged by the Directive to make substantial progress towards meeting this potential. The statistics on the use of cogeneration that Member States provide will enable the Commission to follow developments in the use of cogeneration, and to assess the need for further initiatives or the setting of concrete targets in the future.