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**Sweden's annual report pursuant to Article 24 (1) of Directive 2012/27/EU of the
European Parliament and of the Council on energy efficiency**

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1 Conditions for Member States' annual reporting on progress towards national energy efficiency targets

Pursuant to Article 24(1) of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, each Member State must by 30 April of each year starting in 2013 report on the progress achieved towards national energy efficiency targets.

A detailed framework for the annual reporting is presented in Annex XIV, part 1, to the Directive. It shows which indicators provide a basis for monitoring progress towards the indicative national energy efficiency target for 2020.

According to that framework, the first report must, in addition to the information to be reported annually, also include the indicative national energy efficiency target referred to in Article 3(1). That Article requires Member States to set an indicative national energy efficiency target on the basis of either primary or final energy consumption, primary or final energy savings, or energy intensity. Member States must notify these targets to the Commission by 30 April 2013. When doing so, they must also express those targets in terms of an absolute level of primary energy consumption and final energy consumption in 2020 and must explain how, and on the basis of which data, this has been calculated. When setting those targets, Member States must take into account:

- a) that the Union's 2020 energy consumption has to be no more than 1 474 Mtoe of primary energy or no more than 1 078 Mtoe of final energy;
- b) the measures provided for in this Directive;
- c) the measures adopted to reach the national energy saving targets adopted pursuant to Article 4(1) of Directive 2006/32/EC; and
- d) other measures to promote energy efficiency within Member States and at Union level.

When setting those targets, Member States may also take into account national circumstances affecting primary energy consumption, such as:

- a) remaining cost-effective energy-saving potential;
- b) GDP evolution and forecast;
- c) changes of energy imports and exports;
- d) development of all sources of renewable energies, nuclear energy, carbon capture and storage; and
- e) early action.

2 Indicative national target for energy efficiency

2.1 National target for reduced energy intensity

In spring 2009 the Swedish Riksdag adopted a national target of 20% higher energy efficiency by 2020. It is expressed as a cross-cutting objective for a 20% reduction in energy intensity between 2008 and 2020. According to the objective, Sweden's energy intensity measured as the energy supplied per unit of GDP at fixed prices should fall by 20% between 2008 and 2020. The target is an integral part of the energy-policy decisions of 2009 (Government Bill 2008/09:163, Committee Report 2008/09:NU25, Riksdag Communication, 2008/09:301) made on the basis of the Coalition Government's agreement on energy- and climate-policy issues (Government Bill 2008/09:163). The target was set having regard to, among other things, the EU's energy efficiency target for 2020 and national circumstances pursuant to the provisions of Article 3(1) of Directive (2012/27/EU) on energy efficiency.

This objective has already been notified to the European Commission as the Swedish energy efficiency target within the framework of the national reform programme prepared in connection with the EU's growth strategy for 2020, Europa 2020, and referred to in Council Recommendation 2010/410/EU of 13 July 2010 on broad guidelines for the economic policies of the Member States and of the Union¹.

2.2 Estimate of the absolute level of primary and final energy consumption at target attainment

Article 3(1) of Directive 2012/27/EU on energy efficiency states that when notifying the indicative national target to the Commission, Member States must also express that target in terms of an absolute level of primary energy consumption and final energy consumption in 2020 and explain how, and on the basis of which data, this has been calculated.

According to Sweden's energy efficiency target, the energy supplied per unit of GDP at fixed prices, i.e. the energy intensity, is to be 20% lower in 2020 than in 2008. The concept of energy supplied is not used in the Energy Efficiency Directive. Instead, the concept used is that of primary energy consumption, defined in Article 2(2) as "gross inland consumption, excluding non-energy uses". In order to be able to compare Sweden's energy intensity target with the EU's energy efficiency target, the numerator in Sweden's target (i.e. energy supplied) must also be based on gross inland consumption excluding non-energy uses (primary energy consumption). In Sweden's official energy statistics it corresponds to the total amount of energy input minus the energy used for international transport and non-energy uses.

In 2008 Sweden's primary energy consumption (within the meaning of the Directive) rose to 534 TWh and GDP to SEK 3 263 billion (2009 prices). This means that the energy intensity was 164 Wh/SEK (GDP₂₀₀₉). In order for Sweden's energy intensity target to be reached, the energy intensity must be 131 Wh/SEK (GDP₂₀₀₉) in 2020. Table 1 shows the primary energy consumption at target attainment for various values of the average GDP₂₀₀₉ in 2008-2020.

¹ OJ L 191, 23.7.2010, p. 28.

Table 1. Primary energy consumption at target attainment in 2020 for various values of the average annual GDP

Annual GDP growth 2008 to 2020	GDP ₂₀₀₉ 2020 [SEK billion]	Energy intensity [Wh/SEK]	Primary energy consumption [TWh]
0.0%	3 263	131	427
1.0%	3 677	131	482
2.0%	4 138	131	542
3.0%	4 652	131	609
4.0%	5 224	131	684
5.0%	5 860	131	768

Final energy consumption is the end-use of energy, i.e. the electricity, district heating, fuel, etc. used by industry, the transport sector, dwellings and services, etc. The difference between energy supplied and final energy consumption consists of energy conversion losses and distribution losses and of the use of energy for international transport and non-energy uses (which are already excluded in this case). Official statistics (1983-2011) show no constant link between final energy consumption and energy supplied (primary energy consumption). However, there is a link between final energy consumption and energy supplied adjusted for losses in nuclear power. The relationship between them can be considered constant², see equation 1. Nuclear power production, and, subsequently, its losses, are considered to be independent of growth rates and final energy consumption.

(1)

$$\frac{\text{final energy consumption}}{\text{primary energy consumption} - \text{nuclear power losses}} = 0.90$$

When energy supplied is adjusted for nuclear power losses, there are three options for these losses (see Table 2). Options 1 and 3 are based on the historical minimum and maximum values³ of 97 and 152 TWh, respectively. Option 2 is the historic mean value⁴ of 131 TWh.

² Standard deviation = 0.0086

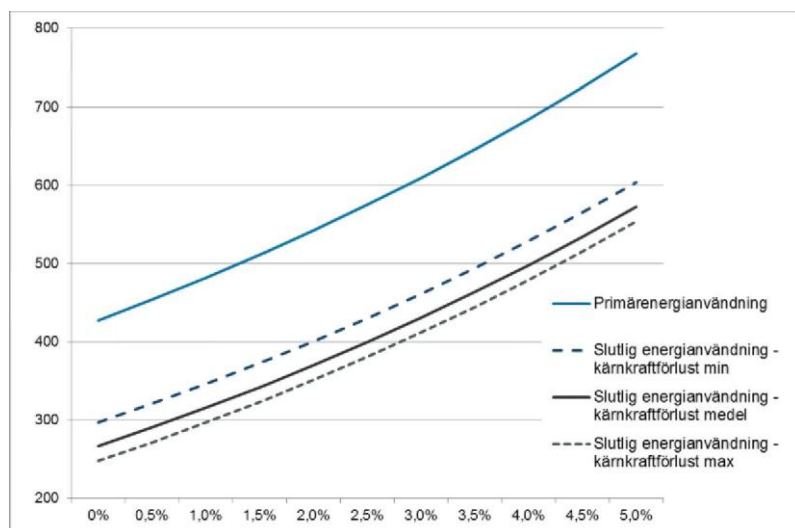
³ The minimum and maximum values for 1986-2011 (the newest reactors started operating in 1985).

Table 2. Final energy consumption at target attainment in 2020 for various values of the average annual GDP₂₀₀₉ evolution in 2008-2020 and for various nuclear-power-loss scenarios.

Annual GDP growth 2008 to 2020	1. Nuclear power min	2. Nuclear power avg	3. Nuclear power max
0.0%	297	267	248
1.0%	346	316	297
2.0%	401	370	351
3.0%	461	431	412
4.0%	529	498	479
5.0%	604	573	554

Figure 1 summarises the primary and final energy consumption in 2020 at attainment of Sweden's energy intensity target at different growth rates.

Figure 1. Primary and final energy consumption (TWh) at target attainment in 2020 for various values of annual average GDP evolution per year (%) and for various nuclear-power-loss scenarios.



⁴ Mean value for 1986-2011.

primärenergianvändning: primary energy consumption

slutlig energianvändning: final energy consumption

kärnkraftsförluster min/medel/max: nuclear power losses min/avg/max

3 indicators for monitoring progress towards the indicative national energy efficiency target

Annex XIV, part 1, to the Directive provides a general framework for the annual reports to be submitted to the Commission by Member States pursuant to Article 24(1). The reporting framework includes a number of indicators, for which annual values are to be reported two years before the current year. Thus the indicators in the 2013 report concern 2011.

Table 3. Indicators for monitoring progress towards the indicative national energy efficiency target

Indicator	Unit	Value in 2011
i) Primary energy consumption, defined as gross inland consumption, excluding non-energy uses	[TWh]	519
ii) Total final energy consumption	TWh	378
iii) Final energy consumption	TWh	379
- of which industry	TWh	144
- of which transport (split between passenger and freight transport, if available)	TWh	91
- of which households and services	TWh	144
iv) Gross value added by sector:		
- industry (SNI 10-33)	SEK million 2011	515 314
- services (SNI 45-98)	SEK million 2011	1 552 525
v) Disposable income of households	SEK million 2011	275 200
vi) Gross domestic product, GDP	SEK million 2011	3 499 914
vii) Electricity production from thermal power production	GWh	74 743
- of which nuclear power	GWh (net)	58 026
viii) Electricity production from CHP plant, including in industry	GWh (net)	16 708

ix) Heat generation from thermal power production	GWh	n/a ^a
x) Heat production from CHP plant, including industrial waste heat	GWh	35 304
- <i>of which industrial waste heat</i>	<i>GWh</i>	<i>1 298</i>
xi) Fuel input for thermal power production	GWh	187 260
- <i>of which oil</i>	<i>GWh</i>	<i>1 100</i>
- <i>of which natural gas</i>	<i>GWh</i>	<i>2 530</i>
- <i>of which biofuels</i>	<i>GWh</i>	<i>13 300</i>
- <i>of which coal, including coke oven gas and blast furnace gas</i>	<i>GWh</i>	<i>2 330</i>
- <i>of which nuclear fuel</i>	<i>GWh</i>	<i>168 000</i>
xii) Occupant kilometre	Million okm	141 700
xiii) Tonne-kilometre	Million tkm	97 500
xiv) Population (as at 31/12/2011)	People	9 483 000

a Data on heat production from thermal power production is not available in Sweden's energy statistics.