Translation of report

From: Swedish Energy Agency
Date: 1 June 2010
Ref.: 10-2010-487

Report pursuant to Article 6(3) of the Cogeneration Directive (2004/8/EC)

The Energy Agency has produced this assessment of progress towards increasing the share of high-efficiency cogeneration in Sweden. Article 6(3) of the Cogeneration Directive states that:

> 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.

Progress towards increasing the share of high-efficiency cogeneration

The Government instructed the *Fjärrvärmeutredningen* (District Heating Inquiry; N 2003:03)[1] to submit proposals for the implementation of the Cogeneration Directive, including providing an assessment of the extent and potential of high-efficiency cogeneration in Sweden. In the report *Fjärrvärme och kraftvärme i framtiden* (District heating and cogeneration in the future; SOU 2005:33) the inquiry found that:

> Existing Swedish cogeneration plants are highly efficient. As far as I have been able to ascertain, almost all Swedish cogeneration plants operate at around 90% efficiency. My assessment is that regardless of whatever reference values for high-efficiency cogeneration plants the Commission may establish, they would be fulfilled by the Swedish cogeneration plants (p.112).

In the Energy Agency's view, there is no reason to alter this assessment. There is therefore no real reason to increase the share of high-efficiency cogeneration in relation to cogeneration as a whole, when all cogeneration is already high-efficiency.

Total electricity production from high-efficiency cogeneration is increasing each year, however, thanks to the electricity certification scheme and to other policy instruments such as energy tax and carbon dioxide tax.

The objective of the electricity certification scheme, which was introduced on 1 May 2003, is to boost production of electricity from renewable energy sources. The electricity certification scheme is technology-neutral, and promotes the increase of electricity production from renewable sources in a way that favours lower-cost production ahead of more expensive production. This means that the primary beneficiaries of the system are biofuel-based cogeneration and on-shore wind power. The electricity certification scheme is subject to ongoing evaluation.

[1] Supplementary terms of reference to the District Heating Inquiry (Dir. 2004:58)

In 2002, approximately 4.3 TWh of renewable electricity was produced from high-efficiency cogeneration. Since the electricity certification system was introduced in May 2003, this production has increased to approximately 10.4 TWh in 2008, an increase of some 6.1 TWh (see Table 1 below).

Table 1: Production of electricity certificate-eligible renewable electricity (including peat) from high-efficiency cogeneration, TWh. Source: Electricity Certificate System, Energy Agency

	2003 May - Dec	**2004**	**2005**	**2006**	**2007**	**2008**
Industrial back pressure	2.8	4.7	4.7	5.0	5.6	5.9
Cogeneration	1.4	3.5	3.8	4.1	4.0	4.5
Total	**4.2**	**8.2**	**8.5**	**9.1**	**9.6**	**10.4**

Total production of high-efficiency cogeneration (including that not eligible for electricity certificates) is set out in the table below.

Table 2: Electricity production from cogeneration, TWh. Source: Statistics Sweden

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Industrial back pressure	4.6	4.7	4.6	4.6	5.0	5.7	6.2
Cogeneration	6.3	7.9	8.3	7.3	7.3	7.8	8.1
Total	**10.8**	**12.6**	**12.9**	**11.8**	**12.3**	**13.5**	**14.3**

Cogeneration has thus also increased its share of Sweden's total electricity production (see Figure 1). The proportion of district heating produced by cogeneration shows a similarly positive trend (see Figure 2).

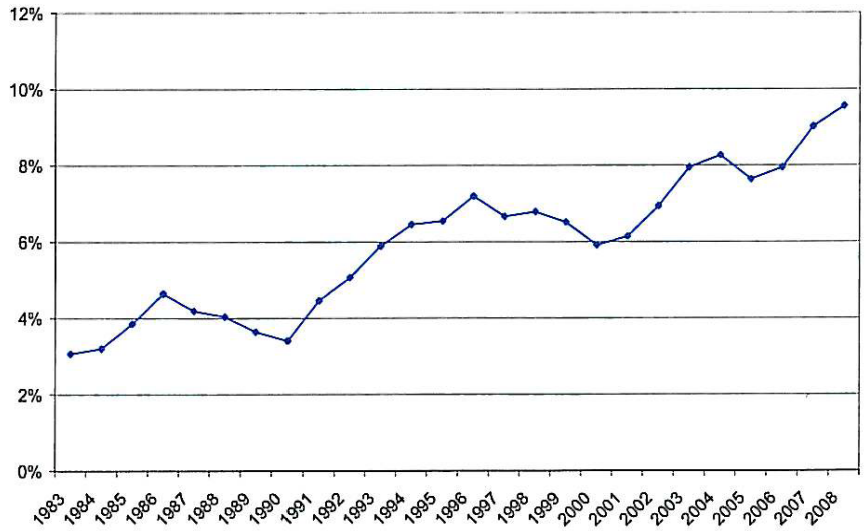


Figure 1 Electricity production through cogeneration (district heating and industry) in relation to total energy production. Source: Energy indicators 2010, Energy Agency.

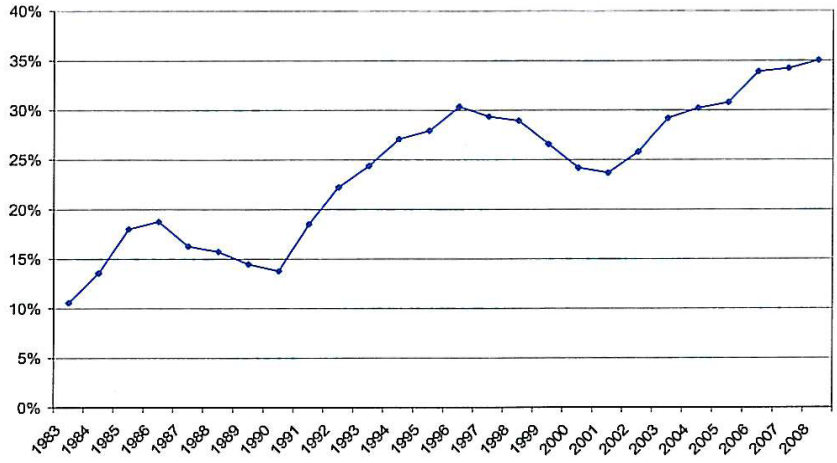
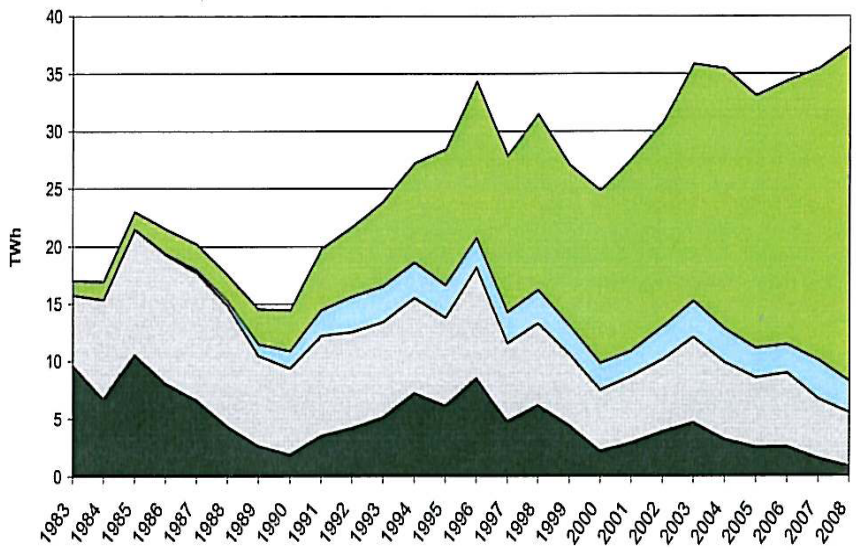


Figure 2 District heating production through cogeneration in relation to total district heating production. Source: Energy indicators 2010, Energy Agency.

Note: This does not include heat produced in industry, only heat produced for the district heating networks.

The increase has mainly taken place via the use of biofuels, at the same time as the use of fossil fuels has fallen. Figure 3 shows trends in fuels used in cogeneration plants in the district heating networks.



[Black] Oil [Light grey] Coal and coke [Blue] Natural gas [Green] Biofuel

Figure 3 Fuels used in cogeneration plants in the district heating networks. Source: Energy indicators 2010, Energy Agency.

In conclusion, the Energy Agency notes that that there is growth in the use of high-efficiency cogeneration in Sweden in absolute terms and as a proportion of electricity production, and that the proportion of district heating produced by cogeneration is growing. High-efficiency cogeneration's share of all cogeneration is estimated to be 100%.