REGERINGSKANSLIET

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The Swedish National Action Plan for the promotion of the use of renewable energy in accordance with Directive 2009/28/EC and the Commission Decision of 30.06.2009.

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1 Summary of the national policy on energy from renewable energy sources

The Swedish energy policy is based on the same keystones as the cooperation on energy within the EU and aims to reconcile sustainability, competitiveness and security of supply. The vision is that in 2050 Sweden will have a sustainable and resource efficient energy supply and with no net emission of greenhouse gases into the atmosphere. The energy policy will create the conditions for an efficient and sustainable energy usage and a cost-effective Swedish energy supply with a low negative effect on health, the environment and the climate that also facilitates the conversion to an ecologically sustainable society. This will enable sound economic and social development to be promoted in the whole of Sweden. The energy policy will contribute to broadening the cooperation with regard to energy, the environment and the climate in the Baltic Sea Region.

Sweden has for many years had a policy for the promotion of renewable energy as part of an overarching policy for sustainable development and efficient use of resources. The aim has been to reduce our dependency on oil and enhance our degree of self-sufficiency, to reduce the impact on the climate from the energy sector, to enhance competitiveness and to develop technology and industry and commerce. Even though policies for the promotion of renewable energy are not in themselves an innovation, new components with binding European targets do exist. Sweden does currently have targets and has had targets in the past. These are now being made more stringent by the government bills 2008/09:162 and 2008/09:163 *om en sammanhållen klimat- och energipolitik* (on an integrated climate and energy policy).

Targets

The Swedish Parliament (Riksdagen) has, at the suggestion of the Government, decided that the proportion of renewable energy in 2020 will be at least 50% of the total energy usage. The proportion of renewable energy in the transport sector must at the same time be at least 10%. The target for 2020 must also be seen in the light of the Government's long-term ambition that Sweden should have a vehicle fleet that is independent of fossil fuels and with no net emission of greenhouse gases into the atmosphere. The Swedish Parliament also decided that a target of 20% increase in the efficiency of energy usage should be set for 2020. The target is expressed as a cross-sectoral target for reduced energy intensity of 20% between 2008 and 2020.

In order to achieve the target of at least 50% renewable energy by 2020, the Government has put forward a number of proposals, including the further development of the electricity certificate scheme for renewable electricity generation. The previous target for new renewable electricity (i.e. to effect an increase of 17 TWh between 2002 and 2016) has been revised and a new target for an increase of 25 TWh by 2020 has been decided on by the Swedish Parliament.

The Swedish Parliament has, at the suggestion of the Government, reached a decision on government bill *Genomförande av direktiv om förnybar energi* (Implementation of the Directive on Renewable Energy) (government bill 2009/10:128) and *Hållbarhetskriterier för*

biodrivmedel och flyttande biobränslen (Sustainability criteria for biofuels and bioliquids) (government bill. 2009/10:164). Both of the government bills contain measures to implement the Directive on the promotion of the use of energy from renewable sources (2009/28/EC). The government bill, *Genomförande av direktivet om förnybar energi* (Implementation of the Directive on Renewable Energy), contains legislative proposals that aim to implement the provisions of the Directive with regard to guarantees of origin and access to and operation of the electricity and gas grid. The government bill *Hållbarhetskriterier för biodrivmedel och flyttande biobränslen* (Sustainability criteria for biofuels and bioliquids) (government bill 2009/10:164) contains legislative proposals to implement the provisions of the Directive with regard to sustainability criteria.

The Swedish Parliament has, at the suggestion of the Government, decided on a national planning framework for wind power that corresponds to 30 TWh by 2020, of which 20 TWh will be on land and 10 TWh will be offshore. A number of simplifications have been made in the examination process for wind power.

The Government's vision is that by 2030 Sweden will have a vehicle fleet that is independent of fossil fuels. The Government's view in the government bill *Genomförande av direktivet om förnybar energi (2009/10:128)* (Implementation of the Directive on Renewable Energy) is that what a fossil fuel independent vehicle fleet actually entails should be put into concrete terms. Furthermore, the link between the national target of at least a 10% share of renewable energy consumption in the transport sector by 2020 and the vision for 2030 should be analysed. Using this analysis as the starting point, we will need to consider how the efforts to fulfil these objectives can be most effectively coordinated. The Government's action plan includes both tax proposals and targeted initiatives. The Government believes that a prerequisite for quickly increasing the use of biofuels and at lower costs is to increase the opportunities to blend biofuels with petrol and diesel. The Government is keen to implement the EU's new fuel quality directive that will allow up to 10% ethanol to be blended with petrol and 7% FAME to be blended with diesel oil.

General instruments

General economic instruments, such as carbon dioxide tax, international emissions trading and certificates for renewable electricity are fundamental to the long-term energy policy. The economic instruments should be gradually developed and exceptions limited as far as possible, taking into account the risk of carbon dioxide leakage and the competitiveness of Swedish trade and industry. The instruments must be complemented by both technology development initiatives and information and initiatives to remove institutional obstacles to renewal.

The Government is working at an international level towards the increased use of economic instruments in the form of increased emissions trading or carbon dioxide tax in order to reduce emissions of greenhouse gases.

The total annual trade in electricity certificates on the market is expected to be in the order of SEK 4.5 billion.

Research

From 2009 the Swedish Energy Agency (Energimyndigheten) will make available just over SEK 1 billion per year for energy research. In addition to this, in the energy sector the annual

grants to universities and technical colleges will increase by SEK 50 million in 2010, by a further SEK 50 million in 2011 and by a further SEK 60 million in 2012. The financing is being targeted at the following areas: large-scale renewable electricity generation and its integration into the electricity grid, electric propulsion systems and hybrid vehicles, waste refineries, biofuels and renewable materials as well as fundamental energy research into, for example, new nuclear technology and carbon dioxide capture and storage.

In addition to the investment into energy research that took place in the research and innovation government bill, the decision reached by the Swedish Government will involve an increase, compared with the 2008 level, in the energy research grant of a further SEK 145 million in 2009, SEK 380 million in 2010 and SEK 350 million in 2011. This will be for the purpose of facilitating the demonstration and commercialisation of a new technology for renewable energy.

The investment will initially relate to second generation biofuels and subsequently to the demonstration and commercialisation of other energy technologies of major national importance and with extensive export potential.

Targeted initiatives

In the budget proposal for 2009 a total of SEK 389 million per year was appropriated for investment into solar photovoltaic cells and biogas for the period 2009-2011. New state aid for solar photovoltaic cells was introduced on 1 July 2009 and on 1 November 2009 new government support was introduced for measures for the generation, distribution and use of biogas and other renewable gases for the purpose of supporting technologies that are not yet commercially viable. The Swedish Parliament has approved SEK 122 million to be assigned during 2010. For 2011 the grant has been estimated at SEK 117 million. A further SEK 50 million was provided during 2009 for the state aid for the installation of solar photovoltaic cells.

In the decision on the budget proposal for 2010 SEK 70 million has also been allocated for the market introduction of wind power for 2010-2012, as well as further enhancements of the wind power network and aid for planning initiatives for wind power.

The Swedish Energy Agency is responsible for the implementation of state aid for measures for the generation, distribution and use of biogas and other renewable gases, for aid for solar photovoltaic cells and for the market introduction of wind power. The Swedish Energy Agency has received additional funding of SEK 89 million per year to enable it to perform its tasks.

Aid for farm-based biogas production is included within the framework of Landbygdsprogrammet (the Rural Development Programme). Between 2009 and 2013 SEK 200 million has been allocated for investments linked to this type of biogas generation.

SEK 280 million is being provided to fund conversion from direct-acting electric heating in single-family houses, multi-residence houses and associated premises for 2010. SEK 24 million is being provided as funding for the installation of solar heating for 2010.

Delegationen för hållbara städer (Delegation for Sustainable Cities) is to reach a decision on contributions amounting to SEK 340 for the development of sustainable cities, including

funding for renewable energy, for 2009-2010. The decision for 2009 on SEK 140 million was announced in December 2009.

There will also be investment in renewable fuels and the development of alternative technologies. A number of measures have been proposed to promote motor vehicles with low environmental impact, including the exemption of environmentally friendly motor vehicles that enter into service from 1 July 2009 from motor vehicle tax for a period of five years. The definition of an environmentally friendly motor vehicle will be successively made more stringent. A number of changes to the taxation of motor vehicles have been introduced, something that aims to improve the incentive for using private motor vehicles and commercial motor vehicles with lower carbon dioxide emissions.

2 Expected Final Energy Consumption 2010-2020

In this section, estimations of the expected final gross energy consumption of all types of energy, both as a total and by sector, are given for the period to 2020. Two scenarios, the reference scenario and the additional energy efficiency scenario have been illustrated.

The reference scenario includes only energy efficiency and energy saving measures that had been implemented prior to 2009. However, the main scenario, which is called additional energy efficiency also, includes the measures that are being implemented from 2009.

The illustrated additional energy efficiency scenario is the Swedish Energy Agency's prediction. The Swedish Energy Agency uses decisions that have already been made as a starting point in its predicting methodology. Since the basic assumptions of the prediction were made prior to the Swedish Parliament having reached a decision on a comprehensive energy efficiency programme (government bill 2008/09:165, report 2008/09 NU25, Riksdag notification 2008/09:301) in June 2009, it has not been possible for all of the measures for additional energy efficiency that have currently been decided on to be included in the main scenario of the prediction. Additional new measures will be introduced, for example, through the renegotiated Directive on the energy performance of buildings as well as additional requirements through, inter alia, the Ecodesign Directive. It has not been possible to consider these in the prediction.

The prediction in the additional energy efficiency scenario shows an increase in energy consumption in real terms of approximately 14% between 2005 and 2020. A smaller increase in energy consumption as a consequence of increased investment in the area of energy efficiency would have an effect on Sweden's proportion of renewable energy. One factor that could have an influence on future energy consumption is the financial crisis.

The reference scenario was devised by the Swedish Energy Agency by attempting to discount energy efficiency initiatives and spontaneous energy efficiency in the consumer sectors (industry, residential accommodation, the service industry and transport).

Table 1: Expected final gross energy consumption of Sweden in heating and cooling, electricity and transport up to 2020 taking into account the effects of energy efficiency and energy saving measures[1] 2010-2020 (ktoe)

	2005	2010		2011		2012		2013		2014	
	Base year	Ref. scenario	Additional energy efficiency	Ref. scenario	Additional energy efficiency	Ref. scenario	Additional energy efficiency	Ref. scenario	Additional energy efficiency	Ref. scenario	Additional energy efficiency
1) Heating and cooling[2]	13 190	15 339	14 448	15 769	14 700	16 199	14 951	16 628	15 203	17 058	15 455
2) Electricity[3]	12 987	13 650	13 089	13 783	13 109	13 915	13 130	14 048	13 150	14 181	13 170
3) Transport according to Article 3.4 a[4]	7 473	7 923	7 686	8 013	7 728	8 103	7 771	8 193	7 813	8 283	7 856
4) Final gross energy consumption.[5]	34 519	37 826	36 089	38 487	36 404	39 148	36 718	39 810	37 032	40 471	37 346

	2015		2016		2017		2018		2019		2020	
	Ref. scenario	Additional energy efficiency	Ref. scenario	Additional energy efficiency	Ref. scenario	Additional energy efficiency	Ref. scenario	Additional energy efficiency	Ref. scenario	Additional energy efficiency	Ref. scenario	Additional energy efficiency
1) Heating and cooling	17 488	15 706	17 918	15 958	18 347	16 209	18 777	16 461	19 207	16 713	19 637	16 964
2) Electricity	14 314	13 191	14 446	13 211	14 579	13 232	14 712	13 252	14 844	13 273	14 977	13 293
3) Transport	8 373	7 898	8 463	7 941	8 553	7 983	8 643	8 026	8 733	8 068	8 823	8 111
4) Final gross energy consumption.	41 132	37 660	41 794	37 974	42 455	38 288	43 117	38 603	43 778	38 917	44 439	39 231

[1] These estimates on energy efficiency and energy savings must be consistent with other such estimates that Member States notify to the Commission, notably in Action Plans under the Energy Services Directive and the Energy Performance of Buildings Directive. If different units are used in those Action Plans, the conversion factors applied should be indicated.

[2] The final energy consumption of all energy commodities except electricity for purposes other than transport, plus the consumption of heat for own use at electricity and heat plants and heat losses in networks (items "2. Own use by plant" and "11. Transmission and distribution losses" on pages 23 and 24 of förordningen om energistatistik, EUT L 304, 14.11.2008) (Ordinance on energy statistics).

[3] The gross electricity consumption is the gross national electricity generation, including autoproduction, plus imports, minus exports.

[4] Transport consumption as defined in Article 3(4)(a) of Directive 2009/28/EC. Renewable electricity in road transport for this figure should be multiplied by a factor of 2.5, as indicated by Article 3(4)(c) of Directive 2009/28/EC.

[5] As defined in Article (2)(f) of Directive 2009/28/EC. This comprises the final energy consumption plus network losses and own use of heat and electricity at electricity and heating plants (NB: this does not include consumption of electricity for pumped hydro storage or for transformation in electrical boilers or heat pumps at district heating plants).

3 Renewable energy targets and trajectories

3.1 National overall target

The Swedish Parliament has adopted a national overall target for renewable energy of 50%, i.e. one percentage point above the binding national target in accordance with Directive 2009/28/EC. The prediction shows that the proportion of renewable energy in relation to the total final energy consumption is expected to be 50.2% in 2020. Sweden therefore predicts that it will have a surplus of approximately 1.2% in 2020 but the surplus does lie within an uncertainty interval. In energy terms, this surplus corresponds to approximately 5.6 TWh (486 ktoe).

There are a number of uncertainty factors associated with the prediction. Something that can have a major effect on the fulfilment of the overall target is a possible introduction of sustainability criteria for solid biofuels. There is a risk that an increased administrative burden could lead to small operators within the forestry industry refraining from certifying the biofuel as sustainable. This would mean that even if the biofuel did fulfil the requirements, it would not be included in the achievement of the target. Another uncertainty factor is the trends in energy consumption. One factor that could have an influence on future energy consumption is the financial crisis. This prediction shows an increase in energy consumption in real terms of approximately 14% between 2005 and 2020. A smaller increase in energy consumption as a consequence of increased investment in the area of energy efficiency would have an effect on Sweden's proportion of renewable energy. A further uncertainty factor is the development within the paper and wood pulp industry. Since this industrial sector represents a large share of the total biofuel consumption, reduced activity within this sector would have an impact upon Sweden's share of renewable energy.

Table 2: National overall target for the share of energy from renewable sources in gross final consumption of energy in 2005 and 2020 (figures to be transcribed from Annex I, Part A to Directive 2009/28/EC):

	EU target 39.8	**National target**
A) Share of energy from renewable sources in gross final consumption of energy in 2005 (S2005) (%)|		
B) Target of energy from renewable sources in gross final consumption of energy in 2020 (S2020) (%)	**49**	**50**
C) Expected total adjusted energy consumption in 2020 (ktoe)	**39 231**	
D) Expected amount of energy from renewable sources corresponding to the 2020 target (calculated as B x C) (ktoe)	**19 223**	

3.2 Sectoral targets and trajectories

The Swedish Parliament has adopted a target for increasing electricity generation within the electricity certificate scheme by 25 TWh for 2020 compared with 2002. There are other types

of renewable electricity generation in addition to the generation of renewable energy that is included in the electricity certificate scheme, namely large-scale hydroelectric power that was in operation prior to the commissioning of the electricity certificate scheme in 2003, electricity generation based on the incineration of the renewable part of the waste and electricity generation based on certain bio oils.»Since the electricity certificate scheme provides support for a maximum of 15 years, there will also probably be other renewable electricity production outside of the electricity certificate scheme by 2020. The Swedish Parliament has also adopted a target for the transport sector of a minimum of 10% renewable energy.

The prediction[6] in this action plan forms the basis for the Government's opinion regarding indicative sectoral targets. It is the opinion of the Government that the share of renewable energy consumption in the electricity sector should be at least 63% by 2020. The respective shares in the heating and cooling sector should be at least 62% by 2020. It is important to stress that 90% of the share of renewable energy in the heating and cooling sector is based on biomass and that a prerequisite for the target for this sector (and also the overall target for Sweden) being achievable is that the biomass must be qualifiable with regard to a possible introduction of sustainability criteria for solid biofuels. Furthermore, it is the opinion of the Government that the share of renewable energy consumption in the transport sector, using the calculation method specified in the Directive, must be at least 14% by 2020.

According to the prediction, Sweden lies above the indicative trajectory for the entirety of the prediction period, but the margin will decrease and will be 1.2 percentage points by 2020, which falls within the uncertainty interval of the prediction. See Figure below.

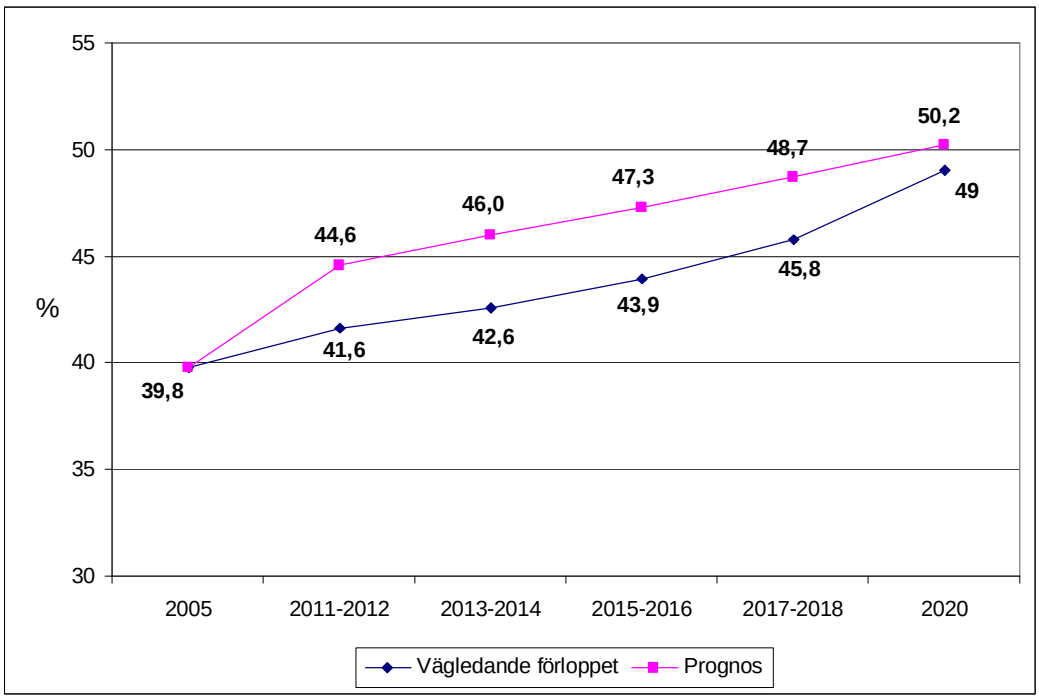

Figure 1. The indicative trajectory versus the predicted development in the share of renewable energy in Sweden. See Annex 2.

Key to chart:
Vägledande förloppet – indicative trajectory

[6] The prediction contained in this action plan is the same as that given in Article 4.3 on 17 December 2009.

The implicit sectoral shares, together with the outcome of the overall target as a result of the prediction, are shown in Table 3 below.

Tables 4a and 4b show the underlying figures that are necessary in order to calculate the predicted sectoral shares.

Table 3: National 2020 target and estimated trajectory of energy from renewable in heating, cooling, electricity and transport

(Calculation tables 4a and 4B are expected to guide the preparation of table 3).

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Renewable energy sources within the areas of heating and cooling[7] (%)	537%	57.0%	57.6%	58.2%	58.7%	59.3%	59.8%	60.3%	60.8%	61.2%	61.7%	62.1%
Electricity generation from renewable sources[8] (%)	50.9%	54.9%	55.7%	56.5%	57.3%	58.1%	58.9%	59.7%	60.5%	61.3%	62.1%	62.9%
Renewable energy sources within the area of transport[9] (%)	4.0%	7.4%	8.1%	8.8%	9.4%	10.1%	10.7%	11.3%	11.9%	12.5%	13.2%	13.8%
Overall share of renewable energy sources[10] (%)	39.7%	43.5%	44.2%	44.9%	45.6%	46.3%	47.0%	47.7%	48.3%	49.0%	49.6%	50.2%
Of this from the cooperative mechanism[11] (%)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Surplus from the cooperative mechanism[12] (%)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

As Part B of Annex I to the Directive	2011-2012	2013-2014	2015-2016	2017-2018	2020
	S_{2005}+**20 %** (S_{2020}-S_{2005})	S2005 +**30 %** (S_{2020}-S_{2005})	S2005 +**45 %** (S_{2020}-S_{2005})	S2005 +**65 %** (S_{2020}-S_{2005})	S_{2020}
Minimum trajectory for renewable energy sources[13] (%)	41.64	42.56	43.94	45.78	49
Minimum trajectory for renewable energy sources (ktoe)	16 336	16 697	17 238	17 600	19 223

[7] Share of renewable energy in heating and cooling: gross final consumption of energy from renewable sources for heating and cooling (as defined in Articles 5(1)b) and 5(4) of Directive 2009/28/EC) divided by gross final consumption of energy for heating and cooling.

[8] Share of renewable energy in the area of electricity: gross final consumption of electricity from renewable sources (as defined in Articles 5(1)(a) and 5(3) of Directive 2009/28/EC) divided by gross final consumption of electricity.

[9] Share of renewable energy in the area of transport: final energy from renewable sources consumed within the area of transport (see Articles 5(1)(c) and 5(5) of Directive 2009/28/EC) divided by the consumption in the area of transport of 1) petrol; 2) diesel; 3) biofuels used in road and rail transport and 4) electricity in the area of land transport.

[10] Share of renewable energy in gross final energy consumption.

[11] In percentage points of the overall share of renewable energy sources.

[12] In percentage points of the overall share of renewable energy sources.

[13] As defined in Annex I.B to Directive 2009/28/EC.

Table 4a: Calculation table for the renewable energy contribution of each sector to final gross energy consumption (ktoe)

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
(A)Expected gross final consumption of renewable energy sources for heating and cooling	**7 084**	**8 237**	**8 468**	**8 698**	**8 929**	**9 159**	**9 390**	**9 620**	**9 851**	**10 082**	**10 312**	**10 543**
(B)Expected gross final consumption of electricity from renewable energy sources	**6 605**	**7 189**	**7 305**	**7 422**	**7 539**	**7 656**	**7 772**	**7 889**	**8 006**	**8 123**	**8240**	**8 356**
(C)Expected final consumption of energy from renewable energy sources in transport	**288**	**528**	**576**	**624**	**672**	**720**	**768**	**816**	**864**	**912**	**960**	**1 008**
(D)Expected total energy consumption from renewable energy sources[14]	**13 689**	**15 695**	**16 097**	**16 498**	**16 899**	**17 301**	**17 702**	**18 103**	**18 505**	**18 906**	**19 307**	**19 709**
(E)Expected transfer of renewable energy sources to other Member States [15]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(F)Expected transfer of renewable energy sources from other Member States and third countries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(G)Expected consumption of energy from renewable energy sources adjusted for target D - E + F	**13 689**	**15 695**	**16 097**	**16 498**	**16 899**	**17 301**	**17 702**	**18 103**	**18 505**	**18 906**	**19 307**	**19 709**

[14] According to Article 5(1) of Directive 2009/28/EC, gas, electricity and hydrogen from renewable energy sources shall only be considered once. No double counting is allowed.
[15] See also Section 4.7.

Table 4b: Calculation table for the renewable energy in transport share (ktoe)

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
(C)Expected consumption of energy from renewable energy sources in transport [16]	287.6	527.7	575.8	623.8	671.8	719.9	767.9	815.9	864.0	912.0	960.0	1008.1
H)Expected consumption of energy from renewable energy sources in road transport [17]	0.0	3.0	3.5	4.1	4.7	5.3	5.9	6.5	7.1	7.7	8.3	8.9
(I)Expected consumption of biofuels from wastes, residues, non-food cellulosic and lingo-cellulosic material in transport [18]	13.4	40.3	45.7	51.1	56.5	61.9	67.2	72.6	78.0	83.4	88.8	94.2
J)Expected renewable energy sources contribution to transport for target for the transport sector: C+(2.5-1)xH+(2-1)x(I)	301.0	572.5	626.8	681.1	735.4	789.7	844.0	898.3	952.6	1006.9	1061.2	1115.5

[16] Covers all renewable energy sources used in the area of transport including electricity, hydrogen and gas from renewable energy sources, but excluding biofuels that do no comply with the sustainability criteria (see Article 5(1) last Subparagraph). Specify the actual values here without using the multiplication factors.
[17] Specify the actual values here without using the multiplication factors.
[18] Specify the actual values here without using the multiplication factors.

4 Measures for achieving the targets

4.1 Overview of all plans and measures to promote the use of energy from renewable sources

Table 5: Overview of all plans and measures

Name and reference of the measure	Type of measure*	Expected result**	Targeted group and/or activity***	Existing or planned	Start and end dates of the measure
Energy tax *Lag (1994:1776) om skatt på energi* (Act (1994:1776) on energy tax)	Financial	Fiscal and steering tax for more efficient energy consumption and increased share of renewable energy	Households, enterprises	Existing and planned adjustments	Energy tax on petrol 1924, on the majority of other liquefied petroleum products and carbon fuels 1957, on LPG 1964 and on natural gas 1985-
Sulphur tax *Lag (1994:1776) om skatt på energi* (Act (1994:1776) on energy tax)	Financial	Environmental tax to reduce sulphur emissions	Industry and power plants, the transport sector, heating	Existing	1991-
Carbon dioxide tax *Lag (1994:1776) om skatt på energi* (Act (1994:1776) on energy tax)	Financial	Environmental tax to reduce sulphur emissions	Households, enterprises	Existing and planned adjustments	1991
Nitrous oxide tax *Lag (1990:613) om miljöavgift på utsläpp av kväveoxider vid energiproduktion* (Act (1990:613) on environment charges on emissions of nitrous oxides from energy generation)	Financially regulatory	Miljöstyrande avgift, steering towards reduced emissions, no direct promotion of renewable fuels.	Industry and power plants, at least 25 GWh per year.	Existing	1992-
Exemption from energy and carbon dioxide tax for CO_2-neutral fuels and for vegetable and animal oils and fats and biogas as a heating fuel *Lag (1994:1776) om skatt på energi (*Act (1994:1776) on energy tax)	Financial	Promotes the use of bioenergy.	Biofuels	Existing	1991-
Electricity certificate scheme, *Lag (2003:113) om elcertifikat* (Act (2003:113) concerning electricity certificates)	Financially regulatory	25 TWh new renewable electricity generation (previously 17 TWh) for 2020 (previously for 2016) compared with 2002	Quota-bound electricity suppliers/consumers and producers of renewable electricity	Existing and adjustment of quota levels	From 2003 the increase in ambition relates to the period 2013-2035
EU-ETS, *Lag (2004:1199) om handel med utsläppsrätter* (Act (2004:1199) on emissions trading)	Financially regulatory	EU-wide instrument à conversion to the use of renewable energy fuels	Plants within the trading system	Existing with adjustment	New period from 2013
Marketing of wind power, *Förordning (2003:564) om bidrag till åtgärder för en effektiv och miljöanpassad energiförsörjning* (Ordinance on grants for measures for efficient and environmentally-friendly energy)	Financial contribution	Development and demonstration support for wind pilot projects; SEK 350 million 2008-2012; Total granted so far just over 400 million 2003-2009, expected to generate 0.95 TWh (production is also eligible for	Wind power enterprises	Existing	2003-2007; 2008-2012

		electricity certificates)			
Planning support for wind power, *Förordning om stöd till planeringsinsatser för vindkraft* (SFS 2007:160) (Ordinance on support for planning initiatives for wind power)	Financial contribution	To support the planning process	Municipalities, county administrative boards, municipal and regional cooperative bodies	Existing	2007-2009 (there are funds remaining and it will also be possible to apply in 2010)
Investment aid for photovoltaic cells connected to the grid, *Förordning (2009:689) om statligt stöd till solceller* (Ordinance on government support for solar photovoltaic cells)	Financial	Target is that the number of operators will increase in Sweden, that the system costs will be reduced and that electricity from solar photovoltaic cells will increase by 2.5 GWh during the period	Companies, public and private organisations and private individuals Concerns solar photovoltaic cell systems connected to the electricity grid (also entitled to electricity certificates)	Existing	1 July 2009 – 31 December 2011
Financial support for investment for solar heating *Förordning (2008:1247) om stöd för investeringar i solvärme* (Ordinance on support for investment in solar heating)	Financial			Existing	2009-2010
Aid for conversion from direct-acting electrical heating, *Förordning (2005:1255) om stöd för konvertering från direktverkande elvärme i bostadshus* (Ordinance on support for conversion from direct-acting electrical heating in residential buildings)	Financial	Conversion from direct-acting electricity to district heating, bioenergy and heat pumps	Owners of residential buildings or associated premises	Existing	Funding must only relate to measures that have been commenced no earlier than 1 January 2006 and completed no later than 31 December 2010.
HUS/ROT relief (renovation, maintenance and conversion and modifications), *lag (2009:194) om förfarande vid skattereduktion för hushållsarbete*, HUSFL (Act concerning the procedure for tax reductions for household work)	Financial	Tax credit for work costs including for investment in renewable energy	Individuals (single-family houses and housing co-operatives)	Existing	8 December 2008-30 June 2009, (ROT), 1 July 2009- (HUS)
Obligation to supply renewable fuels (*Pumplagen*) (the Pump Act), *Lag (2005:1248) om skyldighet att tillhandahålla förnybara drivmedel* (Act concerning the obligation to provide renewable fuels)	Regulating	All retail outlets (above a certain volume) must supply renewable fuel	Retail outlets for fuel	Existing	2006
Grants to fuel retail outlets for investment in pumps other than ethanol, *Förordning (2006:1591) om statligt stöd till åtgärder för främjande av distribution av förnybara drivmedel* (Ordinance on government support for measures to promote the distribution of renewable fuels)	Financial	114 retail outlets had been given grants (average just over SEK 1 million per application) in 2009 for the installation of biogas pumps	Retail outlets for fuel	Existing	2007-2009, it is still possible to apply for grants for works that had been commenced before the end of 2009.
Vehicle tax, *Vägtrafikskattelag* (2006:227) (the Road Traffic Act), and *Lag (2006:228) med särskilda bestämmelser om fordonsskatt* (Act with special provisions concerning vehicle tax)	Financial	Environmentally-steering	Vehicle owners	Existing	Enhanced environment control introduced 2006
Exemption from vehicle tax for environmental cars, *Lag (2006:228) med särskilda bestämmelser om fordonsskatt* (Act with special provisions concerning vehicle tax)	Financial	Promoting environmentally-friendly cars	Vehicles owners, the vehicle industry	Existing	2010, retroactive from 1 July 2009 - 2012
Reduction in the amount of benefit for environmental cars, *inkomstskattelagen* (1999:1229) (the Income Tax Act) and	Financial	Promoting environmentally-friendly cars (compare the taxable benefit of	The company car sector	Existing	2009-

Skatteverket's (the Swedish Tax Agency) regulations and general guidelines		environmentally-friendly cars with equivalents alternatives, even though the environmentally-friendly car is more expensive to purchase)			
Environmental cars in government procurements, *Förordning (2004:1364) om myndigheters inköp och leasing av miljöbilar* (Ordinance concerning procurements made by authorities and leasing of environmental vehicles), *Förordning (2009:1) om miljö- och trafiksäkerhetskrav för myndigheters bilar och bilresor* (Ordinance concerning environmental and traffic safety requirements for authority vehicles and journeys)	Regulating	Promoting environmentally-friendly cars	Governmental authorities	Existing	1 January 2005 -
Vehicle procurements by municipalities, local rules					
Parking benefits, exemption from congestion charges, etc. in certain towns, *Lag (2004:629) om trängselskatt* (Congestion Tax Act)	Financial and regulatory	Promoting environmentally-friendly cars			Congestion charge in Stockholm since 2005, in Gothenburg probably from 2013
Government public procurement with environmental requirements, *Lag (2007:1091) om offentlig upphandling* (Public Procurement Act), *lag (2007:1092) om upphandling inom områdena vatten, energi, transporter och posttjänster* (Act on public procurement of water, energy, transport and postal services)		Promoting the development of new climate-efficient technologies	Governmental authorities	Existing	
Investment support for biogas and other renewable gases, *Förordning (2009:938) om statligt stöd till åtgärder för produktion, distribution och användning av biogas och andra förnybara gaser* (Ordinance concerning government support for measures for the production, distribution and use of biogas and other renewable gases)	Financial	Funding for projects that contribute to increased generation, distribution and use of renewable gases	Production centres, distributors and consumers of biogas and other renewable gases	Existing	1 November 2009 - 2011
Investeringsstöd för produktion eller förädling av biogas inom Landsbygdsprogrammet (the Swedish Rural Development Programme), *Förordning (2007:481) om stöd för landsbygds-utvecklingsåtgärder* (Ordinance concerning support for rural development measures)	Financial		Farmers and other rural entrepreneurs	Existing	
Investment support for planting energy forests on arable land within *Landsbygdsprogrammet* (the Swedish Rural Development Programme), *Förordning (2007:481) om stöd för landsbygds-utvecklingsåtgärder* (Ordinance concerning support for rural development measures)	Financial	Target regarding multiannual energy crops that an area equivalent to 30,000 hectares is to have been planted during the programme period (2007-2013)		Existing	
Support for climate and renewable energy projects, special funds allocated within *Landsbygdsprogrammet* (the	Financial		Company and project funding	Existing	2010-2013

Swedish Rural Development Programme), *Förordning (2007:481) om stöd för landsbygds-utvecklingsåtgärder* (Ordinance concerning support for rural development measures)					
Support for energy identification for SMEs, *Förordning (2009:1577) om statligt stöd till energikartläggning* (Ordinance concerning government support for energy identification)	Financial	Funding for energy surveying in companies that have an energy consumption in excess of 0.5 GWh, up to a maximum of SEK 30,000 per enterprise	Small and medium-sized enterprises (energy-intensive enterprises are included primarily of PFE) and certain agricultural enterprises	Existing	2010-
Delegationen för Hållbara Städer (Delegation for Sustainable Cities), *Förordningen (2008:1407) om statligt stöd för hållbara städer* (Ordinance concerning government support for sustainable cities)	Financial	Grants for sustainable urban development, in total SEK 340 million 2009-2010. In 2009 SEK 130 million was granted to Stockholm, Malmo, Umea as well as 14 planning grants.	Primarily municipalities but also enterprises in municipalities Sustainable urban development including grants for renewable energy such as biogas, solar energy, wind power and district heating	Existing	2009-2010

*Indicate whether the measure is (predominantly) regulatory, financial or soft (i.e. information campaigns).

**Is the expected result behavioural change, installed capacity (MW; t/year), energy generated (ktoe)?

***Who is the measure targeted at – investors, end users, the public service, planners, architects, engineers, etc.? Or what is the targeted activity/sector - biofuel generation, the use of animal manure as energy, etc.)?

4.2 Specific measures to fulfil the requirements under Articles 13, 14, 16 and Articles 17 to 21 of Directive 2009/28/EC

4.2.1 Administrative procedures and spatial planning (Article 13(1) of Directive 2009/28/EC)

a) List of existing national and, if applicable, regional legislation concerning authorisation, certification, licensing procedures and spatial planning applied to plants and associated transmission and distribution network infrastructure.

The licensing of plants that produces electricity, heating or cooling from renewable energy sources and for the conversion of biomass to biofuel is described below in greater detail. Refer to Chapter 4.2.6 Electricity Infrastructure Development for further details about the grid concessions under the Swedish Electricity Act.

There exists no certification or licensing procedure for these types of plants.

The Swedish licensing and legislative system is so structured that the Swedish Parliament and the Government govern through laws and regulations that are applied by national authorities that autonomously interpret and implement these laws and regulations.

At a national level, there are regional government authorities and county administrative boards that have the task of coordinating and implementing the targets and mandates stipulated by the national authorities. The county administrative boards are also, in this

context, involved in supervision and issuing licences, primarily in the area of the environment such as environmentally-harmful activities.

They also have promotional duties where they further governmental interests and advise the municipalities of the region as well as administer funding for areas such as energy efficiency and energy conversion.

At the local level there are the municipalities that make decisions with a high level of autonomy within their geographic area, including taking charge of the spatial planning, with the support of the municipal planning monopoly. They also have licensing and supervisory duties for smaller plants and control much of the physical siting through their planning activities.

Miljöbalken (the Environmental Code)

Miljöbalken (the Environmental Code) (MB) came into force on 1 January 1999 and is a coordinated environmental law with the aim of promoting sustainable development. When the Environmental Code came into effect it replaced 16 laws that were thereby repealed. The Environmental Code regulates the situations in which permits or registrations are required from an environmental perspective in order to conduct a certain activity. Förordningen (1998:899) om miljöfarlig verksamhet och hälsoskydd (Ordinance (1998:899) concerning environmentally hazardous activities and public health specifies which activities require permits or registrations under the rules of the Environmental Code for environmentally-harmful activities. The Government may in individual cases reserve the right to test the admissibility of an activity, e.g. expansion of hydroelectric power or the erection of wind farms, if certain criteria are fulfilled (Chapter 17 Section 3 of MB).»Should a municipality demand this and there are no particular grounds to refuse, the Government reserves the right to the examination (Chapter 17 Section 4(a) of MB).

The Environmental Code also regulates when an environmental impact study needs to be arranged. The environmental impact study is arranged by the operator and constitutes part of the decision-making documentation dealt with by the respective decision-making authorities. An operator also needs to take into account interests other than the environment and therefore other legislation will also be applicable in the examination of licensing application, e.g. kulturminneslagen (the Heritage Conservation Act).

There are a number of laws that are linked to the Environmental Code, e.g. skogsvårdslagen (the Forest Management Act), luftfartslagen (the Civil Aviation Act) and väglagen (the Public Road Act). This link means that the respective laws refer to provisions in the Environmental Code, which must be applied when examining and considering pursuant with the law.

The Environmental Code contains 33 chapters and approximately 500 paragraphs. There are a large number of associated regulations and ordinances, which have been issued by virtue of the provisions of the Environmental Code.

Ordinances are decided by the Government, which in turn authorises the authorities to decide on regulations within their respective areas of responsibility. The authorities may issue general guidelines in addition to the binding rules that are linked to the legislation. These guidelines contain general recommendations about the application of rules and regulations.

Förordningen (1998:899) om miljöfarlig verksamhet och hälsoskydd (Ordinance (1998:899) concerning environmentally hazardous activities and public health

This ordinance specifies the situations in which an activity is considered to be environmentally hazardous and requires an environmental licence to be conducted. A comprehensive annex to the ordinance contains a list of the activities that necessitate the possession of a licence or are notifiable. There are three categories, A, B, which require licences and C, which only requires notification. In accordance with the ordinance, licences are applied for from the environment court or the county administrative board and notifications made to the local government committee. The list also contains production plants for renewable electricity generation Depending on their power outputs, such plants can end up in one of the three categories. Similarly, in the case of wind farms the size of the farm may mean that a licence will need to be applied for from the county administrative board's miljöprövningsdelegation (Environment Testing Delegation) or that registration with the municipality is required. Chapter 11 of the Environmental Code and förordningen (1998:1388) om vattenverksamhet (Ordinance concerning water activities) also contain rules and obligations for a licence that concern the expansion of hydroelectric power plants.

Plan- och bygglagen (1987:10) (Planning and Construction Act)

The regulatory framework of Plan- och bygglagen (PBL) (the Planning and Construction Act) is targeted at the part of the municipalities' work on planning that concerns the utilisation of land, water and the built environment. The Act regulates urban development through planning (the municipalities' development plans, overview and area regulations), examination of licensing applications and supervision. The purpose of PBL is to promote social development with equal and good living conditions in both the short and long-terms. The spatial planning is a concern to the municipalities (the so-called 'municipal planning monopoly'). The planning includes determining the location of the development and the design of the built environment. Developments must be sited on land that is fit for purpose. As regards the examination of licence applications, according to PBL a building permit is required to construct buildings and certain facilities. In March 2010 the Government presented the government bill *En enklare plan- och bygglag* (government bill 2009/10:170) *(*A Simplified Planning and Construction Act) in which it is proposed, inter alia, that *byggnadsverkslagen* (1994:847) (the Act on Technical Requirements for Construction Works, etc.) be incorporated into PBL. It is proposed that the new Act will come into force on 2 May 2011.

Byggnadsverkslagen (1994:847) (the Act on Technical Requirements for Construction Works, etc.

The Act regulates the technical functional requirements for building works and building products. The Act states that buildings and facilities that are being built or where extensive modifications are being made must fulfil certain fundamental technical functional requirements. Associated with these requires are issues regarding, for example, fire safety, noise protection, the management of energy, water and waste and accessibility for people whose mobility is reduced. The functional requirements must, provided that normal maintenance is performed, be fulfilled for the duration of an economically reasonable service life of the building. It also states that the building must be maintained in such a way that the functional requirements are primarily preserved.

Ellagen (1997:857) (the Swedish Electricity Act).

The basic provisions in the electricity field are contained in *ellagen* (the Swedish Electricity Act). The Act regulates electrical installations, the trade in electricity in certain cases and

electrical safety. The contents of the Act are structured as for the areas of grid concessions, grid activities, grid tariffs, system responsibility and balance responsibility, protective measures, damages, consumer protection and supervision.

Ledningsrättslagen (1973:1144) (the Utility Easements Act)

The Act applies to, inter alia, electrical high voltage cables for which a concession is required. Under this law the party that wishes to utilise the space within the property for a cable or any other device is entitled to do so (*ledningsrätt* - utilities easement). Easement includes, according to what has been decided for the service, the right to take the necessary measures within the property to route and utilise a cable or other device.

Legislation regarding tax on energy

Sweden imposes a number of taxes on energy, namely energy tax, CO_2 tax and sulphur tax, which are levied on the consumption of fuels, energy tax on electrical power, which is levied on the consumption of electrical power and tax on the thermal output of nuclear reactors. In addition to this there is also a charge levied on nitrous oxide emissions in the generation of energy. The purpose of the environmental taxes is to reduce environmental impact according to the 'polluter pays principle'. The CO_2 tax is levied on fossil fuels such as coil, oil and natural gas. This presently equates to SEK 1.05 per kg of CO_2. The purpose of the energy tax is to govern to enable the target for more efficient use of energy and the target for increased share of renewable energy to be achieved at the lowest possible socio-economic cost. In the same way as other taxes the energy and environmental taxes contribute to the financing of public activities. In addition to the above-specified taxes charges are also levied for the financing of authorities, for example.

Lagen (2003:113) om elcertifikat (the Electricity Certificates Act)

A system using electricity certificates was introduced on 1 May 2003 and replaced the previous aid scheme for renewable electricity generation. The electricity certificate scheme features an approval procedure for facilities in which the Swedish Energy Agency is responsible for the approval. However, this approval only relates to the possibility of obtaining an electricity certificate whilst the facility must also have a licence in accordance with the applicable regulations for each type of facility.

b) Ministries/authorities in charge and their competences in the field.

Näringsdepartementet (Ministry of Enterprise, Energy and Communications)	*Responsible for proposals on regulatory framework that implement the Government's energy policy. The department in charge of the Swedish Energy Agency, Svenska Kraftnät, Elsäkerhetsverket (the National Electrical Safety Board) and Energimarknadsinspektionen (the Energy Markets Inspectorate). Responsible for ellagen (the Swedish Electricity Act) and the regulatory framework of the electricity certificate scheme and sustainability criteria.*
Miljödepartementet (Ministry of the Environment)	*Environmental policies, environmental legislation – The central environmental*

	legislation is contained in the Environmental Code. The aim is to promote a sustainable development that will allow present and future generations to live in a healthy and conducive environment. Housing and building – Sustainable community planning, urban development, plan- och bygglagen (the Planning and Construction Act).
Finansdepartementet (the Ministry of Finance)	*Responsible for proposals regarding laws on taxes. The department in charge of the county administrative boards, responsible for Government contact with the municipalities.*
Energimyndigheten (the Swedish Energy Agency)	*The administrative authority for issues regarding the use and supply of energy, it works towards efficient and sustainable energy consumption and towards a rational supply, conversion, distribution and consumption of energy, it coordinates the work of restructuring the energy system and works towards an increased consumption of renewable energy sources, especially wind power.*
Energimarknadsinspektionen (the Energy Markets Inspectorate)	*In charge of supervision, regulation and examination of licence applications in accordance with ellagen (the Swedish Electricity Act) and naturgaslagen (the Natural Gas Act)and supervision and regulation in accordance with fjärrvärmelagen (the District Heating Act).*
Svenska Kraftnät	*Administers, operates and develops the power transfer system, is the authority with system responsibility ellagen (the Swedish Electricity Act) and naturgaslagen (the Natural Gas Act), responsible for transmission.*
Naturvårdsverket (Swedish Environmental Protection Agency)	*The administrative authority in the area of the environment, it promotes sustainable development, in particular directing, coordinating, following-up and assessing the environmental and supervisory activities in relation to other central, regional and local authorities as well as following-up how the Environment Code is being applied.*
Boverket (the National Board of Housing, Building and Planning)	*The administrative authority for issues regarding the built environment and management of the areas of land and water, for spatial planning, building and administration of the development and for housing issues. The agency is also responsible for the central administration of different*

	government funding within its area of activity
Jordbruksverket (the Swedish Board of Agriculture)	*Follows, asses and keeps the Government informed of developments within the Board's area of responsibility, collaboration, overall planning, regulation and other matters of strategic importance regarding the management of aid to farmers. Gives funding to biogas plants*
Regional authority, county administrative boards	*Work towards national targets having an impact in the county at the same time taking into consideration regional conditions and requirements. The county administrative board works cross-sectorally from a governmental overall perspective and within the authority's area of responsibility coordinates different public interests and governmental authority initiatives, including information regarding sustainable community planning and housing, energy and climate. The county administrative board is also responsible for testing and supervising MB and supervising PBL as well as following-up and assessing both MB and PBL.*
Local authority municipalities	*Responsible for spatial planning (planning monopoly) – building permits, supervisory duties within the area of the environment.*
Miljödomstol (Environmental Court)	*Environmental Court is the term used for a special court in accordance with Chapter 20 of the Environmental Code. The first instance consists of five environmental courts. The ruling of an environmental court may be appealed against to Miljööverdomstolen (the Supreme Environmental Court), whose ruling after leave of appeal may be appealed against to Högsta domstolen (the Supreme Court of Sweden). The environmental courts consider matters relating to permits for water activities and environmentally hazardous activities and other environmental protection matters.*

c) The planned review to take appropriate action in accordance with Article 13(1) of Directive 2009/28/EC must be conducted by the end of December 2011.

The review of the approval procedure takes places continually from year to year consisting of government assignments or authority initiatives. The Government believes that it is vitally important to follow-up the licensing process for the establishment of new renewable electricity generation on an annual basis and to review the processes for grid connections/grid enhancement/grid expansion as a consequence of the increased ambitions of the electricity certificate scheme.

d) (Summary of the existing and planned measures at regional and local levels (where relevant).

Sweden has 21 counties and 290 self-governing municipalities.

At a regional and local level both the county administrative boards and the municipalities are generally involved in providing information about regulatory frameworks, how and where to apply for a licence or register and information about tariffs.
Today there are a large number of application and registration forms that are available via websites and in many cases it is possible to apply electronically. A number of regional and local authorities also provide information about "their" processing times.

At a local level – During the spring of 2010 the Swedish Parliament decided on a new Planning and Construction Act (government bill 2009/10:170, report 2009/10:CU25, Riksdagen notification 2009/10:366). According to the new PBL the new provisions will be simpler and clearer. Commercial enterprises and individuals that have applied for building permits must be notified within ten weeks. The municipality must be able to specify which conditions may be applicable to a building permit. The municipality must announce whether or not a development plan will be devised and planning notification given within four months. It is proposed that the new Planning and Construction Act come into force on 2 May 2011.

At a local level – Simplified processing for the establishment of wind farms, amendments to PBL and MB, came into force on 1 August 2009, refer to reply under f).

e) Have any unnecessary obstacles or disproportionate requirements been detected in relation to the approval, certification or licensing rules applicable to plants and associated transmission and distribution network infrastructure for the generation of electricity, heating or cooling from renewable sources and to the transformation of biomass into biofuels or other energy products? If so, which?

– It is often the lead times in the grid connection that are limit-setting in the establishment of large wind farms and within the grid connection it is the lead times for matters relating to licences that set the limits. It is difficult to say whether this is due to unnecessary obstacles or disproportionate requirements in relation to the approval procedure at the present moment in time. The Government believes that it is of vital importance to review the processes for grid connection/ enhancement/expansion.[19]
– The charge for building permits varies significantly between the country's different local operators. This is very evident with regard to building permits for solar heating in planned areas where there can be a difference of a factor of three. This means that almost the whole of the available funding for solar heating could be used in obtaining a building permit.
– The examination of licence applications is currently under review (The proposal of the Miljöprocessutredningen (Environmental Process Investigation) and the Ministry of the Environment's proposal for simpler legal text for environmental impact studies) in order to streamline and simplify the examination of licence applications.

f) What level of administration (local, regional or national) is responsible for authorising, certifying and licensing renewable energy installations and for spatial planning? *(If this depends on the type of installation, please specify.)* **If more than one level is involved, how is coordination**

[19] Konsekvenser för elkunden av en höjd ambitionsnivå i elcertifikatsystemet, Delredovisning 2. Uppdraget att föreslå nya kvoter i elcertifikatsystemet m.m. ER 2009:35 (Consequences of an increased level of ambition for the electricity certificate scheme for the electricity customer, Interim Report 2. The assignment to propose new quotas for the electricity certificate scheme, etc. ER 2009:35).

between the different levels managed? How will coordination between different responsible authorities be improved in the future?

Sweden's environmental legislation, the Environmental Code, stipulates that a licence must be obtained from a specific authority or that this authority must be notified in order to establish or conduct activities that could impact upon the environment or public health. This applies to heating plants, hydroelectric power plants and wind farms.

The authority that is to examine the respective type of installation, as stipulated in Chapter 9 of MB, is specified in a separate ordinance, förordningen (1998:899) om miljöfarlig verksamhet och hälsoskydd (Ordinance (1998:899) concerning environmentally hazardous activities and public health) in which different types of activity are classified in relation to their impact on the surroundings and their magnitude or extent. The Environmental Court examines licences for larger installations (A installations) and the county administrative board's Environmental Testing Delegation (abbreviated to MPD in Swedish) examines those of smaller installations (B installations). The municipality has to be notified in the case of so-called "C installations". Hydroelectric power plants are examined by the Environmental Court.

The ruling of the Environmental Court may be appealed against to the Supreme Environmental Court and then to the Supreme Court of Sweden whilst the ruling of the county administrative board may be appealed against to the Environmental Court and then as the last instance the Supreme Environmental Court. The procedure for licences and registration is regulated in detail through laws, ordinances, and regulations and is clarified in manuals.

Information can be obtained from the website of the relevant authorities, where brochures, forms and application instructions are also available. All authorities provide support and information with regard to the examination procedure.

For licensable activities (A and B) the county administrative board will consult with the applicant in the initial stage of the examination process in order to identify the scope and direction of the environmental impact study (Abbreviated to MKB in Swedish), which must accompany the application. The application may therefore be adapted in proportion to the needs of each relevant activity.

The county administrative board has supervisory responsibility for licensable installations (A and B installations) but may delegate this to the relevant municipality, which is often the case. The municipalities supervise C installations and other minor activities.
The guidance responsibility for supervision under Miljöbalken (the Environmental Code) is divided between fourteen central authorities. The county administrative board has general responsibility for guiding and standardising the municipalities' environmental supervision.

Plan- och bygglagen (the Planning and Construction Act) together with Miljöbalken (the Environmental Code) govern the spatial community planning in Sweden. Plan- och bygglagen (the Planning and Construction Act) regulates how the spatial planning is to be conducted. The basic spatial planning is conducted in the municipalities. The municipalities' comprehensive survey plans are central instruments for the spatial planning. The purpose of the comprehensive survey plans is to provide guidance and support when deciding on the utilisation of land and water areas within the municipality and how the built environment is to

be developed and preserved. Different trade-offs between public and individual interests in an open and democratic process are made in plan- och bygglagen (the Planning and Construction Act). The municipal comprehensive survey plans are indicative when examining and reaching decisions in accordance with a number of different laws.

The development plan is used when the municipality wishes to legally examine and establish the suitability of the land for development and the design of the design of the built environment. A development plan is devised for only part of the land in the municipality. Plan och bygglagen (the Planning and Construction Act) regulates when an examination of the land use is to take place by the production of a development plan. This is what happens, for example, with regard to new coherent developments, individual buildings that have a significant impact on the surroundings and individual buildings that are intended to be built within areas where there is a large demand for land.

There are no specific requirements on development plans for production facilities for renewable energy. However, a development plan may be required should such installations be deemed to constitute or include installations that do require development plan, e.g. tunnels, rock cavities or towers. The same may also apply when the installation includes buildings that have a significant impact on the surroundings or are being built where there is a large demand for land or are being built in conjunction with the establishment of a new coherent development.

A development plan determines how the land in the area concerned is to be used (park land, green areas, land for industrial purposes, etc.) and can to a certain extent regulate the design and location of the building. The existence of a licence in accordance with the Environmental Code)does not constitute exemption from the requirement for a development plan. The regulations of the development plan are binding for the building permits that are then required in order to construct buildings and certain installations.

A building permit may be required irrespective of whether or not a development plan is required. The building permit requirement applies in principle to all buildings and in the same way for the installations specified above.

Within the area for which a development plan has been devised a building permit may also be required in order to perform modifications or alterations to buildings if the external appearance of the building is appreciably affected. The same applies when changing material for facades and roofs. However, a lower requirement applies to one and two dwelling buildings. A building permit is only required here if the work would significantly alter the building or the character of the area. A building permit may, but need not necessarily, be required for the establishment of a solar heating installation.

Building permits are applied for through the municipality. The municipality cannot grant a building permit for a property if a development plan is required for the land use and no such plan exists. The municipality must then firstly approve a development plan. If a development plan is not required, a building permit will be sufficient. If a development plan is required for the area the building permit must be in agreement with the development plan. As regards wind farms, a building permit is not required if the installation is examined in accordance with the Environmental Code. The examination of the building permit application applies to location, external design and use. The technical characteristics are to be listed in the building

application, which must be submitted to the municipality at least three weeks prior to work starting.

The strategic function of the comprehensive survey plan is enhanced by the fact that the plan must specify how in the spatial planning the municipality intends to take into account and coordinate the comprehensive survey plan with national and regional targets as well as plans and programmes of importance to sustainable development within the municipality. The Government has highlighted the importance of a current comprehensive survey plan that addresses the issue of wind power and how the municipality intends to cater for other national interests, e.g. nature conservation, historical monument conservation and reindeer husbandry.

Currently the municipalities are able to receive funding for planning work related to wind power. Areas of national interest for wind power, indicated by the Swedish Energy Agency, and regional planning documents for wind power, generated by the county administrative boards, are also available as a basis for the municipalities' planning.

In order to simplify the processing of wind power establishments amendments to the Planning and Construction Act and the Environmental Code came into effect on 1 August 2009. The new legislation has enabled coordination between the authorities to be improved and the examination procedures for wind power to be simplified. According to the new regulations the entire examination is to take place during the environmental permit examination. The previous requirements under the Planning and Construction Act (PBL) on the development plan and building permit will therefore on the whole be abolished when a planned wind farm has been granted a permit in accordance with the Environmental Code (MB). The so-called "duplicate examination" has therefore been removed for wind farms. Instead the municipalities have been given a so-called "right of veto", which means that they must give their consent in order for an installation that requires a permit under the Environmental Code to be granted such a permit. However, the requirement on the development plan is still applicable when wind farms are intended to be established in areas where there is a large demand for land for housing or installations. For wind farms that are not of such a size that necessitates a permit, the requirements for a building permit under PBL and registration under MB are still applicable. The limits for building permits have also changed. For example, wind farms that are in excess of 20 metres in height or whose rotor diameters are in excess of 3 metres now require building permits.

Förordningen (1998:899) om miljöfarlig verksamhet och hälsoskydd (Ordinance (1998:899) concerning environmentally hazardous activities and public health) specifies the rules for the examination of wind farms. This ordinance has been amended and the amendments came into force on 1 August 2009. The new provisions mean, for example, that it is no longer the total output power of the wind farm that determines whether the activities are licensable or notifiable, instead it is their number and height in metres.

A new Section 25 (a) has also been introduced into the ordinance. This specifies what is to be included in a registration of a wind farm, including a technical specification, a description of the wind conditions, the impact on natural and cultural environments, the presence of existing wind farms within a radius of 2 km, an account of the electricity grid and roads, a landscape analysis and calculations of noise, shadows and reflections.

Section 25 (b) states that the municipality must grant exemption from the requirements of Section 25 (a) for anything that is not required for the processing. It also states that the

municipality shall, as appropriate, coordinate the processing of an application in accordance with MB that relates to an activity using wind power with the building permit application processed in accordance with PBL, which relates to the same wind farm.

Section 26 (a) also contains a supplement that with regard to notifiable activities the municipality must examine whether the application for a permit for the activities needs to be examined. In the examination the authority must consider the criteria specified in Annex 2 to the förordningen (1998:905) om miljökonsekvensbeskrivningar (Ordinance (1998:905) on Environmental Impact Assessments). Should the authority find that the activities are to be assumed to involve a significant impact on the environment, the authority shall order the operator to apply for a licence.

The limits for licensable and notifiable installations are specified in the annex to förordningen (1998:899) om miljöfarlig verksamhet och miljöskydd (Ordinance (1998:899) concerning environmentally hazardous activities and public health) under the heading Gaseous fuels, electricity, heating and cooling (Gasformiga bränslen, el, värme och kyla). The permit obligation applies for two or more wind power plants where each plant is in excess of 150 metres in height, including rotor blade, or installations with seven or more plants where each plant is in excess of 120 metres. The notification obligation applies to individual wind turbines that are in excess of 50 metres in height including rotor blades. If there is no permit obligation for two or more wind turbines, the notification obligation shall instead apply.

The examination of environmental licences for major wind turbines is therefore conducted by the county administrative board with a decision from its Environmental Testing Delegation. The decision may be appealed against to the Environmental Court. No building permit is required from the municipality where an environmental permit has been granted by the county administrative board. However, the municipality must support this decision, otherwise a permit for the establishment of a plant cannot be granted.

Notifiable wind farms are registered with the municipality which will process the registration as appropriate together with the bulging permit application. Should the activities involve significant impact upon the environment, the municipality must order the operator to apply for a licence.

No building permit under the Planning and Construction Act nor a licence or registration under the Environment Code is required for wind farms if the rotor diameter is no more than 3 metres, the turbines not mounted on a building, the total height is no more than 20 metres and the distance to the boundary of the building site exceeds the total height.

g) How is it ensured that comprehensive information on the processing of authorisation, certifications and licensing applications and on assistance is made available to applicants? What information and assistance is available to potential applicants for new renewable energy installations on their applications?

According to Swedish constitutional law the principle of public access shall be applied. One manifestation of the principle of public access is the principle of public access to official records. In order to guarantee inspection of the work conducted by the Swedish Parliament, the Government and the authorities, the right of public access to official records has been incorporated into one of the constitutional laws, tryckfrihetsförordningen (1949:105) (the Freedom of the Press Act). The public access to official records entitles everybody to gain

access to public documents and usually without having to state the reason for wishing to do so or to identity oneself.

It is also generally the case that a hearing authority is responsible for providing information on its activities in accordance with myndighetsförordningen (2007:515) (the Government Agencies Ordinance).

In addition to this, where there are authorities with promotional responsibilities, the information provided by such authorities is an important resource in the promotional work.

Information is provided via application forms, websites, brochures and also verbally via telephone enquiries and seminars.

There are also four wind power coordinators and a national network for wind power within the area of wind power. Furthermore, the Swedish Energy Agency has, on behalf og the Government, developed an Internet-based manual about wind power (Vindlov.se) for all of the information that is needed for licensing matters regarding wind power and information on most things from concept stage to the commissioning of the completed wind farm. Vindlov is being created and operated by the Swedish Energy Agency in collaboration with Boverket (the National Board of Housing, Building and Planning), Energimarknadsinspektionen (the Energy Markets Inspectorate) and Naturvårdverket (the Swedish Environmental Protection Agency). A dozen or so other government agencies, organisations and bodies are also making contributions with content, opinions and comments to enable the website to be as comprehensive and correct as possible. Potential applicants and other interested parties are the target groups. The Vindlov.se website was commissioned at the start of 2010. Information regarding funding and instruments is available on the Swedish Energy Agency's website.

The EU Services Directive (2006/123/EC), which came into force at the start of the year is intended to simplify the procedures for companies wishing to establish themselves or temporarily sell their services within the EEA/EU. One way of achieving this is by the setting up of contact points that provide information and services. The Swedish contact point consists of a web function with additional functions that are provided by different authorities and a helpdesk. Kommerskollegiet (the National Board of Trade) has the overall responsibility for the point of contact available on www.verksamt.se. This includes information regarding the types of permits that are needed for different activities, e.g. in order to connect an installation to the electricity grid. The function has not yet been fully developed. Besides being able to search for and obtain information, companies will be able to submit applications and register for the applicable authorisation procedure. A direct link to the relevant authority is provided via the website for more detailed information regarding requirements, costs and the application procedure for the permits, registration or notifications that are required. Using the contact point, business people will also be able to communicate directly with the appropriate authorities via a messaging function where the authority will also be able to request additional information, etc.

h) How is horizontal coordination facilitated between different administrative bodies, responsible for the different parts of the permit? How many procedural steps are needed to receive the final authorisation/licence/permit? Is there a one-stop-shop for coordinating all steps? Are timetables for processing applications communicated in advance? What is the average time for obtaining a decision on the application?

The respective authorities act according to instructions, etc.

The procedure includes between one and three stages for a final decision, e.g. one stage for municipal notifications without reminders and three stages for county administrative board rulings that are being appealed against to the Environmental Court and the Supreme Environmental Court. The timetable for the processing of applications varies greatly across the country, in municipalities, county administrative boards and environmental courts, for example. Applications for environmental permits for wind power, for example, take on average between one to three years from application to decision, depending on the size of the installation and opposing interests. Appeals take longer. Environmental tests are often performed on the grid connection in conjunction with the tests on the installation.

See also Point f).

i) Do the authorisation procedures take into account the specificities of the different renewable energy technologies? If so, please describe how. If they do not, do you envisage taking them into account in the future?

The Swedish regulatory framework is basically technology-neutral and therefore the testing procedure is applicable. There are specific sectoral rules for wind power (see Point f).

Förordningen (1998:899) om miljöfarlig verksamhet och hälsoskydd (Ordinance (1998:899) concerning environmentally hazardous activities and public health) specifies how different types of activity are classified in relation to their impact on the surroundings and their magnitude or extent. The Environmental Court examines licences for larger installations (A installations) and the county administrative board's Environmental Testing Delegation (abbreviated to MPD in Swedish) examines those of smaller installations (B installations). The municipality has to be notified in the case of so-called "C installations". Hydroelectric power plants are examined by the Environmental Court.

j) Are there specific procedures, for example, a simple notification, for small-scale, decentralised installations (such as solar panels on buildings or biomass boilers in buildings)? If so, what are the procedural steps? Are the rules publicly available to the general public? Where are they published?
Is the introduction of simplified notification procedures planned in the future? If so, for which types of installations or systems? (Is net metering possible?)

The municipalities decide how small-scale individual installations are to be managed as they are managed in different ways in different municipalities. For example, they can be approved through a simplified building permit procedure, a building application, which is submitted to the municipality.

The rules and regulations are available to the general public on the county administrative boards and municipalities' websites and on those of the Swedish Energy Agency, Naturvårdverket (the Swedish Environmental Protection Agency) and Boverket (the National Board of Housing, Building and Planning) as well as from a number of other sources. The rules and regulations concerning wind power are also assembled on www.vindlov.se. the Swedish Energy Agency is responsible for the development of the new web platform and a total of 20 authorities have collaborated and have the responsibility for updating the regulatory framework for which they are responsible.

A separate ordinance “förordningen (1998:899) om miljöfarlig verksamhet” (Ordinance (1998:899) concerning environmentally hazardous activities” specifies which authority is to examine which type of installation, in accordance with Chapter 9 of MB. This ordinance classifies different types of activities in relation to their impact on the environment and their magnitude or extent. The Environmental Court examines licences for larger installations (A installations) and the county administrative board’s Environmental Testing Delegation (abbreviated to MPD in Swedish) examines those of smaller installations (B installations). The municipality has to be notified in the case of so-called “C installations”. Hydroelectric power plants are examined by the Environmental Court.

Simplifications have recently (1 August 2009) been introduced for the examination of wind power when procedures including the so-called “duplicate examination” for wind power installations was removed Refer to Point f) for details in relation to this.

Net metering is not currently applicable, but a new provision has recently come into force that means that an electricity consumer that has a power rating contract of a maximum of 63 Amps and that produces electricity that is input at a maximum of 43.5 Kilowatt does not pay any charge for the input supply. However, this is only applicable if the electricity consumer has over the course of a calendar year taken out more electricity from the system than has been fed into the system.

According to the current regulatory framework, the feeding in and feeding out of electricity to/from networks for which as concession is required must be metered and reported separately to the parties concerned. In order to simplify matters for small-scale producers of electricity a number of European countries have introduced net charging, i.e. input and output electricity are set off against each other for a period of time, e.g. a calendar month, and the producers only have to pay for any excess consumption or alternatively pay for excess generation. Energimarknadsinspektionen (the Energy Markets Inspectorate) has in the appropriation direction for 2010 been given the task of investigating the advantages and disadvantages that a net charging regulation would entail as well as the effects that this would have on the liability to pay energy tax on electricity and any other possible consequences. The commission includes assessing whether it is appropriate to introduce a net charging regulation. The commission is to be reported to the Ministry of Enterprise, Energy and Communications during autumn 2010.

k) Where are the fees associated with applications for authorisation/licences/permits for new installations published? Are they related to the administrative costs of granting such permits? Is there any plan to revise these fees?

The fees for building permits are set, published and payable to the respective municipalities.

There are usually no fees payable for environmental tests, however all activities for which a permit is required, A and B activities in accordance with Chapter 9 of Miljöbalken (the Environmental Code) (environmentally hazardous activities), do pay a fixed annual fee for the costs incurred by the authorities for the environmental inspection. The inspection fee will then also include a smaller sub item for the examination of licence applications. A separate examination fee is payable for hydroelectric plants, depending on their size. As regards C activities (notification procedural matters), the municipality (and the county administrative board) may charge a separate inspection fee for the actual costs incurred.

No fee is charged for applying to Energimarknadsinspektionen (the Energy Markets Inspectorate) for a network concession under ellagen (1997:857) (the Swedish Electricity Act) or for a concession under naturgaslagen (2005:403) (the Natural Gas Act).[20] The cost for processing the permit is included in the inspection fee, which is paid as part of the network cost.

l) Is official guidance available to local and regional administrative bodies on planning, designing, building and refurbishing industrial and residential areas to install equipment and systems using renewable energy sources for electricity and heating and cooling, including district heating and cooling? If such official guidance is not available or is insufficient, how and when will these need be addressed?

The governmental agency Boverket (the National Board of Housing, Building and Planning) publishes building and design guidelines and also provides advice and support to the local administrative bodies, the municipalities and the regional administrative bodies, the county administrative board. The advice that is provided is not specifically aimed at equipment and systems that use renewable energy sources, but these issues, in so far as they arise, are also part of the National Board of Housing, Building and Planning's information provision activities.

The advice that is provided within the standard system is also considered to be sufficient for the issues of planning, design, building and refurbishing industrial and residential areas that relate to renewable energy sources.

The governmental agency, the Swedish Energy Agency, trains the municipalities' energy and climate advisers who provide and communicate information on renewable energy sources for electricity consumption, heating and cooling. All of the 290 Swedish municipalities offer municipal energy and climate advice. They primarily focus on the general public and commercial enterprises but may to a certain degree also approach public bodies.

The Swedish Energy Agency also conducts a national programme called Uthållig kommun (the Sustainable Municipality), which currently includes 60 of the country's 290 municipalities. The participating municipalities receive special funding with regard to energy and planning, which they have indicated as being of particular importance.

For wind power in particular, there exists a number of cooperating governmental agencies, driven national wind dialogues, which provide advice and shares experiences with different central authorities, county administrative boards and the organisation Sveriges Kommuner och Landsting, SKL (the Swedish Association of Local Authorities and Regions). Information on wind power is available to administrative bodies, trade and industry and the general public on the websites of the Swedish Energy Agency, Boverket (the National Board of Housing, Building and Planning), Energimarknadsinspektionen (the Energy Markets Inspectorate) and Naturvårdverket (the Swedish Environmental Protection Agency).

The county administrative boards are responsible for strategic coordination and management of the regional work in reducing climate impact and addressing energy transition. The county administrative boards have also been commissioned by the Government to broaden and

[20] However, fees are payable for concessions under lagen (1978:160) om vissa rörledningar (Act concerning specific pipelines). However, after the old natural gas act was introduced in 2000, it is veryuncommon for concessions to be granted under the rörledningslagen (Act concerning pipelines). This has only occurred once during the last ten years, namely for a transmission line for district heating.

develop the climate and energy strategies of individual counties that were devised in the autumn of 2008. Energy conservation and renewable energy are two of the cornerstones of these strategies.

m) Is there specific training for case handlers of authorisation, certification and licensing procedures of renewable energy installations?

No, there is no specific training of that type available.

4.2.2 Technical specifications (Article 13(2) of Directive 2009/28/EC)

a) To benefit from funding schemes, do renewable energy technologies need to meet certain quality standards? If so, which installations and what quality standards apply? Are there national or regional standards that go beyond the European standards?

This applies to solar heating installations in order to benefit from solar heating funding.

The National Board of Housing, Building and Planning's ordinances and general guidelines (BFS 2009:2) concerning support for investment in solar heating, stipulates that funding is to be provided for such devices the solar collectors of which
1. Are marked with a Solar Keymark and have a valid certificate issued by an approved certification body for Solar Keymarks and
2. Have an annual heat exchange calculated in accordance with Section 5.
The calculation under Point 2 must be performed by a test laboratory that has been accredited for testing in accordance with lagen (1992:119) om teknisk kontroll (Tecchnival Inspection Act) and SS-EN 12975-1:2006 and SS-EN 12975-2:2006.

Funding is also provided to such devices for solar collectors of which
1. Fulfil the requirements of SS-EN 12975-1:2006 and SS-EN 12975-2:2006,
2. Have an annual heat exchange calculated in accordance with Section 5 and
3. Are certified by a products certification body.
Testing under Point 1 must be performed by a test laboratory that has been accredited for the task in accordance with lagen om teknisk kontroll (the Technical Inspection Act). Calculations under Point 2 must be performed by an accredited test laboratory for tests under Point 2. Certification under Point 3 must be performed by a products certification body that has been accredited for the task in accordance with lagen om teknisk kontroll (the Technical Inspection Act) and with the Specific CEN Keymark Scheme Rules for Solar Thermal Products (Final version 8.00 – January 2003). The task of the certification body also includes verification of the accredited test laboratory's calculation of heat exchange. The general guidelines associated with these ordinances specify that certification only means that the technical requirements for the Solar Keymark have been fulfilled. There is no requirement for the solar collector to be marked with the Solar Keymark.

The testing of solar collectors and the calculation of annual heat exchange may also be performed by a test laboratory from a country within the EEA or Turkey if the body has been accredited for the requirements in these ordinances and fulfils the requirements in Standard SS-EN-ISO/IEC 17025. The calculation under Section 5 may also be performed by a test laboratory from a country within the EEA or Turkey if the body has been accredited for testing under Section 3 (2) and fulfils the requirements of Standard SS-EN-ISO/IEC 17025. Product certification may also be performed by a body from another country within the EEA or Turkey if the body has been accredited for the requirements in these ordinances and fulfils

the requirements of Standard SS-EN-45011. The accredited body must thereby be accredited by an accreditation body that is able to show that it fulfils the requirements of SS-EN-ISO/IEC 17011. The task may also be performed by a test laboratory, or a certification body from a country within the EEA or Turkey, which in some other way offers equivalent guarantees with regard to technical and professional competence and independence.

4.2.3 Buildings (Article 13(3) of Directive 2009/28/EC)

NB: Articles 13(4) – 13(6) are referred to in the following questions.

a) Reference to existing national and regional legislation (if any) and summary of local legislation concerning the increase of the share of energy from renewable sources in the building sector.

("The building sector" refers to building work).

On 17 June 2010 the Government decided to commission the state energy authority (the Swedish Energy Agency) and Boverket (the National Board of Housing, Building and Planning) in consultation with other involved agencies to present proposals for the implementation of Articles 13(3) – 13(6) in the Renewable Energy Directive. A report on the commission, in those parts that relate to the implementation of Articles 13(3) and 13(6), is to be submitted by 15 October 2010, those relating to Article 13(5) by 31 December 2010 and those relating to Article 13(4) by 31 December 2011.

There exists no national, regional or local legislation here that specifically regulates an increased share of renewable energy within the building sector. It does exist indirectly in the form of targets and plans for the phasing-out of fossil-fuelled heating and funding for certain renewable heating and electricity for converting from direct-acting electricity in favour of renewable energy. Funding is provided for investment in solar heating, including for the installation of solar photovoltaic cell systems connected to the electricity grid.[21] Funding is also provided for conversion from direct-acting electrical heating to remote heating or individual heating using biofuels or rock heat pumps, lake water heat pumps or geothermal heat pumps.[22] For district heating and industrial process heating the CO_2 tax and EU ETS are important instruments for the promotion of alternatives to fossil fuels.

Targets and plans have been set up at governmental level down to local level. There exists in the area of heating an explicit long-term prioritisation on the use of fossil fuels for heating being phased-out by 2020.[23] As regards the phasing-out of direct-acting electrical heating, the National Board of Housing, Building and Planning's appropriation direction for 2010 contains an explicit short-term target for its energy policy in the promotion of energy savings in the building sector and in particular a reduced consumption of electricity for the heating of residential housing and commercial premises. The use of solar heating technology for the heating of residential housing and commercial premises must also be promoted.

[21] Förordningen (2008:1247) om stöd för investeringar i solvärme (Ordinance concerning support for investment in solar heating) and Förordning (2009:689) om statligt stöd till solceller (Ordinance on government support for solar photovoltaic cells).
[22] Förordningen (2005:1255) om stöd för konvertering från direktverkande elvärme i bostadshus (Ordinance concerning support for conversion from direct-acting electrical heating in residential buildings).
[23] Government bill 2008/09:163 En sammanhållen klimat- och energipolitik – Energi (An Integrated Climate and Energy Policy – Energy)

At a regional level there are plans and targets for the phasing-out of fossil fuel for heating by means of the regional climate and energy strategies. Work on climate and energy strategies is also underway at a local level. This is partly within the framework of the Uthållig kommun (Sustainable Municipality) programme and partly through the recently introduced funding for energy efficiency in municipalities and county councils.

There are also a number of local examples in municipal energy plans.

Within the framework of the Directive (2002/91/EC) (EPBD) on the Energy Performance of Buildings, Sweden has chosen to take advice concerning fossil-fuelled boilers, with aim of speeding up the conversion to renewable fuels by utilising this advice, which is also in progress in Sweden. The rewording of the Directive that will come into force in the spring of 2010 contains, inter alia, an expansion of the area of application for this Article (14) of the Directive, which will in future relate to heating systems for buildings and not solely fossil-fuelled boilers. The intention is that in the future Sweden will also apply advice as an instrument for the implementation of the Article.

Riksdagen (the Swedish Parliament) has also adopted targets for environmental quality within 16 areas. [24] The environmental quality targets describe the quality and the condition of Sweden's environmental, natural and cultural resources that are ecologically sustainable in the long-term. The targets must be reached within one generation, i.e. by 2020 (2050 with regard to the climate target). The Government has set up a miljömålsråd (Environmental Targets Council), which is responsible for the following-up of the environmental quality targets. In November 2005, 72 interim targets were adopted by Riksdagen (the Swedish Parliament) in order to give concrete form to the environmental work on the path towards the environmental targets.

Environmental quality target 15 A good built environment is defined as: "Cites, towns, urban areas and other built environments must constitute a sound and healthy living environment and contribute to a sound regional and global environment. Natural and cultural values must be protected and developed. Buildings and installations must be located and designed in an environmentally-sound manner and in such a way as to promote effective long-term management of land, water and other resources." It is the opinion of the Government (government bill 2009/10:155) that the environmental quality target of a good built environment should include the following within a generation:

- the built environment provides aesthetic experiences and promotes well-being and offers a variety of residential housing, places of work, services and culture in such a way as to give everybody access to a rich and developing life and to reduce the extent of their daily journeys,
- the cultural, historical and architectural heritage in the form of buildings and built environments and places and landscapes of particular value is to be protected and developed,
- a long-term sustainable development structure is to be developed through both the relocation of buildings, installations and activities and through the use, management and transformation of existing buildings in conjunction with the sustainable design of buildings,
- cities, towns and urban areas are to be planned from a coherent and sustainable perspective to social, economic, environmental and health-related issues,

[24] Government bill 1997/98:145, report 1998/99:MJU6, Riksdagen notification 1998/99:183

- the infrastructure for energy systems, transportation, waste management, etc. is to be integrated into the town planning and designed in order to reduce the consumption of resources and energy and impact on the climate,
- natural and green areas in close proximity to developments and which are easily accessible are to be protected so that the needs of play, recreation, growing one's own fruit and vegetables and a healthy local climate can be satisfied,
- Transport facilities are to be located and designed so as to limit any harmful encroachment into the urban or cultural environments and in such a way that they do not constitute any risk to health or safety or otherwise interfere with the environment.
- environmentally–sound public transport systems are accessible and are of good quality and sound conditions for pedestrian and cycle traffic exist,
- people are not exposed to harmful air pollutants, noise nuisances, harmful radon levels or other unacceptable risks to health or safety,
- energy, water and other natural resources are consumed in an efficient, economical and environmentally-sound manner in order to reduce consumption in the long-term and that mainly renewable energy sources are used, and
- the total quantity of waste and the hazard associated with the waste decreases at the same time as the waste management is effective for the community and simple for consumers and waste and residues are sorted so that they may be processed according to their properties and re-circulated in a balanced interaction between the development and its surroundings.

Interim Target 6 (2020/2050) under Environmental Target 15 God bebyggd miljö handlar om energieffektivisering av bebyggelse (A conducive built environment is about increasing the energy efficiency of buildings): "Delmålet innebär att den totala energianvändningen per uppvärmd areaenhet i bostäder och lokaler ska minska" (The interim target signifies that the total energy consumption per heated area unit in residential housing and commercial premises must decrease). Minskningen bör vara 20 procent till år 2020 och 50 procent till år 2050 i förhållande till användningen 1995. Till år 2020 ska beroendet av fossila bränslen för energianvändningen i bebyggelsesektorn vara brutet, samtidigt som andelen förnybar energi ökar kontinuerligt". (The reduction should be 20% by 2020 and 50% by 2050 in relation to the consumption in 1995. The dependence on fossil fuels for energy consumption in the building sector must have been broken by 2020 at the same time as the share of renewable energy continually increases). Riksdagen (the Swedish Parliament) approved this wording of the interim target (report 2005/06:BoU9, Riksdagen notification 2005/06:365).

Article 13(3) states that Member States shall recommend to all actors, in particular local and regional administrative bodies to ensure equipment and systems are installed for the use of electricity, heating and cooling from renewable energy sources and for district heating and cooling when planning, designing, building and renovating industrial or residential areas. The Member States shall, in particular, encourage local and regional administrative bodies to include heating and cooling from renewable energy sources in the planning of city infrastructure, where appropriate.

Interim Target 1 concerning planning documents under Environmental Target 15 God bebyggd miljö (A sound built environment) states, inter alia,: "Senast år 2010 ska fysisk planering och samhällsbyggande grundas på program och strategier för hur energianvändningen ska effektiviseras för att på sikt minskas, hur förnybara energiresurser ska tas till vara och hur utbyggnad av produktionsanläggningar för fjärrvärme, solenergi,

biobränsle och vindkraft ska främjas." (The physical and spatial planning must be based on programmes and strategies for how to achieve increases in efficiency in energy consumption in order to decrease this consumption in the long-term, how to protect renewable energy resources and how to promote the development of production facilities for district heating, solar energy, biofuels and wind power by 2010). In the annual questionnaires, which have been completed since 2006, the municipalities have answered questions about municipal energy plans or other relevant documents that could act as such. In 2009 35% of the municipalities' responded saying that they currently had such energy plans and a further 21% that work was in progress. This is a distinct reduction on previous years. The strategies are reported on relatively infrequently in the comprehensive survey plan. Action is necessary to stimulate and develop the municipalities' planning documentation work in order to achieve the environmental targets. The county administrative boards and Boverket (the National Board of Housing, Building and Planning) have the task of supporting this work. All of the counties were given the task of devising regional climate and energy strategies during 2008. It has not been possible to see from the 2009 environmental targets questionnaire whether this has assisted the municipalities' energy planning.

In March 2010 the Government presented the government bill *En enklare plan- och bygglag* (a simplified planning and construction Act) (government bill 2009/10:170) with a proposals for a new planning and building law to replace the current plan- och bygglagen (1987:10) (Planning and Construction Act). The new law is the result of a large number of proposed amendments from a number of reports. The rules for planning and building are being simplified. Furthermore, definitions of important terms and expressions are being introduced into the law in order to facilitate its application. A provision specifying that planning and other tests under the law must take into consideration environmental and climatic aspects is being introduced. This is based on the need for the municipalities' planning to be able to play an important role in the climate work. In order to avoid duplication of procedures and the production of environmental impact assessments, for example, provisions are being proposed on the coordination of the processing of certain matters in accordance with plan- och bygglagen (the Planning and Construction Act), the Environmental Code, etc. The strategic function of the comprehensive survey plan is being bolstered just as the requirement for the relevance testing of the plan.

Article 13(5) stipulates that Member States shall ensure that new public buildings and existing public buildings that are subject to major renovation, at national, regional and local level fulfil an exemplary role in the context of this Directive from 1 January 2012 onwards. Member States may, inter alia, allow that obligation to be fulfilled by complying with standards for zero energy housing, or by providing that the roofs of public or mixed private-public buildings are used by third parties for installations that produce energy from renewable sources.

The EC directives on public procurements [25] make it possible, but not obligatory, to stipulate environmental requirements in procurement procedures. They contain provisions regarding how contracting authorities and units can contribute in their procurements to protecting the environment and promoting sustainable development. Sustainable development is an interaction between the three parts – ecological, social and economic sustainability.

[25] Direktiv 2004/17/EG om vatten, energi, transporter och posttjänster (Directive 2004/17/EC on water, energy, transport and postal services) and direktiv 2004/18/EG om offentlig upphandling av byggentreprenader, varor och tjänster (Directive 2004/18/EC on public procurement of development contracts, goods and services) .

According to the procurement rules, it is therefore possible to observe environmental requirements in public procurement. Environmentally-sound public procurement involves setting a good example and influencing the market. Public procurement enables public authorities to create strong incentives for producers to produce environmentally-sound alternatives. Public procurement in Sweden is regulated in lagen (2007:1091) om offentlig upphandling (Act concerning public procurements) and lagen (2007:1092) om upphandling inom områdena vatten, energi, transporter och posttjänster (Act concerning procurement within the water, energy, transport and postal services sectors).

b) Ministries/authorities in charge:

The Ministry of the Environment/Boverket (the National Board of Housing, Building and Planning) in relation to plan-och bygglagen (PBL in Swedish) (the Planning and Construction Act) and Boverket (the National Board of Housing, Building and Planning) in relation to its building regulations (BBR in Swedish) and its future amended regulations (BÄR in Swedish). The Ministry of Enterprise, Energy and Communications/the Swedish Energy Agency in relation to promotional measures.

c) A review (if any) of the rules is planned to take place no later than by 31 December 2011.

On 17 June 2010 the Government decided to commission the state energy authority (the Swedish Energy Agency) and Boverket (the National Board of Housing, Building and Planning) in consultation with other involved agencies to present proposals for the implementation of Articles 13(3) – 13(6) in förnybartdirektivet (the Renewability Directive). A report on the commission, in those parts that relate to the implementation of Articles 13(3) and 13(6), is to be submitted by 15 October 2010, those relating to Article 13(5) by 31 December 2010 and those relating to Article 13(4) by 31 December 2011.

The National Board of Housing, Building and Planning's building regulations (BBR in Swedish) stipulate the minimum requirements for the technical properties of buildings, etc. as regards energy savings, etc. The requirements are designed to be a verifiable functional requirement, which means that technical solutions are not specified. The building regulations are also general in nature. The conditions and requirements that exist in the erection or conversion of individual buildings are quite distinct, e.g. as regards the form of heating and energy sources. Sweden currently has a high proportion of renewable energy used in the building sector, both directly and indirectly through, inter alia, district heating and cooling. The primary focus is on the employment of instruments to promote renewable energy other than the setting of minimum levels for renewable energy in the building sector.

d) Summary of the existing and planned measures at regional/local levels:

The local bodies (the municipalities) are responsible for spatial planning within the municipalities. The developer is responsible for the actual detailed design of buildings, etc.

During 2008 all of the county administrative boards were given the task by the Government to devise regional climate and energy strategies in order to reduce emissions of greenhouse gases, promote energy conversion, increase the share of renewable energy and promote energy efficiency and more efficient transport systems. The strategies are an important element of the national energy and climate policy to enable the targets that have been set at local and regional levels to be realised. The result of the work has now been reported to the

Government and has been analysed by the Swedish Energy Agency, which submitted a summary to Regeringskansliet (the Government Offices of Sweden) 27 February 2009 (N2009/2235/E). The county administrative boards have, as the Government understands it, initiated a process to reach a regional consensus regarding the energy and climate issues in broad collaboration with the municipalities, real estate companies, municipal energy companies, transportation companies, commercial enterprises, government agencies, non-profit organisations, colleges and cooperative and autonomous bodies, etc. The county administrative boards have described their regional characteristics as regards energy consumption and CO_2 emissions as well as their opportunities to reduce the climate-impacting emissions and produce renewable energy. Many county administrative boards have on the basis of this formulated a vision and targets for their work and some have progressed even further by starting to plan for action and initiatives and have allocated responsibility for this. The Government has found that the work has so far been of a varying quality and from 2010 will be providing funds in order to bolster the continued work of the county administrative boards by developing and implementing the regional climate and energy strategies. Now for the first time many county administrative boards have been able to gain and overview of the challenges and opportunities facing the counties in relation to energy and climate.

The Swedish Energy Agency programme Uthållig kommun (the Sustainable Municipality) is a unique collaboration between the Swedish Energy Agency and in excess of 20% of the country's municipalities. The programme is based on the participating municipality's ambitions to make the local community more sustainable. The overall goal of the Uthallig kommun (the Sustainable Municipality) programme for 2008 - 2011 is to contribute to sustainable energy consumption within an energy system that is secure, cost-effective and has a low negative impact on public health, the environment and the climate. There are a number of examples of the targets and plans for a reduction in the consumption of fossil energy for heating and indirect and indirect increases in the share of renewable energy within the framework of the climate strategies within the Uthallig kommun (the Sustainable Municipality) programme.

The municipalities, county councils and regions are of vital importance as engines in this change work. They are political arenas with responsibility for local and regional development working as a team together with trade and industry and other players. They are also community planners, major operators and procurers and not least an important platform for civil dialogue and civil involvement. The municipalities, county councils and regions have important roles to play and make important contributions to the energy and climate work. Key priority areas are contributing to extending the environmentally-sound energy supply, working towards energy efficiency and cost savings, increased investment in public transport and infrastructure, green planning and environmentally-friendly procurements. The involvement of trade and industry is vital for successful energy and climate work. Trade and industry is able to offer experience and there is potential for energy efficiency and energy conversion. The environmentally-driven commercial development is a prerequisite for sustainable growth..[26]

In June 2007 Sveriges Kommuner och Landsting (SKL) (the Swedish Association of Local Authorities and Regions)) conducted a questionnaire survey about the climate work

[26] Energy and climate, position paper, SKL (the Swedish Association of Local Authorities and Regions) May 2008

conducted by its members. The questionnaire was answered by 227 municipalities, i.e. 78% and all of the 20 county councils and regions. There follows an extract of the results.

87% work towards reducing emissions of greenhouse gases as part of their *spatial planning*. The three most common areas are localisation of infrastructure, places of work and residential housing for reduced transportation requirements and energy efficient transportation (57% of all of the municipalities), localisation of wind power (51%) and location of building developments for the expansion of remote heating (48%). Where municipalities own the land, 23% percent are focusing on energy requirements for building developments, whilst 9% are focusing on voluntary agreements regarding the energy performance of non municipally-owned land.

As regards *municipally-owned premises*, the municipalities are focusing on energy efficiency and renewable energy in several contexts. 95% do so through new developments, conversions and renovations. 92% are focusing on systematically increasing energy efficiency in the existing property stock. 89% have already converted to renewable energy for heating or are in the process of doing so.

As regards *municipally-owned residential housing*, energy efficiency and renewable energy are being focused on to almost the same extent. 83% do so through new developments, conversions and renovations. 80% are focusing on systematically increasing energy efficiency in the existing property stock. 79% have already converted to renewable energy for heating or are in the process of doing so.

Energy efficiency requirements and climate performance requirements for *procurements and purchases* are most common for vehicles (e.g. environmentally-friendly cars), on which 84% stipulate such requirements. 57% also stipulate such requirements on travel paid for by the community and on other goods and services. 44% stipulate such requirements on other transport services.

80% of the municipalities *collaborate with the local business community* in their climate work. Two out of three collaborate on increasing energy efficiency or converting to renewable fuels in the business community, e.g. through joint projects, advice, environmental inspections or environmental certifications.
30% collaborate on the generation of biofuels and 21% on developments and residential housing. Other collaboration areas are travel and passenger transport (19%), goods transport (17%), and product development within the area (15%) and technology export (7%). Remote heating, waste heat, wind power, biogas and information, strategy work and training belong to the other questions termed “open answers”.

81% of the municipalities are focusing on actively *informing* and *involving* their inhabitants about the greenhouse effect and what they can do to reduce its impact.

As regards *county council premises*, all of the municipalities are focusing on systematically increasing energy efficiency in the existing property stock as well as for new developments, conversions and renovations. All of the municipalities except one have converted to renewable energy for heating or in the process of doing so. Four also state that they no longer use any fossil fuels for heating whatsoever. All 18 county councils that submitted figures for the heating of their premises indicate a clear reduction in energy consumption, on average

16% per square metre in five and a half years. The four that have comparable tasks for 1995 reduced their energy consumption for heating by almost 25% per unit area by 2006.

From 1 January 2010 municipalities and county councils will be able to apply for government funding for strategically targeted work on energy efficiency issues within their own operations. This is expected to lead to a greater internal coordination of energy issues within the municipalities and county councils and promote the integration of an energy economy perspective into different municipal areas of responsibility.

e) Are there minimum levels for the use of renewable energy in building regulations and codes? In which geographical areas and what are these requirements? (Please summarise.) What measures have been built into these codes to ensure that the share of renewable energy used in the building sector will increase? What are the future plans related to these requirements/measures?

On 17 June 2010 the Government decided to commission the state energy authority (the Swedish Energy Agency) and Boverket (the National Board of Housing, Building and Planning) in consultation with other involved agencies to present proposals for the implementation of Articles 13(3) – 13(6) in förnybartdirektivet (the Renewability Directive). A report on the commission, in those parts that relate to the implementation of Articles 13(3) and 13(6), is to be submitted by 15 October 2010, those relating to Article 13(5) by 31 December 2010 and those relating to Article 13(4) by 31 December 2011.

The third sub-paragraph of Article 13(4) states: By 31 December 2014, Member States shall, in their building regulations and codes or by other means with equivalent effect, where appropriate, require the use of minimum levels of energy from renewable sources in new buildings and in existing buildings that are subject to major renovation. Member States shall permit those minimum levels to be fulfilled, inter alia, through district heating and cooling generated using a significant proportion of renewable energy sources.

Plan- och bygglagen (PBL in Swedish) (Planning and Construction Act), and plan- och byggförordningen (1987:383) (PBF in Swedish) (Planning and construction ordinance) contain provisions for planning in relation to land and water and more general provisions in relation to building. Reference is made to lagen (1994:847) om tekniska egenskapskrav på byggnadsverk, m.m. (BVL in Swedish) (Act concerning technical characteristics of structures, etc.) and the associated förordning (1994:1215) om tekniska egenskapskrav på byggnadsverk, m.m. (BVF in Swedish) (Ordinance concerning technical characteristics of structures, etc.). The fundamental technical characteristic requirements that buildings must fulfil when being built or altered, inter alia, as regards energy economy and heat insulation, are regulated in the above.

No alterations to existing building are included at ordinance level in the National Board of Housing, Building and Planning's building regulations. However, there are also at present more ambitious plans to devise binding ordinances for alterations to buildings. Currently, the Swedish Board of Housing, Building and Planning's general guidance on the alteration of buildings (BÄR in Swedish) is applicable to alterations to buildings, however these are only indicative guidelines regarding the fulfilment of the technical characteristic requirements when altering buildings.

The Swedish Board of Housing, Building and Planning's building regulations are designed to be functional requirements and are expressed as minimum levels for the various technical requirements that buildings must fulfil, e.g. as regards energy economy.

Currently renewable energy is being promoted in the Swedish Board of Housing, Building and Planning's building regulations by, for example, the installation of solar heating facilitating the fulfilment of a maximum permitted level for energy consumption in the building regulations.

f) What is the projected increase of renewable energy use in buildings by 2020? (If possible differentiating between residential (single-unit and multiple unit), commercial buildings, public buildings and industrial buildings.)) (To answer this question you may use a table similar to Table 6 below. Data could be given yearly, or for selected years. Heating, cooling and electricity consumption from renewable energy sources should be included.)

The table below is based on the same data and same assumptions as the forecast in general.

Table 6 Estimated share of energy from renewable sources within the building sector (%)

	2005	2010	2015	2020
Residential housing	55.9%	60.3%	64.7%	69.1%
Commercial buildings	50.7%	55.0%	59.3%	63.6%
Public buildings	50.5%	55.1%	59.7%	64.3%
Industrial buildings	NA	NA	NA	NA
TOTAL	55.9%	60.3%	64.7%	69.1%

g) Has the introduction of requirements on minimum levels for the share of energy from renewable sources new and newly refurbished buildings been considered for the national policy? If so, what are these levels? If not, how will the appropriateness of this policy option be explored by 2015?

On 17 June 2010 the Government decided to commission the state energy authority (the Swedish Energy Agency) and Boverket (the National Board of Housing, Building and Planning) in consultation with other involved agencies to present proposals for the implementation of Articles 13(3) – 13(6) in förnybartdirektivet (the Renewability Directive). The commission includes proposing the necessary amendments to the building regulation and building standards in order for appropriate measures to be implemented in order to increase the share of energy from all types of renewable energy sources within the building sector. Boverket (the National Board of Housing, Building and Planning)shall in consultation with the Swedish Energy Agency assess the need and the appropriateness of a possible change to the regulatory framework in the form of building regulations in order to increase the share of energy from renewable sources within the building sector. The commission includes analysing the extent to which the existing building regulations for new developments and existing buildings that are in the process of renovation will contribute to the share of energy from renewable sources within the building sector. Should this be deemed appropriate, proposed measures are to be put forward taking into account the fact that primary focus is on using instruments other than the setting of minimum levels for renewable energy in the building sector in order to promote renewable energy. Proposed amendments to the regulatory framework must be able to come into force by 31 December 2014. The part of the commission that relates to measures and proposed implementation of Article 13(4) of the Renewable Energy Directive) must be reported to Regeringskansliet (the Government Offices of Sweden) by 31 December 2011.

h) Please describe the plans for ensuring the exemplary role of public buildings at national, regional and local levels by using renewable energy installations or becoming zero energy buildings from 2012 onwards? (Please take into account the requirements under the Directive on the Energy Performance of Buildings).

On 17 June 2010 the Government decided to give Swedish Energy Agency and Boverket (the National Board of Housing, Building and Planning) in consultation with other involved agencies to present proposals for the implementation of Articles 13(3) – 13(6) in förnybartdirektivet (the Renewability Directive). The Swedish Energy Agency and Boverket (the National Board of Housing, Building and Planning) are to propose measures in order to ensure that new public buildings or existing buildings play an exemplary role in utilising renewable energy sources from 1 January 2012 onwards. The parts of the commission that relate to the proposed implementation of Article 13(5) of the Renewable Energy Directive) are to be reported to Regeringskansliet (the Government Offices of Sweden) by 31 December 2010.

Government energy efficiency funding is to be introduced to the municipalities and county councils in 2010. The Government is bolstering the local and regional energy and climate work within the country and decided on 17 December 2009 on an ordinance regarding government funding to the municipalities and county councils that are involved in strategically increasing energy efficiency in their own operations. All of the municipalities and county councils that undertake to actively work towards increasing energy efficiency will receive annual financial support. In total SEK 99 million per year is being allocated for the municipalities and county councils. The investment is part of a new five-year energy efficiency programme for the period 2010 – 2014. The funding can be applied for from the Swedish Energy Agency from 1 January 2010 and a decision on funding for the whole five-year period will be given. One of the requirements for the award of funding is the establishment of an energy efficiency strategy and subsequently actively work towards its implementation. The strategy is to include a situation analysis, targets, an action plan and a selection of at least two out of the six measures that are described in Annex VI to the EU Energy Service Directive. This includes the purchasing of energy-efficient products and leasing/owning energy-efficient buildings. The effects of the energy efficiency work are to be reported on an annual basis to the Swedish Energy Agency. Besides paying financial support to the municipalities and county councils, the Swedish Energy Agency will also provide advice and support to the municipalities and county councils on increasing energy efficiency. The scope of the strategy, requirements regarding follow-ups and reporting, etc. are regulated in an ordinance that was decided on by the Swedish Energy Agency in January 2010.

For the rest of the public sector, förordningen (2009:893) om energieffektiva åtgärder för myndigheter (Ordinance concerning energy efficiency measures for authorities) shall apply. This was introduced in the autumn of 2009 and its purpose is to contribute to an efficient end use of energy in the public sector. Each authority is to implement at least two out of the six listed measures and these measures are to be implemented on a continual basis. Government agencies may as tenants and/or property owners choose from the following measures:
1. the utilisation of financing instruments for energy savings, including agreements on energy performance, where measurable and pre-defined energy savings are stipulated as requirements,
2. the purchase of equipment on the basis of lists provided by the Swedish Energy Agency and which contain energy-efficient product specifications for different categories of equipment,
3. the purchase of equipment that consumes energy efficiently in all modes, including in sleep

mode,
4. the replacement or modification of existing equipment with the equipment referred to in 2 and 3,
5. the utilisation of energy inspections and implementation of their recommendations, or
6. the purchase or lease of energy-efficient buildings or parts of such buildings, or implementation of measures to make the buildings already owned or leased by the authority more energy-efficient.

Article 5 of the Directive on the Energy Performance of Buildings (2002/91/EC) states, inter alia, that as regards new buildings the Member States must ensure that an evaluation takes places as to whether alternative systems are technically, environmentally and economically viable. Alternative systems refers, for example, to decentralised energy supply systems that are based on renewable energy, combined heat and electricity generation, district heating/small-scale district heating or district cooling/small-scale district cooling, if available, heat pumps, under certain conditions, and this must be considered before building commences. In the proposed revision of the directive, it states in Article 6 that the Member States must ensure that four specified heating systems must be considered prior to the building of new houses commences and an assessment made as to their suitability from a technical, environmental and economic standpoint. The specified systems are:
(a) a decentralised energy supply system based on renewable energy
(b) cogeneration
(c) district or block heating and
(d) heat pumps, where available.

The proposed revision also includes a new article, Article 9, regarding so-called virtually zero energy buildings. The article stipulates that national plans be drawn up to increase the number of buildings for which both CO_2 emissions and the consumption of primary energy are low are equal to zero and that “virtually zero energy buildings” be given a national definition.

The amendment to the directive is expected to come into force in the spring of 2010. The proposals have not yet had any effect on Swedish legislation or planning, but preparatory work for their national implementation is in progress in that Swedish authorities on behalf of the Government are analysing, inter alia, what changes the revision of the directive will involve for Swedish legislation.

Delegationen för hållbara städer (Delegation for Sustainable Cities) has been appointed by the Government for the period 2008 – 2010 in order to stimulate sustainable urban development in various ways. The delegation is a forum in which representatives from architects, planners, technology consultants and export promoters are assembled. The Government has given the Delegation för hållbara städer (Delegation for Sustainable Cities) the task of administering and deciding on governmental economic support for the development of sustainable cities. The support is regulated in förordningen 2008:1407 om statligt stöd för hållbara städer (Ordinance concerning government support for sustainable cities). The governmental support will stimulate urban development projects that will contribute to reduce greenhouse gas emissions. The projects will create attractive and ecological, socially and economically sustainable urban environments. The projects could be prototypes for integrated sustainable urban planning and applied environmental technology. They will show the potential in the development of sustainable cities, be demonstrators for and facilitate the spread and export of environmental technology and knowledge. The funding amounts to SEK 340 million for 2009 – 2010.

The expansion of district heating in Swedish municipalities, which has been in progress since the end of the 1940s, can also be mentioned in this regard.

The EC directive on public procurements[27] makes it possible, but not obligatory, to stipulate environmental requirements in procurement procedures. They contain provisions regarding how contracting authorities and units can contribute in their procurements to protecting the environment and promoting sustainable development. Sustainable development is an interaction between the three parts – ecological, social and economic sustainability. According to the procurement rules, it is therefore possible to observe environmental requirements in public procurement. Environmentally-sound public procurement involves setting a good example and influencing the market. Public procurement enables public authorities to create strong incentives for producers to produce environmentally-sound alternatives. Public procurement in Sweden is regulated in lagen (2007:1091) om offentlig upphandling (Act concerning public procurements) and lagen (2007:1092) om upphandling inom områdena vatten, energi, transporter och posttjänster (Act concerning procurement within the water, energy, transport and postal services sectors).

According to studies conducted for Naturvårdverket (the Swedish Environmental Protection Agency), 60% of the governmental, municipal and county council organisations regularly stipulate environmental requirements on procurements. However, in one third of the procurements the environmental requirements are phrased in such a way as to have no effect on the products or services that are being purchased. The same applies to government framework agreements. This suggests, inter alia, a need for increased knowledge about how to phrase effective environmental requirements. There are a limited number of court rulings in the area of public procurements and environmental requirements. This applies to both EC courts and Swedish courts. The fact that there exists no well-developed case law that applies to procurements and environmental requirements increases the uncertainty as to which environmental requirements may be stipulated. One source for further information on procurements is AB Svenska Miljöstyrningsrådet (the Swedish Environmental Management Council). The Council is owned by the state and trade and industry and its duty is to pursue environmentally-sound procurements within the government, municipalities and county councils. The Environmental Management Council provides, inter alia, procurement criteria for a number of products and services. This includes procurement criteria for building contracts for new developments and the conversions of commercial premises.

Refer also to the answer in Point d) regarding ongoing and planned measures at local and regional levels including requirements on regional climate and energy strategies, the governmental programme Uthållig kommun (the Sustainable Municipality) and the climate work of Sweden's municipalities and county councils (including energy efficiency and renewable energy in spatial planning and in their own premises and residential buildings).

i) How are energy efficient renewable energy technologies in buildings being promoted? (These measures may concern biomass boilers, heat pumps and solar thermal equipment that fulfil eco-label requirements or other standards developed at national or Community level (cf. text of Article 13(6))).

[27] Directive 2004/17/EC on water, energy, transport and postal services and Directive 2004/18/EC on the award of public works contracts, public supply contracts and public service contracts.

On 17 June 2010 the Government decided to commission the state energy authority (the Swedish Energy Agency) and Boverket (the National Board of Housing, Building and Planning)in consultation with other involved agencies to present proposals for the implementation of Articles 13(3) – 13(6) in förnybartdirektivet (the Renewability Directive). The parts of the commission that relate to measures and proposed implementations of Articles 13(3) and 13(6) in förnybartdirektivet (the Renewability Directive) must be reported in full to the Regeringskansliet (Government Offices of Sweden) by 15 October 2010.

Refer to Point 4.2.2. a) for performance requirements in order to benefit from funding for investment in thermal solar energy.

As regards energy labelling, Sweden fulfils MB directive on mandatory energy labelling. There are energy labelling requirements for air-air heat pumps (and air conditioning systems).

There is also the Nordic system for environmental labelling (the Swan) and the EU Ecolabel. Miljömärkning Sverige AB is responsible for the Swan and labelling under the EU Ecolabel. Swan-labelled heating systems include wood burners and biofuel systems, rock heat pumps and air-air heat pumps.

In order to increase awareness of energy efficient products amongst commercial enterprises and
the general public and to stimulate product development, the Swedish Energy Agency's test lab is conducting tests in a number of areas including heating equipment. Tests are also being conducted in order to ensure that the requirements of the labelling are being fulfilled.

4.2.4 Information provisions (Articles 14(1), 14(2) and 14(4) of Directive 2009/28/EC)

a) Reference to existing national and/or regional legislation (if any) and information requirements according to Article 14 of Directive 2009/28/EC:

The Government has given the Swedish Energy Agency the duty of having complete responsibility for information under förnybartdirektivet (the Renewability Directive).

As regards the issue of ensuring that information on supporting measures is available to all parties, under Swedish constitutional law (the Swedish Constitution) administrative authorities and other bodies, etc. that perform public administration duties must observe everybody's equality before the law and also observe impartiality and objectivity. Myndighetsförordningen (the Government Agencies Ordinance) states that all government agencies are responsible for providing information on their activities. Tryckfrihetsförordningen, (the Freedom of the Press Act), which is also a constitutional law, expresses the principle of the public accessibility of documents [refer also to 4.2.1 g) above].

The Swedish Energy Agency has overall national responsibility for the dissemination of information and knowledge about energy efficiency. This is governed in part by the agency's appropriation directions. At a regional level the county administrative boards are responsible for coordinating and devising regional energy and climate strategies. At a local level the municipalities work on devising local energy plans on the basis of national legislation. Municipal energy and climate advisers also work within the municipalities. The advisers are

employed by the municipality but are funded by the Swedish Energy Agency. Funding is provided by virtue of förordningen (1997:1322) om bidrag till kommunal energi- och klimatrådgivning (Ordinance concerning grants for municipal energy and climate advice). Under the ordinance, the energy and climate advice is to impart locally and regionally adapted knowledge about energy efficiency, energy consumption and climate impact and to provide information about the opportunities available to change energy consumption in commercial premises and residential housing. The energy and climate advice may also include the transportation of people and goods. The energy and climate advice may be targeted at domestic households, commercial enterprises and organisation and to municipalities regarding their own buildings, property and transportations.

b) The body/(ies) responsible for the dissemination of information at national/regional/local levels.

The Government has given the Swedish Energy Agency the duty of having complete responsibility for information under förnybartdirektivet (the Renewability Directive).

The Swedish Energy Agency has national responsibility for disseminating information about energy efficiency (and renewable energy) to consumers, doemstic households and commercial enterprises. At a regional level the regional energy offices act as energy players by disseminating information and improving knowledge principally through different types of projects. The county administrative boards are responsible for devising regional energy and climate strategies in consultation with other parties. The county administrative boards also largely provide information on energy issues in their supervisory activities of commercial enterprises within the framework of the Environmental Code. The municipal energy and climate advisers work at a local level on disseminatuing information about energy efficiency. They also address climate and transport issues but the starting point is energy. The energy and climate advisers work with a wide selection of target groups such as private individuals, consumers, schools, domestic households and commercial enterprises.

c) Summary of the existing and planned measures at regional/local levels (where relevant).

At a regional level the county administrative boards work with coordinating and devising the regional energy and climate strategies in order to drive forward the regional and local energy activities. At a local level the municipalities work with municipal energy plans. The county administrative boards and municipalities conduct inspections in accordance with the Environmental Code, which contains general requirements on energy economy and opportunities to use renewable energy sources. In addition to this, the regional energy offices work within the energy sector to promote energy efficiency and the use of renewable energy sources. They continually operate projects within this area and act as collaborative partners in energy issues. The energy offices are very much involved in regional and local trade fairs in order to reach out to the general public. The municipal energy and climate advisers work continually on disseminating information about energy efficiency to the general public and commercial enterprises. Since 1 January 2010 municipalities and county councils have been able to apply for government funding from the Swedish Energy Agency for their strategic energy efficiency work. Since April 2010 commercial enterprises with an annual consumption in excess of 0.5 GWh and which are not part of Programmet för energieffektivisering i elintensiv industri (Programme for energy efficiency in electricity intensive industry) may apply for government funding in order to conduct energy surveys and review their energy consumption. The Swedish Energy Agency operates an annual national campaign regarding energy economy by active involvement in major trade fairs across Sweden.

d) Please indicate how information is made available on supporting measures for using renewable energy sources in electricity, heating and cooling and in transport to all relevant parties (consumers, builders, installers, architects, suppliers of relevant equipment and vehicles). Who is responsible for verifying and publishing of this information? Are there specific information resources for the different target groups, such as end users, builders, property managers, property agents, installers, architects, farmers, suppliers of equipment using renewable energy sources, public administration? Are there information campaigns or permanent information centres in the present, or planned in the future?

The Government has given the Swedish Energy Agency the duty of having complete responsibility for information under förnybartdirektivet (the Renewability Directive).

Responsibility for information about existing support measures is primarily incumbent on the authority that administers the support. However, the Swedish Energy Agency as the promoting agency has special responsibility.

The municipal energy and climate advisers work on disseminating information and knowledge about renewable energy used for electricity, heating, cooling and transport. The principal target groups are consumers, domestic households and commercial enterprises. The municipalities have employer responsibility, which means that they assess the competence of energy and climate advisers when employing these advisers. The Swedish Energy Agency also assists in providing training to further develop the competence of these advisers. In addition to this, the Swedish Energy Agency also provides a large amount of information material that can be distributed by the advisers during the course of their work. The regional energy offices are also important information disseminators. They are able to adapt certain information provisions to different target groups through various projects, e.g. towards farmers and property owners. The project work of the regional energy offices is continually in progress. There are regional information centres in some regions and these have been set up as a result of regional initiatives.

e) Who is responsible for publishing information on the net benefits, costs and energy efficiency of equipment and systems using renewable energy sources for heating, cooling and electricity? The supplier of the equipment or system, public body or somebody else?)

According to the guidelines issued by the Swedish Energy Agency the government agency must provide supporting data for the assessment of all of the energy policy programmes. This is achieved by means of different types of studies and basis material, follow-ups and reports. This can also relate to issues including net benefits, environmental effects and energy efficiency. The Government has given the Swedish Energy Agency the duty of having complete responsibility for information under förnybartdirektivet (the Renewability Directive).

The Swedish Energy Agency has supervisory responsibility for the regulatory framework resulting from MB Ecodesign Directive (2009/125/EC) and Energy Labelling Directive (92/75/EC) in Sweden.

Commercial enterprises and trade associations within the renewable energy equipment area produce their own material and market products, including descriptions of net benefits, etc.

One of the units of the Swedish Energy Agency (Testlab) has the task of conducting tests. This comprises the testing of energy-intensive products and also of heating systems and to a certain degree building shells, e.g. doors in detached houses. The results of the test are made

available to the public and commercial enterprises and are largely disseminated by the municipal energy and climate advisers.

f) What guidance can planners and architects receive to help them to properly consider the optimal combination of renewable energy sources, high efficiency technologies and district heating and cooling when planning, designing, building and renovating industrial or residential areas? Who is responsible for this?

The Government has given the Swedish Energy Agency the duty of having complete responsibility for information under förnybartdirektivet (the Renewability Directive). Boverket (the National Board of Housing, Building and Planning) has national responsibility for issues relating to spatial planning and all technical characteristic requirements under the building regulations.

Boverket (the National Board of Housing, Building and Planning)has the national public authority responsibility for spatial planning and building.The municipalities are able to provide certain guidance through their planning work.There is no national publication that provides overall guidance on optimising a number of energy-related issues to each other within town planning.Instead all of the experiences concerning these issues were compiled in 2000 into the publication “Planera med miljömål!En idékatalog, Boverket, Naturvårdsverket” (Planning with environmental objectives! An idea catalogue, the National Board of Housing, Building and Planning, Naturvårdverket (Naturvårdverket (the Swedish Environmental Protection Agency) and also in other reports produced during the so-called “SAMS project”. Current experiences that are now emerging from Uthållig kommun (the Sustainable Municipality), from the sub-project concerning spatial planning, and the compilations of knowledge and experience that will emerge from Delegationen för hållbara städer (the Delegation for Sustainable Cities) can provide up to date support. It is then up to the municipalities in conjunction, inter alia, with their general planning to work with appropriate structures and generally make optimal considerations.

g) Please describe the existing and planned information and training programmes for the general public on the benefits and practicalities of developing and using energy from renewable sources. What is the role of regional and local participants in designing and managing these programmes?

The general public will receive information primarily from the municipal energy and climate advisers. The advisers receive support from the Swedish Energy Agency in the form of funding, training and information material. The regional energy offices are responsible for regional coordination. The energy offices also provide the general public with information through their project work. The Swedish Energy Agency in collaboration with other governmental agencies conducts an annual national campaign to further reach out to the general public and create improved awareness of energy efficiency (and renewable energy sources).

In addition to this the Swedish Energy Agency operates its own comprehensive information provision activities via newsletters, press releases and the production of a large number of publications and brochures. Governmental agencies are also obliged to answer questions from private individuals.

4.2.5 Certification of installers (Article 14(3) of Directive 2009/28/EC)

a) With reference to existing national and/or regional legislation (if any) concerning certification or equivalent qualification schemes for installers in accordance with Article 14(3) of Directive 2009/28/EC.

The Government intends to give the Swedish Energy Agency, Boverket (the National Board of Housing, Building and Planning) and SWEDAC (the Swedish Board for Accreditation and Conformity Assessment) the task of devising proposals for a national coordinated certification scheme or equivalent in accordance with Article 14(3). The assignment should also include devising proposals on how information (in so far as it is not already currently available) on certification schemes or equivalent qualification systems is to be provided for the general public in accordance with Article 14(4).

Certification involves a competent, independent party certifying conformity with pre-defined and specified requirements or standards. Certification is usually voluntary, even though exceptions do exist.

Certification is being performed by accredited certification bodies in an increasing number of areas. SWEDAC (the Swedish Board for Accreditation and Conformity Assessment) is Sweden's national accreditation body. SWEDAC is a governmental agency that is subordinate to Utrikesdepartementet (the Ministry for Foreign Affairs) and Näringsdepartementet (the Ministry of Enterprise, Energy and Communications). SWEDAC is responsible for issues of control under lagen (1992:1119) om teknisk kontroll (Technical Inspection Act). In this law accreditation refers to a declaration that a body is competent to perform the activities to which the accreditation relates. SWEDAC deals with the accreditation, inter alia, of certification bodies for the certification of products, management systems or personnel. Applicable European or international standards must be observed in the accreditation. As an accreditation body SWEDAC in accordance with the requirements of the international standard ISO/IEC 17011.

In Sweden there is certification within a number of areas that are regulated. This includes electrical installation competence. This also applies to the competence of installers who handle refrigerants in accordance with Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases and förordningen (2007:846) om fluorerade växthusgaser och ozonnedbrytande ämnen (Ordinance (2007:846*)* on fluorinated greenhouse gases and substances that deplete the ozone layer), as well as European Commission Regulation (EC) No 303/2008 establishing minimum requirements and the conditions for mutual recognition for the certification of companies and personnel as regards stationary refrigeration, air conditioning and heat pump equipment containing certain fluorinated greenhouse gases and substances that deplete the ozone layer. Certification is a requirement for managing plants with in excess of 3 kg of refrigerant. From 1 January 2009 the previous accreditation for cooling will no longer apply and the responsible authority will be The Swedish Environmental Protection Agency. Because of new EU regulations the Government decided on an amendment to förordningen om fluorerade växthusgaser och ozonnedbrytande ämnen (Ordinance on fluorinated greenhouse gases and substances that deplete the ozone layer), which came into force on 15 June 2009. The major difference to before is that removal of the requirement for accreditation and its replacement with a requirement for the certification by accredited bodies of companies and personnel that work with cooling units and heat pumps containing F gases.

There is also a voluntary personal certification. For solid fuel plants requirements are stipulated on waste gas flues for which the chimney cleaners have received training. There are

also a number of voluntary certification schemes for installers. Pellsam has a voluntary certification scheme for installers of pellet devices. Svensk solenergi has a voluntary certification scheme for solar heating installers. Brunnsborrarna has a personal certification scheme. Gas installers (biogas) are covered by the industry scheme for training and approval. The scheme is related to LBE (lagen [1988:868] om brandfarliga och explosiva varor) (Flammable Goods and Explosives Act (1988:868)). The gas supplier is responsible for ensuring that this is complied with in accordance with energigasnormen (energy gas standard) - a system similar to the district heating requirement on the installer that is approved/verified by the distributor.

Svenska värmepumpsföreningen (SVEP) (the Swedish Heat Pump Association) provides installer training that leads to their certification. The installer must be able to: Calculate the power requirements of the building, different heat-conveying systems, warm water tap systems, control and regulation of heat pumps, solid and liquid condensation, the cooling principle, dimensioning of collectors, agreements and advertising. Today a SVEP certification means that a person in a managerial position in a company has passed the examination on the SVEP certification course, EU-cert. The course was devised by EHPA, the European Heat Pump Association, and is therefore international. The course is principally aimed ay installers but is also suitable for others connected with the industry. When searching for a member company on the SVEP website it is possible to see whether or not the company is certified. SVEP stipulates the same requirements for its installers as for the third party certification that is available. The third party certification is valid in most of the EU Member States. To apply for this certification, contact Incert. (http://www.incert.se/) This certification takes place without accreditation from SWEDAC.

The Directive 2002/91/EG on the Energy Performance of Building was implemented in Sweden through, inter alia, lagen (2006:985) om energideklarationer för byggnader (Act concerning energy declarations for buildings). Under this Act only certified energy experts may draw up and approve the energy declaration. Boverket (the National Board of Housing, Building and Planning) publishes the ordinances and general guidelines that form the basis of the certification of energy experts.

In conclusion it can be mentioned that (the requirement on) certification tends to disfavour the weaker players in the market, i.e. the smaller players, since they have relatively higher certification costs.

b) Responsible body/(ies) for designing and approving certification/qualification schemes up to 2012 for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps.

The Government intends to give the Swedish Energy Agency, Boverket (the National Board of Housing, Building and Planning) and SWEDAC (the Swedish Board for Accreditation and Conformity Assessment) the tasks of devising proposals for a national coordinated certification scheme or equivalent in accordance with Article 14(3). The assignment should also include devising proposals on how information (in so far as it is not already currently available) on certification schemes or equivalent qualification systems is to be provided for the general public in accordance with Article 14(4).

c) Are such certification schemes/qualifications already in place? If so, please describe these.

See above.

d) Is information on these schemes publicly available? Are lists of certified or qualified installers published? If so, where? Are other schemes accepted as equivalent to the national/regional scheme?

Available on the websites of the industry associations and of the companies.

e) Summary of the existing and planned measures at regional/local levels (where relevant).

The Government intends to give the Swedish Energy Agency, Boverket (the National Board of Housing, Building and Planning) and SWEDAC (the Swedish Board for Accreditation and Conformity Assessment) the tasks of devising proposals for a national coordinated certification scheme or equivalent in accordance with Article 14(3). The assignment should also include devising proposals on how information (in so far as it is not already currently available) on certification schemes or equivalent qualification systems is to be provided for the general public in accordance with Article 14(4).

4.2.6 Electricity infrastructure development (Article 16(1) and Article 16(3) to (6) of Directive 2009/28/EC)

The Swedish electricity grid that three levels: national grid, regional grid and local grid. The national grid consists of 220 kV and 400 kV cables. The regional grid connects to the national grid and has a lower voltage, usually 40-130 kV. The local grid connects to the regional grid and from the local grid, with voltage levels of 20 kV or lower, the electricity is transformed within the distribution areas to the low voltage 400/230 V that is used in domestic households.

The national grid is owned, administered and operated by the State via Affärsverket svenska kraftnät (Svenska kraftnät). Five companies are involved in the regional networks and approximately 170 companies in the local networks.

In accordance with Chapter 8. Section 1 of ellagen (the Swedish Electricity Act), the Government must appoint an authority with the overall responsibility for ensuring that electrical installations work together safely so that the balance within the whole or parts of the country is maintained in the short-term between the generation and consumption of the electricity (transmission system operator). Svenska kraftnät has been appointed as the transmission system operator (TSO) in Sweden and has overall system responsibility for the operation of the Swedish transmission network and electricity transfer connections.

Chapter 1 Section 7 of ellagen (the Swedish Electricity Act) stipulates that the Government must appoint an authority as the grid authority and that this authority shall address the issues that under ellagen (the Swedish Electricity Act) or under ordinances announced by virtue of ellagen (the Swedish Electricity Act) are incumbent on the grid authority. The Government has appointed Energimarknadsinspektionen (the Energy Markets Inspectorate) (EI)) as the grid authority. The EI will ensure that the regulatory framework is complied with and will also devise ordinances and examine and issue permits in accordance with ellagan (the Swedish Electricity Act). The EI is the national regulatory authority for energy.

a) With reference to existing national legislation concerning requirements related to the energy grid (Article 16).

It is the following chapters of ellagen (the Swedish Electricity Act) that are principally concerned, Chapter 2 Grid concessions, etc., Chapter 3 Grid activities, etc., Chapter 4 Grid tariffs and Chapter 8 Overall system responsibility and balance responsibility, etc. The answers below specify the relevant paragraphs.

As regards the approval procedures for grid infrastructures, requirements are also stipulated principally through the Planning and Construction Act and the **Environmental Code.**

b) How is it ensured that transmission and distribution grid will be developed with a view to integrating the targeted amount of renewable electricity while maintaining the secure operation of the electricity system? How is this requirement included in the transmission and distribution operators' periodical network planning?

In accordance with Chapter 3 Section 1 of ellagen (the Swedish Electricity Act) an electricity grid company that operates and maintains a grid and, where required, expands its grid and, where applicable, is responsible for its connection to other grid. The electricity grid company is also responsible for ensuring that its grid is secure, reliable and efficient and that it can in the long-term fulfil any reasonable requirements on the transmission of electricity.

Chapter 3 Sections 6-8 of ellagen (the Swedish Electricity Act) contain an elucidation of the obligations incumbent on whoever has the grid concession for the line and for the area to connect an electrical installation to the cable or the grid in the absence of particular grounds. Disputes in relation to the concession holder's obligations are to be tried by the grid authority.

Chapter 2 Section 11, Chapter 3 Section 1-9 and Chapter 8 Section 1 of ellagen (the Swedish Electricity Act) and förordningen (1994:1806) om systemansvaret för el (Ordinance concerning system responsibility for electricity), contain, inter alia, minimum requirements and minimum operating regulations for the safe operation of the electrical system. The location of the renewable energy is just as much vital importance to the studies as the amount of energy that is generated. In order to reduce uncertainty, the major grid owners in Sweden are collaborating on a joint database in which all known connection projects for renewable energy will be complied.

The energy balance analyses show which transfer interface is in need of enhancement and an analysis of the calculated prices for the model in different areas indicates the size of the bottlenecks that could occur. The capacity stated between the different areas is the trading capacity that has been calculated, taking into account the ability to maintain secure operation of the electricity system. For the areas in which the analyses indicate a need for enhancement, separate studies are being conducted in order to determine the actual measures (new AC cables, HVDC transfers or other measures) need to be implemented in order to enhance the transfer capability in the most advantageous way in terms of public finances. The permitted new trading capacities have also been calculated taking into account operational stability.

The same type of energy balance studies have not been conducted for the distribution grid as for the transmission grid, instead the need for enhancement has been followed-up on the basis of the planned quantities of renewable energy that will have an effect on the grid in the respective areas.

Svenska kraftnät will apply a regulatory framework in order to maintain the operational stability of the electricity system, which is common to the Nordic system responsible main grid companies. The regulatory framework is documented in the Nordic collection of rules, which in English is called "The Nordic Grid Code", principally in the System Operation Agreement section, which is a civil agreement between the Nordic system responsible main grid companies. The regulatory framework fulfils the requirement for minimum operating regulation and minimum obligations.

In addition to this there are Svenska kraftnät's ordinances, operating agreements, balance agreements, connection agreements and plant agreements at main grid level. Svenska kraftnät has also issued technical guidelines for stations, control plants, cables, voltage regulation (voltage quality when connecting electricity generation, operation, maintenance and the environment. All agreements and guidelines relate to the main grid level but do due to natural reasons have resulting effects at regional grid and local grid levels. The ordinances apply to plants irrespective of voltage level.

Chapter 8 Section 4 of ellagen (the Swedish Electricity Act) regulates the balance responsibility. An electricity supplier may only supply electricity to bleeding points where somebody has assumed the financial responsibility for ensuring that the national electricity supply system is supplied with an equal amount of electricity as is being withdrawn from the bleeding point (balance responsibility). Such an undertaking must be made by means of a balance responsibility agreement with the system responsible authority (Svenska kraftnät).

Over the last few years the Swedish ellagen (the Swedish Electricity Act) has been supplemented by a number of provisions that promotes technical development and investment.

- The requirement to read electricity meters on a monthly basis, which has applied since 1 July 2009 has resulted in virtually all meters managing to conduct remote readings in Sweden. Many meters also contain technology that allows other functions to be performed.
- The functional requirement of Chapter 3 Section 9 of ellegan (the Swedish Electricity Act), which means that from 1 January 2001 no interruption may be in excess of 24 hours, have accelerated investment in the grid.
- All grid companies, with the exception of Svenska kraftnät, must, in accordance with Chapter 3 Section 9 (c) of ellagen (the Swedish Electricity Act) must produce an annual risk and vulnerability analysis in relation to the security of supply to the grid and an action plan that shows how the security of supply is to be improved.

c) What will be the role of intelligent networks, information technology tools and storage facilities? How will their development be ensured?

The supply of electricity from wind power will vary to a greater extent compared with traditional electricity generation. The high proportion of hydroelectric power in Sweden and Norway will contribute to equalising the total supply of electricity, which will in all probability reduce the need for advanced forms of storage facilities.

However, hydroelectric power is not an infinite regulating resource.In the longer term various types of energy stores may be relevant in order to cope with peak loads, even when the wind power does not produce appreciable amount of power (which would preferably occur during the cold winter days in Sweden). It is also believed that the consumer side will need to be used in different ways as a regulating resource in the future.This strongly supports the application of various types of "smart grid" into the Swedish system, which would involve increased consumer flexibility, not least to equalize the consumption between peak load times and other times.In summary, smart grid are considered to have an important role to play in the issue of increasing

the generation of renewable energy, reducing the demand for power and increasing the flexibility of electricity consumption.
If plug-in hybrid vehicles have a major impact it will also be of great importance that the charging of these vehicles (and also the possibility of utilising the energy that is already stored in the vehicle to support the power balance) can be regulated so that they are charged during periods when there are surplus supplies of energy. Effective methods and models for forecasting, inter alia, the wind power generation are also very important. Research and development in these areas is currently underway in Sweden, in particular as regards the integration of large quantities of wind power into the electricity supply system.

A larger spread of distributed generation (a large number of small generating units in closer proximity to the consumers, in contrast to the principally central generation of today) will also place other demands on the controllability of the grid.

Chapter 3 Section 1 of ellagen (the Swedish Electricity Act) stipulates the requirement, inter alia, that a grid company is responsible for operation and maintenance and, where required, the expansion of its grid and, where applicable, its connection to other grid. The company is also responsible for ensuring that its grid is secure, reliable and efficient and that it can in the long-term fulfil any reasonable requirements on the transmission of electricity. The grid companies are free to choose the solutions that are technically possible and economically reasonable in order, inter alia, to connect renewable electricity generation. The Swedish Government envisages that smart grid and IT tools will play an increasingly important role in enabling the grid companies to fulfil these requirements.

In addition to this, a programme of extensive and continual research and development is underway in Sweden that is targeted at electrical power transmission and distribution systems, including smart grid and IT and storage opportunities.

The Government has also given the EI the task of investigating and identifying any potential obstacles and to present proposals for measures to create the conditions for an expanded and developed utilisation of smart meters and smart electricity grid. This task is to be conducted on the basis of the opportunities for creating conditions for more active electricity customers, improving the incentive to more efficient electricity consumption and power reductions during peak load periods and to facilitate an increased introduction of renewable electricity generation. A report on the assignment is to be submitted by 1 December 2010.

d) Is the reinforcement of the interconnection capacity with neighbouring countries planned? If so, which interconnectors, for which capacity and by when?

Svenska kraftnät has, within the framework of its assignment from the Swedish government, the responsibility to continually review the need for grid improvements from both a national and a regional perspective. The system responsible Nordic grid companies have, within the framework of the previous Nordic collaborative organisation Nordel (now replaced by ENTSO-E), in a series of system development plans indicated a number of important improvements. These include:

- A new 400 kV Nea–Järpströmmen transmission line between Norway and Sweden, which has recently been commissioned. The investment will increase the transmission capacity by approx. 500 MW.

- A new Fenno-Skan 2 DC current connection with 800 MW transmission capacity between Sweden and Finland, which will be commissioned in 2012.
- A new VSC-HVDC multi-terminal connection, SydVästlänken (the South-West Link), in southern Sweden and between Sweden and Norway. The connection is expected to be completed in stages between 2013 and 2016. It will enhance the transmission grid by 1200 MW both in southern Sweden and between Sweden and Norway.

In addition to these, a new DC current connection VSC-HVDC between Sweden and the Baltic States (NordBalt) is planned, with a capacity of 700 MW. It is expected to be ready for commissioning in 2015/2016. Svenska kraftnät and the Finnish system responsible grid company, Fingrid, are also investigating the joint need to further enhance the connections between Sweden and Finland with a third AC current line in the north.

e) How is the acceleration of grid infrastructure approval procedures being addressed? What is the current situation and average time for obtaining approval? How will it be improved? Specify the current situation and legislation, bottlenecks detected and plans to streamline the procedure using an implementation timetable and the expected results.)

In Sweden the expansion of electricity grid infrastructures is approved through ellagen (the Swedish Electricity Act), The Environmental Code and plan- och bygglagen (the Planning and Construction Act). Refer also to Chapter 4.2.1 Administrativa förfaranden och fysisk planering (Administrative procedures and spatial planning) for further details about The Environmental Code and plan- och bygglagen (the Planning and Construction Act).

The Planning and Construction Act contains a number of tools for planning and construction. One of the most important is the municipal comprehensive survey plan, which shows how the municipality intends to use land and water areas within the municipality. It will also show how the built environment is to be developed and preserved, how national interests are to be fulfilled and environmental quality standards observed. The comprehensive survey plan acts as a guide for other plans and decisions, but it is not legally binding.

A so-called development plan is used when the municipality wishes to legally examine and establish the suitability of the land for development and the design of the design of the built environment. A development plan determines how the land in the area concerned is to be used (park land, green areas, land for industrial purposes, etc.) and the appearance and location of buildings. Development plans are used both when new areas are to be built and when existing areas are to be developed or preserved. The regulations of the development plan are binding for the building permits that are then required in order to construct buildings and certain installations. A specific process is to be followed when a development plan is devised. Further consultation is to be conducted where neighbours, the authorities and other parties will have the opportunity to present their opinions.

Electricity grid must not be established contrary to the development plan or area provision (Chapter 2 Section 8 of ellagen (the Swedish Electricity Act)) within areas that are included by a development plan or area provisions. An amendment to a development plan takes in the order of 12 to 18 months.

No building permit is required for cables or switchgear when establishing electricity grid infrastructures, but is required for the switchgear control building and other buildings within the station.

The operation of electricity grid is a legal monopoly since it is considered inappropriate from an environmental and a socio-economic perspective to have several competing electricity grid. The grid company/owner therefore has a monopoly within its geographic area or for a line and must have a permit (a grid concession) in order to build and use its electricity grid. The grid concessions must ensure a rational expansion of the electricity grid and a limit to their encroachment on public health, the environment and nature.

According to Chapter 2 of ellagen (the Swedish Electricity Act) there are two types of grid concession. A *line concession* relates to a line in a principally specific direction and an *area concession* that entitles the holder to build and use lines up to a specific voltage within a more closely-defined area. The Government has authorised the national regulatory authority for energy, the Energy Markets Inspectorate, to examine the applications for and issue permits for local grid, regional grid and in certain cases also national grid. Grid concessions for national grid are always awarded by the regulatory authority, but in certain cases, e.g. as regards overseas connection or lines with voltages in excess of 145 kV where some party concerned, municipality or government agency opposes the approval of the application, the grid concession if granted by the government.

The grid companies (approximately 170 in number) that distribute to end customers have general permits, grid concessions for the area, which allow the companies to expand and develop the local grid up to a voltage level of at least 20 kV without any additional permit from the grid authority.

In order to promote the development and presence of renewable energy, the Government has introduced a provision into Swedish legislation that allows the internal grid between electricity generation stations to be developed and used without the need for a grid concession. The exemption was introduced on 1 January 2009 into Section 22 (a) § of förordningen (2007:215) om undantag från kravet på nätkoncession enligt ellagen (1997:857) (Ordinance concerning exemption from the requirement for a grid concession under ellagen (the Swedish Electricity Act).

The application for a grid concession for a line is often preceded by a pilot study the primary purpose of which is to investigate the conditions and alternative sections. The pilot study also includes consultation with the general public affected, landowners, municipalities, authorities and other interested parties in accordance with the provisions of the Environmental Code. Should a development plan for the selected section for the line with a different purpose for the land be encountered during the work of the pilot study, it will be possible to apply for an amendment to the development plan with the municipality. The county administrative board determines whether the line concerned could be considered to involve significant impact on the environment. An environmental impact study (MKB in Swedish) will then be conducted in order to investigate and describe the impact the proposed expansion could have on public health, the environment and the management of natural resources. Directly affected parties are also consulted with, during the preparation of the environmental impact study. Where the county administrative board decides that a line can be considered to involve a significant impact on the environment, this will necessitate a more comprehensive environmental impact

study and consultation with a wider circle of parties. The environmental impact study is to be appended to the application for a grid concession for a line.[28]

Permits for the actual electricity grid are currently regulated in ellagen (the Swedish Electricity Act) (for the actual electricity grid that does not require a permit under the Environmental Code). The ellagen (the Swedish Electricity Act) does make reference to the Environmental Code, but there is no corresponding reference to ellagen (the Swedish Electricity Act) from the Environmental Code. However, a permit or registration may be necessary under the Environmental Code to establish a line or electricity grid, e.g. should the natural environment be impacted upon. For example, a permit or registration is required under the Environmental Code)for an exemption from the law on shoreline protection, water activities (this may be preparing ditches, cleaning existing ditches, dredging in water areas, laying underwater cables or routing ditches/waterways with ground cables.

Chapter 2 Section 8 (a) of ellagen (the Swedish Electricity Act) stipulates that when examining the issues of granting grid concessions for lines the provisions of Chapters 2-4, Chapter 5 Section 3 and Chapter 16 Section 5 of the Environmental Code are to be applied. An environmental impact study is to be included the application for a grid concession for a line. Chapter 6 of the Environmental Code applies to the procedure, requirements on the environmental impact study and the plans and planning documentation. Chapter 2 Section 8 of ellagen (the Swedish Electricity Act) states that a grid concession for a line must not be contrary to a development plan or area provisions.

On 1 August 2009 a new third paragraph came into force in Chapter 2 Section 8 (a) of ellagen (the Swedish Electricity Act). The supplementation means that issues that have been examined in a case or a matter relating to permits under the Environmental Code does not need to be re-examined in the matter relating to the grid concession. If there is an environmental impact study as part of the case or matter relating to permits under the Environmental Code that describes the direct and indirect effects on public health and on the environment that could result from the line, no separate environmental impact study is necessary for the concession application. This means that certain issues concerning the environmental impact study are only examined once by the county administrative board instead of, as was previously the case, by both Energimarknadsinspektionen (the Energy Markets Inspectorate) and the county administrative board.

The amendment that resulted from the Government's legislative proposals in government bill 2008/09:146 *Prövning av vindkraft (Examination of wind power)*, is based on a proposal from Miljöprocessutredningen's (the Environmental Process Investigation) interim report *Prövning av vindkraft* (SOU 2008:86). Minor amendments were implemented into The Environmental Code and plan- och bygglagen (the Planning and Construction Act) at the same time as the amendment of ellagen (the Swedish Electricity Act) in order to promote renewable energy sources. The amendments to the Planning and Construction Act mean firstly that the requirement in the development plan for wind farms is limited to the situations where a wind farm is to be established within an area where there is large demand for land and buildings or other facilities (Chapter 5 Section 1 second paragraph of PBL) and secondly that the requirements for building permits for wind farms will change in the light of technical development (Chapter 8 Section 2 of PBL).

[28] The Ministry of the Environment is involved in the development of simpler text for environmental impact studies (Ds 2009:65).

Those apply for grid concessions can expect a decision from Energimarknadsinspektionen (the Energy Markets Inspectorate) within two to three months, including the official period for the submission of comments to the proposal, from the date of application submission. In certain situations supplements to the application may be required prior to and/or after the submission of comments to the proposal process and in these instances it is difficult to predict the processing times.

A concession application for a line is made in accordance with the provisions of förvaltningslagen (the Administrative Procedure Act), which involves both a consultation requirement/communication and opportunity for the individual to appeal against a decision.

Prior to submitting a concession application, Svenska kraftnät will consult with the relevant interest parties on at least one occasion. Energimarknadsinspektionen (the Energy Markets Inspectorate) will then submit the application for consideration prior to any decision being reached. Should the application reach the Government, the Government will also submit the application for consideration prior to any decision being reached.

The application may also be appealed against where Energimarknadsinspektionen (the Energy Markets Inspectorate) decides on the concession, in which case the Government is the next body. It is the Government that will determine whether the appellant is entitled to appeal.

No overall follow-up of total lead times for approvals for the establishment of electricity lines is currently being conducted. However, it can be demonstrated that the licensing processes for station lines are of vital importance to the lead times when establishing larger wind farms.
The Government finds that the lead times for grid concessions and the examination of permit applications under the current legislation are sometimes long. The Government also finds that it is often the lead times of the grid connection that are limit-setting for the establishment of wind farms and it is the issues relating to the permit that are limit-setting within the grid connection. Reduced times for the licensing process for station lines would therefore shorten the lead-time for the wind farm. In the light of the problems specified above, the Government believes that it is of vital importance to review the processes for grid connection/enhancement/expansion. The aim is to avoid bottleneck problems when expanding renewable electricity generation.

f) How is the coordination between grid infrastructure approval and other administrative planning procedures ensured?

Coordination is ensured through the consultation procedure under Chapter 6 of the Environmental Code that precedes the application for a grid concession as well as the consideration of the proposal procedure.

According to Chapter 2 Section 8 of ellagen (the Swedish Electricity Act), a grid concession for a line must not be contrary to a development plan or area provisions.

The regulatory framework is based on the owner of the grid keeping abreast of the municipalities' planning activities (comprehensive survey plans, elaborated comprehensive survey plans and development plans). It is also important that the owner of the grid is able to demonstrate and provide information on his expansion plans to the county administrative boards and municipalities.

The following example is provided to demonstrate how this currently manifests itself. A building application, an environmental permit and an environmental judgement are required in order to establish an offshore wind farm (if the farm is to be sited in Swedish territorial waters). The owner of the wind farm signs a connection agreement with an owner of a grid regarding connection to the grid. The owner of the line must construct a new line, which necessitates a concession for the line and an environmental judgement for the water activities. From submitting the application for an environmental permit and a concession, it currently takes significantly longer before the decision on a concession is given compared with that for an environmental permit. In order to be able to submit an application for an environmental judgement, it is a requirement that the operator has the right of disposal of the area to which the water activities relate. If the owner of the grid does not reach a voluntary agreement with the property owners who own the water area, Lantmäteriet (the Urban Land Administration) may reach a decision on premature access. However, this cannot take place before the decision on the concession has become final and only after this can the owner of the grid apply for an environmental judgement. The permit application process for the grid owner can take a lot longer compared with the same process for the owner of a wind farm. This means that a wind farm can be completed before a connecting line is ready and in the worst case before even the concession has been granted for the line.

g) Are priority connection rights or reserved connection capacities being provided for new installations producing electricity from renewable energy sources?

The conditions for access and connection to the electricity grid are regulated in ellagen (the Swedish Electricity Act). This states that the owner of a grid, in the absence of specific grounds, is obliged, on reasonable terms, to connect an installation to his transmission or distribution grid (Chapter 3 Sections 6-8). All electricity generation installations, including those that produce renewable electricity, therefore have guaranteed access to the electricity grid. The Swedish electricity legislation treats everybody on equal terms and no special priority to the grid is given with the current regulatory framework, either for different types of electricity generation installation or for electricity consumers.

It is possible to reserve spare capacity in so-called radial lines in the main grid; Radial refers to a single line that is connected to a masked grid at only one end. However, this option is permitted for all types or new electricity generation installations.

h) Are any renewable installations ready to come online but not connected due to capacity limitations of the grid? If so, what steps are being taken to resolve this and when is the problem expected to be solved by?

On Gotland, which is an island with limited transmission capacity to the mainland, there is a risk of a future shortage of capacity in transmission connections to the mainland. However, Svenska kraftnät has reached the policy decision that a new line should be commissioned in 2015 and that this new line could then transfer more electricity to the mainland.

i) Are the rules on cost sharing and bearing of technical adaptations set up and published by transmission and distribution system operators? If so, where? How is it ensured that these rules are based on objective, transparent and non-discriminatory criteria? Are there special rules for producers located in peripheral regions and regions with low population density? (Cost bearing rules define which part of the costs is covered by the generator wishing to be connected and which part by the transmission or distribution system operator. Cost sharing rules define how the necessary cost should be distributed between subsequently connected producers that all benefit from the same reinforcements or new lines.)

According to the first paragraph of Article 16 (3) of the Renewable Energy Directive, the Member States must demand that the system transmission operators and system distribution operators devise and publish standard rules on cost sharing and the bearing of technical adaptations. Grid connections, grid enhancements and the improved operation of the grid can be mentioned as examples. Chapter 4 of ellagen (the Swedish Electricity Act) contains provisions on grid tariffs, but no specific requirements regarding the aforementioned. In order to incorporate the requirements of the directive into this section, Energimarknadsinspektionen (the Energy Markets Inspectorate) has proposed that Chapter 4 Section 11 of ellagen (the Swedish Electricity Act), which addresses, inter alia, the right to information on grid tariffs, be supplemented by a provision relating to this. Refer to the report Förnybara energikällor - Åtkomst till och drift av näten, EI R 2009:10 (Renewable Energy sources – Access to and operation of the grid). Under ellagen (the Swedish Electricity Act) grid tariff refers to fees and other terms and conditions for the transmission of electricity and for connection to a line or a grid refer to Chapter 1 Section 5 of ellagen (the Swedish Electricity Act).

The above standard rules are to be applied in a non-discriminatory way. Chapter 4 Section 1 second paragraph of ellagen (the Swedish Electricity Act) already states that the grid tariffs must be objective and non-discriminatory.

There are no special rules for producers located in peripheral regions and regions with low population density.

Owners of grid are entitled under ellagen (the Swedish Electricity Act) to receive from the connecting party an annual grid tariff and a one-off payment connection charge. Svenska kraftnät applies point tariffs, which means that the charge for utilising the main grid is determined per connection point and is based on the energy and power conditions at the connected point. Connection to the grid provides access to the overlying grid and cross-border connections. When connecting to the main grid the connection charge corresponds to the investment costs that are incurred by Svenska kraftnät minus any future utility values of benefit to all main grid customers. Examples of utility values are increased operational stability and increased transfer capability. System enhancements of collective benefit (e.g. a new line through a transfer interface) will not be subject to a connection charge and will instead be financed via the grid tariff. When a system enhancement needs to be made in the vicinity of a connection point, part of the investment can therefore often be assigned to the connection. Such client-specific costs must therefore be included in the calculation of the connection charge.

The national regulatory authority the duty of which includes monitoring the grid tariffs specifies standard rules for how the connection charges are to be calculated.

Certain other grid owners, for example in the regional grid, instead apply channel tariffs. A channel tariff involves calculating a channel from the connection point to a point in the electricity grid called a "balance point". The electricity generation installation must then pay its share of the transfer costs from the feeding point to the balance point. In these situations any future utility values that are gained by the grid owner are not reflected in the connection charge and are instead compensated via a lower channel tariff.

Both of the variations produce the same end result for the connecting party and are based on objective, transparent and non-discriminatory criteria. There are therefore no special rules for example for producers located in peripheral regions and regions with low population density.

The current legislation and regulatory framework means that certain threshold effects can occur. Threshold effect refers to the situation where the power producer who connects to a grid that has insufficient spare capacity is forced to pay the whole grid enhancement cost, including the future capacity that the producer is unable to utilise. The producers that subsequently connect to the grid may utilise this spare capacity without the payment of any separate charge. For this reason many producers are hesitant about being the first to connect to such a grid.

The Government believes that a further developed system of so-called 'premature sharing of grid enhancement costs for large-scale production facilities for renewable energy' should be introduced in order to clarify how great a proportion of this cost should be borne by the respective electricity producers that will benefit from the grid enhancement. Measures and proposals should be further investigated.

j) Please describe how the costs of connection and technical adaptation are attributed to producers and/or transmission and/or distribution system operators. How are transmission and distribution system operators able to recover these investment costs? Is any change to these cost bearing rules planned in the future? What changes do you envisage and what results are expected? (There are several options for attributing grid connection costs. Member States are likely to choose one or a combination of these. According to the "deep" connection cost charging the developer of the installation generating electricity from renewable energy sources bears several grid infrastructure related costs (grid connection, grid enhancement and grid expansion). Another approach is the "shallow" connection cost charging, meaning that the developer bears only the grid connection cost, but not the costs of reinforcement and extension (this is built into the grid tariffs and paid by the customers). A further variant is when all connection costs are nationalised and covered by the grid tariffs.)

Connection lines from an electricity generation installation to the connection point in the grid are to be paid for by the owner of the electricity generation installation. In addition to this, whoever is responsible for the grid owner incurring additional costs must pay these costs. The cost of an enhancement, renovation or expansion of the grid that is of benefit to the client's installation must therefore be met by the client. If the grid enhancement only benefits the future electricity generation installation, the whole cost must be met by the producer. If the enhancement also benefits other parties, the cost must be shared with these parties.

Refer also to Question i).

k) Are there rules for sharing the costs between initially and subsequently connected producers? If not, how are the benefits for subsequently connected producers taken into account?

No, the current regulatory framework does not take into account the advantages for the producers that subsequently connect. Refer also to the answers to Questions i) and j).

In the decision of Regeringsrätten (the Supreme Administrative Court) delivered on 4 July 2008, case no. 7610-04, the Supreme Administrative Courts finds that the cost for the connection relevant to the case should be reasonably shared between five properties. It is believed that these existing properties, considering the current social progress, wish in the long-term to connect to the electricity grid and will then utilise the current expansion. This

decision did not concern the producers but could in principle also be applied to them. However, there exists no specific case law applicable to producers.

l) How will it be ensured that transmission and distribution system operators provide new producers wishing to be connected with the necessary information on costs, a precise timetable for processing their applications and an indicative timetable for their connection with the grid?

Chapter 4 Section 11 of ellagen (the Swedish Electricity Act) states that the holder of a grid concession must, when requested by another party, provide information relating to the grid tariff. Grid tariff also refers to connection to the electricity grid. It is currently the responsibility and duty of every grid owner to process applications within a reasonable period of time by providing a cost estimate and an indicative timetable for connection to the grid. It ultimately falls within the scope of the grid owners' obligations to connect an installation on reasonable terms in accordance with ellagen (the Swedish Electricity Act). The Government has in government proposal *Genomförande av direktiv om förnybar energi (Implementation of the Directive on Renewable Energy)*(prop. 2009/10:128) submitted the proposal that this provision be amended in such a way as to introduce a requirement that the holder of a grid concession, in addition to the aforementioned requirements, submit a timetable for the processing of applications for the connection of production facilities and that the electricity grid companies in conjunction with the submission of an offer for the connection of production facilities also submit a timetable for the connection of the facilities. The proposal has been approved by The Swedish Parliament and will come into force on 1 December 2010.

4.2.7 Electricity grid operation (Articles 16(2), 16(7) and 16 (8) of Directive 2009/28/EC)

a) How is the transmission and distribution of electricity from renewable energy sources guaranteed by transmission and distribution system operators? Is priority or guaranteed access ensured?

The Swedish electricity legislation treats all electricity producers equally and all producers have, in accordance with the provisions of Chapter 3 Sections 6-7 of ellagen (the Swedish Electricity Act), the right to connect their facilities to the transmission or distribution grid. Chapter 3 Section 9 of ellagen (the Swedish Electricity Act) states further that the holder of the grid concession is obliged, on reasonable terms, to transfer electricity on behalf of another party. All electricity production facilities, including those that produce renewable electricity, are therefore guaranteed access to the electricity grid and are also guaranteed transmission and distribution of the electricity that is fed in.

Ellagen (the Swedish Electricity Act has been designed so that all production facilities, including the facilities that produce renewable electricity, have an unconditional right to feed in electricity and have electricity transferred on the electricity grid, refer to Chapter 3Section 9 of ellagen (the Swedish Electricity Act).The issue of dispatching is therefore not relevant.
According to Chapter 8 Section 1 of ellagen (the Swedish Electricity Act), the Government must appoint an authority with the overall responsibility for ensuring that electrical installations work together safely so that the balance within the whole or parts of the country is maintained in the short-term between the generation and consumption of the electricity (authority with system responsibility). The Government has appointed Svenska Kraftnät as the transmission system operator. Chapter 8 Section 4 of ellagen (the Swedish Electricity Act) states further that an electricity supplier may only supply electricity to bleeding points where somebody has assumed the financial responsibility for ensuring that the national electricity

supply system is supplied with an equal amount of electricity as is being withdrawn from the bleeding point (balance responsibility). Svenska Kraftnät is manned 24 hours a day, 7 days a week to ensure that the frequency of the grid is continually kept between the limits of 49.9 and 50.1 Hz.

Through so-called ’balance regulation’, Svenska kraftnät’s balance service ensures that there is always a balance in the grid during the actual operating hours. The balance regulation is performed through primary regulation and secondary regulation. Primary regulation means that the physical balance in the electricity system is finely-adjusted by the automatic increase or decrease in generation in a number of hydroelectric plants. Secondary balance regulation is a manual up or downgrade and takes places through power trading with the party responsible for the balance that entered into agreements with Svenska kraftnät on participation in the balance regulation. The parties responsible for the balance that are able to alter their generation or consumption during operating hours may make a bid for an up or down regulation with Svenska kraftnät’s balance service. The balance service then orders the offers as needed in order of priceThe regulation has a price that is set for each delivery hour and the cost for each imbalance of the party responsible for balance is calculated from the balance statement for which Svenska kraftnät is responsible. The parties responsible for balance therefore have a financial incentive to plan in such a way as to maintain their balances. The Svenska kraftnät balance statement model means that appropriate grid and market-related operational measures are taken in order to maintain the balance in the system All electricity production facilities, including these that produce renewable energy, are included in the model. Because parties responsible for balance have an incentive to plan in such a way as to maintain their balances, this ensures that the balance service does not need to implement any major measures in order to maintain the balance in the system. This also ensures that the proportion of electricity that is generated from renewable energy sources is not reduced more than is necessary.

b) How is it ensured that transmission system operators, when dispatching electricity generating installations, give priority to those using renewable energy sources?

Sweden does not apply priority dispatching. [Refer also to Question a) above]. Ellagen (the Swedish Electricity Act) has been designed so that all production facilities, including the facilities that produce renewable electricity, during normal operating situations, have an unconditional right to feed in electricity and have electricity transferred on the electricity grid, refer to Chapter 3 Section 9 of ellagen (the Swedish Electricity Act). The question is not relevant given the Swedish procedure. Refer also to the answer to Question c) below.

c) What grid- and market-related operational measures are taken in order to ensure that the proportion of electricity from renewable energy sources is not reduced more than is necessary? What types of measures are planned and when is their implementation expected? (Market and grid design that enable the integration of variable resources could cover measures such as trading closer to real time (changing from day-ahead to intra-day forecasting and rescheduling of producers), aggregation of market areas, ensuring sufficient cross border interconnection capacity and trade, improved cooperation of adjacent system operators, the use of improved communication and control tools, demand-side management and active demand-side participation in markets (through two-way communication systems smart metering), increased distributed generation and domestic storage (e.g. electric cars) with active management of distribution networks (smart grid).)

The transmission system operator, Svenska kraftnät, has been given the task by the Government to take responsibility for the national momentary power balance and to ensure that the national electricity supply systems work together securely. In accordance with ellagen

(the Swedish Electricity Act), Svenska kraftnät uses a balance management model, which means that grid and market-related measures are implemented in order to maintain the balance in the system. Within the scope of this task, the system operator enters into agreements with, inter alia, companies that wish to be so-called balance responsible companies (producers/electricity traders) and who make their downward and regulation offers on a joint Nordic regulation power market, which is administered by the Nordic system operator companies. All electricity production facilities, including these that produce renewable energy, are administered by these companies. The regulating resource with the lowest marginal cost is first ordered in the land in question as regards both operating measures for the main grid and for balance maintenance in the Nordic power system (the market). This is regardless of whether or not this is electricity from renewable energy sources. Since wind power has a very low (even negative) marginal cost, this will be used initially.

As the parties responsible for balance have an incentive to maintain their balances and in that they would otherwise have to pay the imbalance costs that they cause, it is ensured that the system operator does not need to implement any major measures in the balance management to maintain the balance in the system. This also ensures that the proportion of electricity that is generated from renewable energy sources is not reduced more than is necessary.

The Swedish electricity certificate scheme is another tool to maintain and increase the proportion of electricity generation from renewable energy sources.

d) Is the energy regulatory authority kept informed about these measures? Does the authority have the competence to monitor and enforce the implementation of these measures?

According to Article 16 point 2 c) of the Renewable Energy Directive, Member States must ensure that appropriate grid and market-related operational measures are taken in order to ensure that the proportion of electricity from renewable energy sources is not reduced more than is necessary. If significant measures are taken to reduce the proportion of electricity from renewable energy sources in order to guarantee the security of the national electricity system and security of energy supply, Members States must ensure that the system operators report these measures to the competent regulatory authorities and indicate which corrective measures they intend to take in order to prevent the proportion of electricity from renewable energy sources being reduced by more than what is appropriate.

There is currently no obligation on the part of system operators to report to the regulatory authority measures for preventing the proportion of electricity from renewable energy sources being reduced by more than is necessary.

The Government has in government proposal *Genomförande av direktiv om förnybar energi (Implementation of the Directive on Renewable Energy)* (prop. 2009/10:128) stated that the Government intends to introduce such provisions into förordningen (1994:1806) om systemansvaret för el (Ordinance concerning system responsibility for electricity).

e) Are plants that produce electricity from renewable energy sources integrated into the electricity market? Could you please describe how? What are their obligations regarding participation in the electricity market?

Yes, they are integrated. However, the generation and trading of electricity is a competitive business, this is why there is no obligation on producers to continually produce electricity. The electricity generated may be sold bilaterally or on the Nordic electricity market. There

are no general obligations to offer the electricity on specific market places, or to provide emergency power at specific times. The decision as to whether or not operate a facility under normal operating conditions rests with the owner of the facility. The rules and obligations for physical deliveries are the same for all electricity producers, irrespective of type of energy. However, in the event of major disruption the transmission system operator may, in accordance with ellagen (the Swedish Electricity Act), order generation to be increased or decreased in order to maintain operational stability in the grid.

It can be added that in Sweden there is an aid scheme for some renewable electricity generation in the form of electricity certificates. The purpose of the system is to provide the producer with a cash injection in addition to the electricity price that the producer receives on the electricity market.

f) What are the rules for charging transmission and distribution tariffs to producers of electricity from renewable energy sources?

According to Chapter 4 Section 1 of ellagen (the Swedish Electricity Act), grid tariffs must be objective and non-discriminatory.

When devising grid tariffs for the transfer of electricity particular consideration needs to be taken of the number of connection points, the geographic location of the connection points, the quantity of transferred energy, the subscribed demand and the costs for the overlying grid and the quality of the electricity transfer.

When devising grid tariffs for connecting to a line or a grid particular consideration needs to be taken of the geographic location of the connection points and the agreed power output at the connection point.

The same rules apply for grid tariffs irrespective of whether or not the electricity of generated from renewable energy sources.

According to Chapter 3 Section 15 of ellagen (the Swedish Electricity Act) there are also a number of provisions relating to compensation for feeding in electricity. The compensation must correspond to the value of the reduction in energy losses caused by the feeding in of electricity from the facility and the possible value of the reduction in charges due to the facility being connected to the grid.

Ellagen (the Swedish Electricity Act) also states that the electricity grid companies' total revenues from operating the grid must be at a reasonable level.

The grid company is obliged to install a meter with associated data collection equipment into the electricity producer's feeding point. The grid company is to charge the electricity producer the cost for this equipment and for its installation into the feeding point. In addition to this, the electricity producer must pay for the feeding of the generated electricity in accordance with the grid tariff applied by the grid company.

Certain exemptions to these provisions apply for the holders of certain smaller production facilities, in particular those facilities that are able to deliver power output of a maximum of 1500 kilowatt. According to Chapter 4 Section 10 of ellagen (the Swedish Electricity Act), the holders of such facilities must not be charged the cost of meters with associated data

collection equipment and for their installation into feeding points. Furthermore, these holders shall also pay a reduced grid charge. They shall only pay the proportion of the charge according to the grid tariff that corresponds to the annual cost for performing metering, calculations and reporting on the grid company's grid.

The Government states in a legislative proposal, prop. 2009/10:51 *Enklare och tydligare regler för förnyelsebar elproduktion, m.m., (Simpler and clearer rules for renewable electricity production, etc.),* that despite the exemption rules it is not cost-effective for an electricity supplier to have a meter installed into a connection point and subsequently sell any surplus. The reason for this is that the grid charge for feeding, even though it has been reduced, is too high to make selling the surplus cost-effective. One way of enabling small electricity consumers to cost-effectively sell their surplus would therefore be to exempt these electricity consumers from the obligation to pay grid charges for their feeding. In the government bill it is proposed that an electricity consumer who has a power rating contract of a maximum of 63 Amps and who generates electricity that can be fed at a power rating of a maximum of 43.5 kilowatt shall not pay any charger for the feeding. However, this is only applicable if the electricity consumer has over the course of a calendar year taken out more electricity from the system than has been fed into the system. According to the government bill, the opportunities for these small electricity producers to sell their surplus or alternatively form net charging contracts with the electricity supplier instead of just feeding electricity into the electricity system without financial compensation. The Swedish Parliament approved the government bill at the start of 2010 and the provision came into force on 1 April 2010.

According to the current regulatory framework, the feeding in and feeding out of electricity to/from networks for which as concession is required must be metered and reported separately to the parties concerned. In order to simplify matters for small-scale producers of electricity a number of European countries have introduced net charging, i.e. input and output electricity are set off against each other for a period of time, e.g. a calendar month, and the producers only have to pay for any excess consumption or alternatively pay for excess production. The Government has in the appropriation direction for 2010 given Energimarknadsinspektionen (the Energy Markets Inspectorate) the task of investigating the advantages and disadvantages that a net charging regulation would entail as well as the effects that this would have on the liability to pay energy tax on electricity and any other possible consequences. The task includes assessing whether it is appropriate to introduce a net charging regulation. The task is to be reported to the Ministry of Enterprise, Energy and Communications during autumn 2010.

4.2.8 Biogas integration into the natural gas grid (Articles 16(7), 16(9) and 16(10) of Directive 2009/28/EC)

a) How is it ensured that the charging of transmission and distribution tariffs does not discriminate against gas from renewable energy sources?

According to naturgaslagen (the Natural Gas Act), tariffs, inter alia, for the transfer and storage of natural gas must be reasonable, objective and non-discriminatory. Natural gas also refers to biogas and gases from biomass in accordance with Chapter 1 Section 2 of naturgaslagen (the Natural Gas Act).

Energimarknadsinspektionen (the Energy Markets Inspectorate) has, as the regulatory authority in the gas market, the task of ensuring compliance with naturgaslagen (the Natural Gas Act). The review of tariffs by Energimarknadsinspektionen (the Energy Markets Inspectorate) and its other monitoring activities ensures that the transmission and distribution charges do not discriminate against gas from renewable energy sources. Up to now tariffs have been reviewed ex post but will in future be ex ante.

b) Has any assessment been carried out on the need to extend the gas grid infrastructure to facilitate the integration of gas from renewable energy sources? What is the result? If not, will there be such an assessment?

The need to extend the existing gas grid infrastructure will be examined in conjunction with the usual examination of permit applications. According to Chapter 2 Section 1 of naturgaslagen (the Natural Gas Act) it is the Government that shall grant permits for the construction of gas pipelines. The current expansion plans for the natural gas grid in Sweden can be divided into plans that develop the domestic natural gas grid through expansion and plans that aim to construct additional connection points/supply channels from overseas to the Swedish natural gas grid.

The governmental energy agency has been given the task by the Government to develop a cross-sectoral biogas strategy and propose measures that will in the short and long-term contribute to increased usage of biogas. This work is being conducted in consultation with Statens jordbruksverk (the Swedish Board of Agriculture) and Naturvårdsverket (the Swedish Environmental Protection Agency), and Transportstyrelsen (the Swedish Transport Agency) will be responsible for the part of the task that concerns the conversion of tractors to gas. The task will be reported to Regeringskansliet (the Government Offices of Sweden) by 31 August 2010 and a status report will be submitted by 10 March 2010.

The strategy focuses on identifying the areas to be prioritised, the measures that are needed and how different efforts could collaborate better in order to stimulate these areas. The obstacles to the continued development of biogas that have been identified and proposed solutions will be presented. It is principally obstacles that entitle the government to become involved that will be addressed, i.e. not all of the obstacles that could be encountered by the industry, e.g. competing businesses in general, will be included in the strategy. The strategy will be jointly devised by the participating authorities but the work will be led by the Swedish Energy Agency.

In the 2009 appropriation directions Energimarknadsinspektionen (the Energy Markets Inspectorate) was given the task of analysing the opportunities for an increased share of renewable gases in the natural gas grid. In its report, Ökad andel biogas på en utvecklad gasmarknad EI R2009:12 (Increased share of biogas in a developed gas market), Energimarknadsinspektionen (the Energy Markets Inspectorate) identifies the absence of a well-developed infrastructure as one of the main problems of biogas. Energimarknadsinspektionen (the Energy Markets Inspectorate) also forms the judgement that there is a risk that a development of the infrastructure on strictly commercial grounds would initially be on the terms of natural gas, or the development would not materialise or would take an unacceptably long time.

In the appropriation directions for 2010 Energimarknadsinspektionen (the Energy Markets Inspectorate) has been given a further task regarding biogas in the natural gas grid. In order to create the conditions for a future successive transition to biogas in the natural gas grid,

naturgaslagen (2005:403) (the Natural Ag Act) may need to be supplemented by special provisions that take account of the feeding and transfer of biogas. Energimarknadsinspektionen (the Energy Markets Inspectorate) will analyse the need for this and if necessary submit proposals for constitutional revisions. An impact study is to accompany the constitutional proposals. The task was reported to Regeringskansliet (the Government Offices of Sweden) on 3 May 2010.

On 5 May 2010 The Swedish Parliament approved the Government bill *Bättre skattemässiga förutsättningar för biogas samt för landansluten el till fartyg i hamn (Improved tax conditions for biogas and for land-connected electricity to vessels in harbours)* (government bill 2009/10:144) concerning taxation rules for biogas in the natural gas grid in order to facilitate the co-distribution of biogas in the natural gas grid and thereby facilitate a desired transition to a higher share of biogas within the energy system. The legal amendments come into force on 1 January 2011.

c) Are technical provisions on grid connection and connection tariffs for biogas being published? Where are these provisions being published?

Technical provisions on grid connection and connection tariffs for biogas are not being published.

There is currently no specific provision concerning the quality of gas in naturgaslagen (the Natural Gas Act). This fact has not hitherto involved any practical problems for the operators in the Swedish gas market. The imported Danish natural gas has in practice governed the quality of other gas that has been fed into the natural gas grid on the west coast of Sweden.

As an increasing number of gas producers, primarily biogas producers, wish to introduce their gas into the natural gas grid on the west coast of Sweden and since in the future natural gas other than the Danish gas may be introduced into the natural gas grid, the more important it will become to regulate the quality of gas.

Despite the fact that naturgaslagen (the Natural Gas Act) does not contain any provision regarding the quality of gas, the issue of quality will be addressed in the preliminary preparations for the legislation. In government bill 2004/2005:62, p. 197, it states that the holder of a natural gas pipeline has the right to place demands on the quality of the gas that is fed into the pipeline. If the gas does not possess the requisite quality, it is not considered to be natural gas and the holder of the pipeline therefore has no obligation to transfer the gas within the pipeline system in accordance with the government bill.

The Swedish Parliament has approved the Government's proposal on amendments to naturgaslagen (the Natural Gas Act) in government bill *Genomförande av direktiv om förnybar energi (Implementation of the Directive on Renewable Energy)* (government bill 2009/10:128) for the implementation of Article 16 on access to and operation of the electricity and gas grid in the Renewable Energy Directive. The amendments to naturgaslagen (the Natural Gas Act) mean that the holder of a natural gas pipeline must publish the methods that are employed to devise tariffs for connection to the natural gas grid. The legal amendments come into force on 1 December 2010.

4.2.9 District heating and cooling infrastructure development (Article 16(11) of Directive 2009/28/EC)

a) Please provide an assessment of the need for new district heating and cooling infrastructure using renewable energy sources that contribute to the 2020 target. Based on this assessment, are there any plans to develop such infrastructures in the future? What are the expected contributions of large biomass, solar energy and geothermal facilities in the district heating and cooling systems?

The district heating grid in Sweden is already well-developed in comparison to the rest of Europe and they extend for approximately 20,000 km across the country. District heating is the predominant form of heating in the main towns of 245 of the country's 290 municipalities and approximately 50% of the national heating requirements are met by remote heating. The use of renewable fuel in district heating has also increased dramatically since the 1970s and in 2008 biofuel constituted approximately 71% of the total energy supply in remote heating production. The remaining district heating is produced using natural gas, fossil waste, coal, coke oven gas and blast furnace gas, peat and oil products. At the start of 2010 the remote heating industry, via the industry association Svensk Fjärrvärme (the Swedish District Heating Association), presented a forecast in which it predicted that the length of the remote heating grid will increase by almost 25% by 2015 and that the proportion of renewable fuels will continue to increase by 2015.

However, there are still residential areas and districts of towns and cities that could be connected and it is also possible to connect additional single-family residences, for example through the continued conversion of electrical heating. The increased CO_2 tax for industries outside of the EU system for emissions trading may make it economically viable for many industrial companies to transfer to district heating.

There are around 2,000 small urban areas in Sweden (in excess of 200 inhabitants). Many of these could be supplied by smaller district heating grids. There are currently already a large number of these smaller district heating systems in existence, which are operated by local business people, e.g. farmers.

There is at the same time a trend towards a reduced heating basis, driven by the ambitions of increasing energy efficiency.

Instruments that are already in place that promote cogeneration and district heating from renewable energy are the CO_2 tax, where biofuels are exempt from tax, the electricity certificate scheme that promotes cogeneration from bioenergy and the EU emissions trading system, which drives forward the conversion from fossil fuels. In regard to the development of its infrastructure, Sweden previously has Lokala investeringsprogram (Local Investment Programmes) and Klimatinvesteringsprogram (Climate Investment Programmes). Usual contributions were for district heating and cooling expansion. Currently Delegationen för hållbara städer (the Delegation for Sustainable Cities) has a similar task to promote sustainable urban develop by means of projects and with governmental funding. The governmental support for converting from direct-acting electrical heating is also driving forward the development towards an increased share of district heating.

It should be pointed out that waste heat is not in itself considered to be renewable energy in the meaning of the directive. It can also be added that the Government has appointed a special investigator, *Utredningen om tredjepartstillträde till fjärrvärmenäten (Investigation of third*

party access to district heating networks), in order to present proposals as to hoe third part access to district heating grids could be developed. According to the investigation's directive, the investigation is to conclude its work by December 2010.

4.2.10 Biofuels and other bioliquids – sustainability criteria and verification of compliance (Articles 17 to 21 of Directive 2009/28/EC)

a) How will the sustainability criteria for biofuels and bioliquids be implemented at national level? *(Is there legislation planned for implementation? What will be the institutional setup?)*

The sustainability criteria will be implemented into Swedish law through lag om hållbarhetskriterier (the Act on sustainability criteria), which The Swedish Parliament has recently decided on (government bill 2009/10:164). Since the sustainability criteria are in part of a very technical and detailed nature this law will be accompanied by more detailed provisions that will be issued by the Government and competent authority. The work of producing these provisions is currently underway.

In addition to this, there will be certain consequential amendments to lagen (1994:1776) om skatt på energi (the Act on energy tax) and lagen (2003:113) elcertifikat (the Act on electricity certificates). The aforementioned government bill also contains legislative proposals within this area. Since the connection between tax reductions on renewable fuels and the fulfilment of the sustainability criteria is in certain regards dependent on the detailed ordinances regarding reporting and verification, it is the intention of the Government to return to this issue. Since this issue is the subject of continued consideration, the requirement that sustainability criteria must be fulfilled in order for the fuel in question to be entitled to tax relief will not be applied until 1 January 2012.

Lagen om hållbarhetskriterier the Act on sustainability criteria), contains the sustainability criteria of the directive (Article 17), a system to verify the fulfilment of the criteria (Article 18) and a method for calculating reductions in greenhouse gas (Article 19). The new law also contains provisions on reporting obligations for distributors and end users of biofuel and bioliquids. The statutory reporting obligation means that operators must report the delivered or used quantity of biofuel and bioliquids that fulfils the criteria and show that this quantity fulfils the criteria.

The reporting obligation applies to fuels that are produced nationally, introduced from another EU country or imported from third countries.

The regulatory authority for Lagen om hållbarhetskriterier (the Act on sustainability criteria), will be the Swedish Energy Agency. The regulatory authority for lagen om elcertifikat (Act concerning electricity certificates) is the Swedish Energy Agency and for lagen om skatt på energi (Act concerning tax on energy) is Skatteverket (the Swedish Tax Agency).

b) How will it be ensured that biofuels and bioliquids that are counted towards the national renewable target, towards national renewable energy obligations and/or are eligible for financial support, comply with the sustainability criteria set down in Articles 17(2) to (5) of Directive 2009/28/EC? *(Will there be a national institution/body responsible for monitoring/verifying compliance with the criteria?)*

The statutory reporting of information under lagen om hållbarhetskriterier (the Act on sustainability criteria) will create a data register of the delivered and used quantities of biofuels that fulfil the sustainability criteria. This information will in conjunction with the calculation of national target fulfilments be combined with other statistical data from the official energy statistics. It will be ensured through the supervision under lagen om hållbarhetskriterier (the Act on sustainability criteria) that only biofuel and bioliquids that fulfil the criteria of 17.2-17.5 will be included in the national target fulfilments. The Swedish Energy Agency is responsible for the supervision. The Swedish Energy Agency is also responsible for the statistics for the parts of the official statistics that relate to the top of energy.

It is a requirement that fuels that are covered by the sustainability criteria fulfil these criteria in order to be eligible for aid and to be included in the national quotas for renewable energy. This is ensured by the conditions in lagen om skatt på energi (Act concerning tax on energy) and lag om elcertifikat (Act concerning electricity certificates). Under both of these laws a right to a reduction in tax and to an electricity certificate necessitates the fulfilment of the sustainability criteria where they relate to biofuels that are covered by the sustainability of the Directive.

Information that is reported in accordance with lagen om hållbarhetskriterier (the Act on sustainability criteria) and the decision of the regulatory authority under the same law may be submitted to Skatteverket (the Swedish Tax Agency) and to the parts of the Swedish Energy Agency's operations that concern supervision under lagen om elcertifikat (Act concerning electricity certificates) for further processing. This submission will create a system that will ensure that financial support is only provided for biofuel and bioliquids that fulfil the criteria of Articles 17(2) – 17(5).

c) If a national authority or body is to monitor the fulfilment of the criteria, does such a national authority or body already exist? If so, please specify. If not, when will they be established?

The Swedish Energy Agency will in accordance with lagen om hållbarhetskriterier (the Act on sustainability criteria) be responsible for supervising the fulfilment of the criteria.

d) Please describe the current national legislation on land zoning and the national land register for verifying compliance with Articles 17(3) - 17(5) of Directive 2009/28/EC. How will economic operators be able to access this information? *(Please describe the existing rules and how to differentiate between areas with different statuses as areas with biological diversity, protected areas, etc. Please also describe the competent national authority that will monitor the land register and changes to the land status).*

The classification and application of land is regulated in Sweden by a number of comprehensive laws within the area of property law. The laws that in Swedish land law are affected by the sustainability criteria in Articles 17(3) – 17(5) are *The Environmental Code* and *Skogsvårdslagen (1979:429) (the Forest Management Act).*

Compliance with Articles 17(3) -17(5) is intended to be verified in Sweden through lagen om hållbarhetskriterier (the Act on sustainability criteria). Where the fuel has been produced from raw material of a Swedish origin, there is a connection between the proposed lag om hållbarhetskriterier (the Act on sustainability criteria) and the legislation that regulates the use of land. The Environmental Code contains provisions on land conservation, which when the raw material is of Swedish origin, are affected when assessing the conformity of the criteria with point b of Article 17(3). The Environmental Code and skogsvårdslagen (the Forest

Management Act) contain provisions relating to changes to land usage that affect Article 17.4. Supervision in accordance with the laws that regulate the land usage is conducted by the county administrative board, the municipality and Skogsstyrelsen (the National Board of Forestry). These bodies are also responsible for supervision that affects changes to the land usage. The procedure relating to changes to land usage is described under f).

The protection of areas for the purpose of nature conservation is regulated in Chapter 7 of the Environmental Code and decided on by the Government, the count y administrative board, Skogstyrelsen (the National Board of Forestry or the municipality depending on the type of protection. The decisions reached in accordance with Chapter 7 of the Environmental Code are registered by the county administrative board or Naturvårdsverket (the Swedish Environmental Protection Agency) in *Naturvårdsregistret (the Conservation Register)* depending on the type of decision reached. Naturvårdsregistret contains information that is accessible to the economic operators via Naturvårdsverket's (the Swedish Environmental Protection Agency) map tool *Skyddad natur (Protected nature)*, which is freely available on the Internet. Information on formal protection is also registered in the national land register. Lantmäteriet (the Urban Land Administration) is responsible for the land register..

At a national level a continual inventory of the forests and open areas of Sweden has been compiled over many years via riksskogstaxeringen (the Swedish National Forest Inventory). The Swedish National Forest Inventory is an annual random sampling that is conducted by Sveriges lantbruksuniversitet (Swedish University of Agricultural Sciences). In Sweden the National Forest Inventory includes all types of land, even though the most extensive account is made of woodlands. The inventory contains a large quantity of information. The Swedish National Forest Inventory enables changes to the land and the condition of forest to be followed over time, which provides a good opportunity at a national level to follow-up the aims of the sustainability criteria for the biomass of Swedish origin.

e) (e) As far as conservation areas are concerned, please provide information under which national, European or international conservation scheme they are classified.

The protection of areas in Sweden is based in national, European and other international protection mechanisms. The national conservation scheme that provides different types of protection is regulated in the Environmental Code. National land conservation forms part of the European conservation scheme Natura 2000 and the implementation of the Habitats Directive and the Bird Directive. National land conservation is also based in international conventions, principally the Ramsar Convention and the Convention on Biological Diversity (CBD). Protected areas are classified in accordance with the International Union for the Conservation of Nature's (IUCN) system for protected nature.

f) (What is the procedure for changing the status of land? Who monitors and reports at national level on land status changes? How often is the land zoning register updated (monthly, annually, bi-annually, etc.)?

In Sweden changes to land status, i.e. changes to land usage, are enshrouded in provisions, which can be found in the Environmental Code together with associated ordinances and regulations. The forestry legislation also contains provisions relating to changing woodland to other types of agricultural land. The supervision of these provisions is conducted by the county administrative board, Skogsstyrelsen (the National Board of Forestry) and the municipality.

In Sweden a change of land usage is usually notifiable. Different regulatory authorities must be notified, depending on the change that takes place. An action that involves cultivating other land for the production of feed, food for human consumption or other similar agricultural production must, in accordance with Chapter 9 Section 6of the Environmental Code and Section 21 of förordningen (1998:899) om miljöfarlig verksamhet och hälsoskydd (Ordinance (1998:899) concerning environmentally hazardous activities and public health, be reported to the municipality before the action is taken. Similarly, there is an obligation to notify the county administrative board in order to take agricultural land out of production in accordance with förordningen (1998:915) om miljöhänsyn i jordbruket (Ordinance (1998:915) on environmental concerns in agriculture). If deforestation takes place in order to use the woodland for another purpose, Skogsstyrelsen (the National Board of Forestry) must be notified of this in accordance with skogsvårdsförordningen (1993:1096) (forest management ordinance) and the regulations of Skogsstyrelsen (the National Board of Forestry) (SKFS 1993:2).

The registers on land usage are Jordbruksverket's (the Swedish Board of Agriculture) block database and Skatteverket's (the Swedish Tax Agency) property rating register. Jordbruksverket's (the Swedish Board of Agriculture) block database contains geographical information on agricultural land that is included in agricultural aid schemes. The block database is continually updated with the results of inspections in accordance with requests for amendments from farmers or for taking a block inventory. Skatteverket's (the Swedish Tax Agency) property rating register contains information for agricultural units on the area of arable land, pasture land, woodland and barren land. The information is based on the details provided by the property owners and is usually updated when a so-called 'general property rating' is carried out, which takes place once every six years.

g) How is compliance with good agro-environmental practices and other cross-compliance requirements (required by Article 17(6) of Directive 2009/28/EC) ensured and verified at national level?

The supervision of cross-compliance requirements as set out in Article 17(6) is implemented by the municipality or county administrative board depending on the area of cross-compliance requirement. The county administrative board is responsible for the verification of cross-compliance in state aid. Should the municipality discover a breach of cross-compliance requirements within the areas of its responsibility, the municipality must report the failure to the county administrative board. The minimum inspection for cross-compliance is one % of the farmers who are applying for land area or animal-based aid. This means that the county administrative board will inspect all of the cross-compliances relevant to the farm of approximately 800 Swedish farms a year. The proportion of farms for which environment-related inadequacies can be ascertained is very low.

The county administrative board verifies fulfilment of the cultivation requirements for agricultural land, i.e. what are referred to as good agricultural and environmental condition in MB ordinances, on approximately 4000 – 5000 farms a year. This is done in conjunction with the verification that the information on the land area in the application for aid agrees with reality.

h) Do you intend to help develop voluntary certification schemes for sustainable biofuel and bioliquids as described in the second subparagraph of Article 18(4) of Directive 2009/28/EC? If so, how?

The Government intends to support the economic operators in their work towards developing voluntary certification schemes as necessary. The development of voluntary certification schemes is of primary importance to the market participants. The Government therefore intends to only assume a supportive role in such development work.

Introduction to Sections 4(3), 4(4) and 4(5)

The Commission's template lacks questions about cross-sectoral instruments, such as excise duties and exemption from excise duty. Since the Commission is enquiring about tax exemptions within all sectors (electricity, heating and cooling and transportation), it would not be of any use to repeat the descriptions of energy and CO_2 taxation under each area. On the basis of this an introductory section to Chapters 4(3), 4(4) and 4(5) will be given here.

In Sweden excise duties and exemptions from excise duty are used to exercise cross-sectoral control within the energy sector and climate. The legislation specifies the applicable regulations, which in similarity with all Swedish legislation is published in statens författningssamling (the Statute Book). (SFS[29]). Skatteverket (the Swedish Tax Agency) also continually reports the applicable energy and CO_2 taxes on its website. [30].

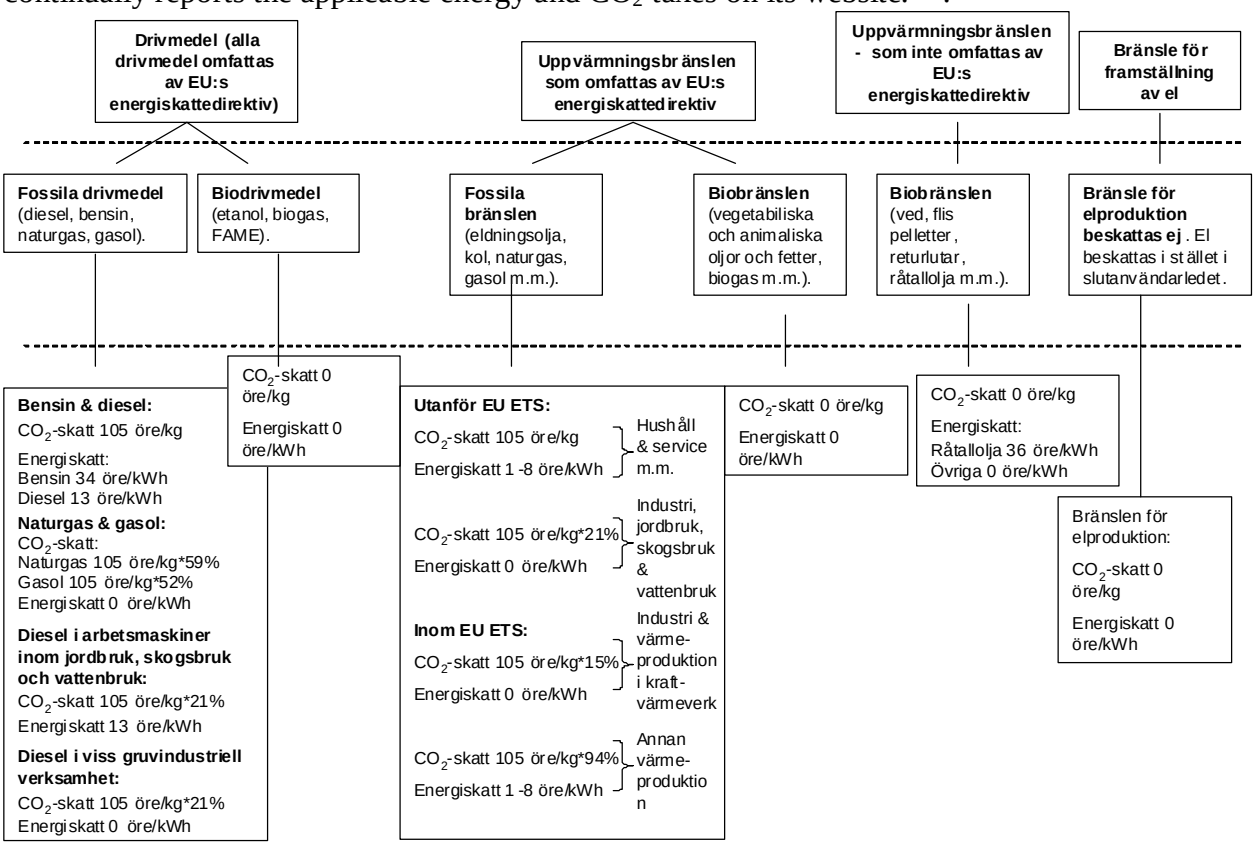

Figure 2. Brief description of the current (2009) energy and CO_2 taxes in Sweden. Source: Government bill 2009/10:41 Vissa punktskattefrågor med anledning av budgetpropositionen 2010 (Certain Excise in respect of the Budget Bill for 2010)

Energy tax on petrol was introduced into Sweden as early as 1924. The energy tax was expanded during the years, in 1957 to the majority of other liquid petroleum products and carbon fuels, in 1964 to LPG and in 1985 to natural gas. As early as 1991, CO_2 tax was

[29] www.notisum.se
[30] http://www.skatteverket.se/skatter/punktskatter/infoenergikoldioxid.4.18e1b10334ebe8bc8000843.html

introduced on the same tax basis as had previously applied for energy tax. Sulphur tax is charged for fuels containing sulphur, such as oil, carbon and peat. Biofuels and peat (except for crude tall oil) are exempt from tax. All biofuels and peat are exempt from CO_2 tax. Electricity is taxed in the user community and fuels for electricity generation are therefore exempt from tax. Schematic descriptions of different reduction rules for specific areas of application are given in the figure above.

Regulation has been stringent, both from a climate policy perspective and as regards an increased consumption of renewable energy, principally in the heating sector, but also in industry (heating fuels). There has also been a steering towards an increased proportion of biofuels on account of the design of the tax system.Energy efficiency is being promoted by the energy taxation.The district heating sector has been transformed from being one almost completely dependent on fossil fuels during the 1980s to one with a very high share of renewable energy. District heating accounts for approximately 50 % of the heating requirement in Sweden. Oil has been almost completely phased out as a heating fuel in the single family residence sector in favour of renewable alternatives, including heat pumps. Industry has also significantly reduced its use of fossil fuels.

The figure below gives an account of energy and CO_2 tax for domestic households and the service industry and CO_2 tax for manufacturing industry and for the production of heat in cogeneration plants. The table also gives the minimum level in accordance with the EU Energy Tax Directive.

Year	***Energy and CO_2 tax for domestic households and the service industry***	***CO_2 tax for manufacturing industry + production of heat in cogeneration plants (from 2008 a lower level outside of the EU ETS) and agriculture (0 energy tax)***
1993	**99**	**23**
1997	**177**	**52**
2001	**217**	**52**
2002	**246**	**53**
2004	**326**	**53**
2008	**358**	**59/42**
2010	***373***	***62/44***
EU MIN *	***21***	***21***

* EU MIN until 2002: 18 €

In addition to taxes on fuels there are also vehicle taxes, which are environmental taxes.

The Government has in government bill *Vissa punktskattefrågor med anledning av budgetpropositionen för 2010* (prop. 2009/10:41) *Certain Excise in respect of the Budget Bill for 2010* (government bill 2009/10:41)*)* set out certain principal positions that apply to financial instruments within the area of climate and energy. The bill contained proposed legislation regarding tax issues in the area of climate and energy that are believed to reduce emissions of greenhouse gases and to contribute to achieving the targets for the share of renewable energy and more efficient use of energy. The majority of the proposals were also presented by the Government in the 2009 annual climate bill (government bill 2008/09:162, *En sammanhållen klimat- och energipolitik – Klimat*) *(An Integrated Climate and Energy Policy – Climate)*

In December 2009 The Swedish Parliament decided to approve government bill 2009/10:41. Certain amendment came into force on 1 January 2010, but it has been decided that the majority of the amendments are to come into force on 1 October 2010, 1 January 2011, 1 January 2013 and 1 January 2015.

The future changes to the energy taxation system can be summarised in the following way:
The CO_2 tax for industry outside of the EU ETS, agriculture and forestry will be increased in two stages, from 21% to 30% of the general CO_2 tax level in 2011 and from 30% to 60% of the general CO_2 tax level in 2015. The so-called '0.8% rule' is to be abolished by 2015 with an initial increase of the limit to 1.2% in 2011..[31] The CO_2 and energy tax rates will be annually adjusted according to the consumer price index.

The CO_2 tax for natural gas as a fuel will be increased in three stages from 59% of the general level to the general CO_2 tax level in 2015. The first increase will take place in 2011 and the second in 2013.

Reduction in the refund of CO_2 tax for diesel oil used in agricultural and forestry machinery will also take place in three stages for the agricultural sector (2011, 2013 and 2015).
All changes to the CO_2 tax are intended to reduce emissions of greenhouse gases. The changes will take place gently and in stages in order to give the operators time to adapt.
The dual control of companies in the trading sector will be abolished or reduced by abolishing the CO_2 tax for industry within the EU ETS in 2011 and reducing the CO_2 tax to 7% of the general level for cogeneration that is also included in the EU ETS.

The energy tax on fossil heating fuels will be restructured according to the energy content of the fuel. The conversion means that from 2011 the energy tax for gas oil, natural gas and coal will be increased to the same level per energy content as for fuel oil. Energy tax will be introduced on fossil heating fuels in sectors in which the energy tax is currently zero, i.e. within industry, agriculture and forestry and for the production of heat in cogeneration plants. However, the energy tax will be set to a lower level that corresponds to 30% of the general energy tax level in 2011. The introduction of energy tax according to the energy content of fossil heating fuels will steer Sweden towards the energy and climate targets in a cost-effective way.
Energy tax on diesel oil will be increased in two stages, by a total of SEK 400 per cubic metre (SEK 0.4 per litre) by 2013. An initial stage of SEK 200 will be implemented in 2011.
As regards the increase in diesel tax, the transport sector will be compensated through reduced vehicle tax for diesel vehicles in 2011. The change will still increase environmental control by an increase in variable costs.

Further transport sector-related tax changes will also be introduced. The vehicle tax on passenger cars will be further related to CO_2 from 2011. A tax exemption of five years for passenger cars with improved environmental qualities was introduced in 2010. Light goods vehicles, light passenger vehicles and mobile homes will also be subject to CO_2-based vehicle

[31] The 0.8% rule involves tax relief for the proportion of the fuel consumption in companies whose consumption of fuel in manufacturing is in excess of 0.8% of the value added. The requirement on energy intensity will therefore be made more stringent in an initial stage in order to achieve a gradual complete abolition of the tax relief.

tax from 2011, whilst heavy electric hybrid buses will be subject to reduced vehicle tax from 2010. These changes will increase environmental control.
Tax on waste incineration will be abolished in October 2010. The renewability proportion in the waste that is incinerated in Sweden is high. The tax has not had the intended controlling effect on waste recycling, which is better controlled by other incentives.

4.3 Aid schemes for the promotion of the use of energy from renewable sources in electricity applied by the Member State or a group of Member States

Financial support 1. The electricity certificate scheme

a) What is the scheme called? Also provide a brief description.

The electricity certificate scheme is a market-based aid scheme designed to expand electricity generation from renewable energy sources and peat in Sweden. The objective is to increase electricity generation from such energy sources by 25 TWh from the 2002 level by 2020. The electricity producers whose electricity generation fulfils the requirements of lagen om elcertifikat (the Electricity Certificate Act). Facilities that were commissioned after the introduction of the scheme on 1 May 2003 are entitled to an electricity certificate for fifteen years, but for a maximum period until the end of 2035. Demand for electricity certificates is created when all electricity suppliers and certain electricity consumers are obliged to purchase electricity certificates corresponding to a specific proportion (quota) of their electricity sales/consumption. The amount of electricity certificates that electricity suppliers must purchase will increase annually as the quota successively increases, which will mean an increasing demand for electricity certificates. On 1 April of each year the quota-bound suppliers submit electricity certificates for cancellation corresponding to their quota obligation. The incentive to establish new facilities that generate electricity using electricity certificate eligible energy sources thereby increases. By selling their electricity certificates the producers of electricity from renewable energy sources receive an additional income from their electricity generation. In this way the scheme stimulates the expansion of electricity generation from renewable sources.
Information on the electricity certificate scheme is available from:
http://www.energimyndigheten.se/Foretag/Elcertifikat/

b) Is it a voluntary or obligatory scheme?

It is obligatory for all of those who are quota-bound under lagen om elcertifikat (the Electricity Certificates Act).
It is voluntary for producers that generate electricity from renewable energy sources.

c) Who manages the scheme? (Implementing agency, regulatory authority)

The Swedish Energy Agency is the regulatory authority and Svenska kraftnät is the authority in charge of keeping the accounts.

d) What are the measures taken to ensure the availability of necessary budget/funding to achieve the national target?

The electricity certificate scheme is not financed from the national budget. The additional income to producers that generate electricity from renewable energy sources is paid by the electricity consumers and is channelled to the producer via the electricity suppliers.

e) How is long-term security and reliability addressed by the scheme?

Reliability is guaranteed by the fact that the resources are transferred outside of the national budget and the existence of a statutory quota obligation that guarantees demand for electricity certificates every year until and including 2035.

f) Is the scheme periodically revised? What type of feedback or adjustment mechanism exists? How has the scheme been optimised so far?

The use of control stations has been one way of regularly following-up and further developing the electricity certificate scheme. A change to lagen om elcertifikat (the Electricity Certificates Act) is necessary in order to adjust the quota that controls how much the renewable electricity generation is to increase. One control station has been implemented since the introduction of the electricity certificate scheme in 2003, which resulted in the implementation of a number of measures. The electricity certificate scheme was extended to 2030, the level of aspiration increased, the allocation period for new facilities limited to fifteen years and cost of the electricity certificate to the electricity consumer became part of the electricity price, i.e. would no longer be separately reported. A new revision is taking place 2009/2010, which has resulted, inter alia, in an increase in the level of aspiration of 8 TWh, from 17 TWh, in order to increase renewable electricity generation by 25 TWh by 2020 compared with the 2002 level and an extension of the electricity certificate scheme to 2035. At the start of 2010 the Government submitted the government bill *Höjt mål och vidareutveckling av elcertifikatsystemet* (government bill 2009/10:133) (Raised goals and further development of the electricity certificate scheme). The Swedish Parliament reached a decision in accordance with the government bill in May 2010.

g) Does the aid differ according to technology?

The electricity certificate scheme is technology-neutral. However, electricity generation based on waste and on certain bio oils does not confer eligibility.

h) What are the expected effects in terms of energy production?

The target is to increase certificate eligible electricity production by 25 TWh by 2020 compared with the production in 2002.

i) Is the granting of the aid conditional on meeting energy efficiency criteria?

No.

j) Is it an existing measure? Could you please indicate which national legislation is regulating it?

The electricity certificate scheme has been the Swedish aid scheme for electricity from renewable energy sources since 1 May 2003. The legal amendments that have been implemented mean that the scheme will continue until 2035. The scheme is regulated by lagen (2003:113) om elcertifikat (the Electricity Certificates Act), förordningen (2003:130) om elcertifikat (Ordinance (2003:130) on electricity certificates)) and the national energy agency's administrative provisions and general guidance on electricity certificates (STEMFS 2009:3).

k) Is this a planned scheme? When would it be operational?

The electricity certificate scheme was introduced on 1 May 2003.

l) What start and end dates (duration) are set for the whole scheme?

The start date is 1 May 2003 and the end date is 31 December 2035.

m) Are there maximum or minimum sizes of system which are eligible?

No, there are no limits to the power outputs of new facilities.

n) (n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

Yes, lagen om elcertifikat (the Electricity Certificates Act) does not contain any such regulation.

o) Are there regional/local schemes? If so, please detail using the same criteria.

No.

Specific questions for tradable certificates:

a) **Is there any quota for the share of electricity produced from renewable sources in the total supply?**

There is a quota that controls the demand for electricity certificates. The quota indicates the number of electricity certificates the electricity supplier/consumer must purchase in relation to electricity sales/ consumption.

b) **Who is obliged to do so?**

The electricity suppliers and certain electricity consumers are obliged to purchase certificates in relation to electricity sales/ consumption.

c) **Are there any technology-specific bands?**

No

d) **Which technologies are covered by the scheme?**

Hydroelectric power, wind power, solar energy, wave energy, geothermal energy, biofuels [in accordance with förordningen (2003:130) om elcertifikat (Ordinance (2003:130) on electricity certificates))] as well as electricity produced in cogeneration plants using peat.

e) **Is international trading in certificates allowed? What are the conditions?**

No, only Swedish electricity certificates are valid upon cancellation.

f) **Is there a floor bottom price?**

No.

g) **Are there any penalties for non-fulfilment?**

If the quota-bound supplier/consumer does not cancel in accordance with his quota obligation a quota obligation fee will be payable. The quota obligation charge is 150 % of the volume-weighted average of the certificate price during a period from 1 April of the calculation year to 31 March of the following year inclusive.

If electricity certificates have been allocated to the holder of a facility on false grounds, the holder must pay a penalty for the electricity certificates that have been erroneously allocated to the holder. The penalty is calculated in the same way as for the quota obligation charge, the period for calculation of the certificate price must be the twelve-month period preceding the day prior to the decision.

h) **What is the average price for certificates? Is this published? Where is this published?**

The average price for electricity certificates is SEK 233 each, counted since 2003. During 2009 the average price of electricity certificates is SEK 293 each. The prices and volumes of all completed electricity certificate transactions are presented on the accounting system website, https://elcertifikat.svk.se/. An average price is also presented.

i) **What is the trading scheme for certificates?**

Trading on the electricity certificate market takes place through both bilateral agreements directly between producers and those who are quota-bound and through agreements for which a broker is employed. Electricity certificate trading takes place with electricity companies with professional trading departments, with industrial and district heating companies and with minor electricity suppliers and producers who only trade a few times a year.

j) **How long can a plant participate in the scheme?**

A plant that was commissioned after 1 May 2003 receives electricity certificates for fifteen years.

Financial support 2. Support for planning initiatives for wind power.

a) **What is the scheme called? Also provide a brief description.**

Support for planning initiatives for wind power.

Since 2007 municipalities, county administrative board, regional autonomous bodies and municipal cooperative bodies have been able to apply for aid for planning initiatives for wind power. The aim is to provide resources for spatial planning in order to create the conditions for a further expansion of wind power.
Information on the aid is available from:
http://www.boverket.se/Bidrag--Stod/Planeringsstod/

b) Is it a voluntary or obligatory scheme?

It is a voluntary scheme.

c) Who manages the scheme? (Implementing agency, regulatory authority)

Boverket (the National Board of Housing, Building and Planning). The Swedish Energy Agency and non-affected county administrative boards will be given the opportunity to comment on matters.

d) What are the measures taken to ensure the availability of necessary budget/funding to achieve the national target?

The aid is limited and funds are allocated by The Swedish Parliament when it decides on the national budget.

e) How is long-term security and reliability addressed by the scheme?

The Swedish Parliament allocated funds in conjunction with its annual decision on the national budget.

f) Is the scheme periodically revised? What type of feedback or adjustment mechanism exists? How has the scheme been optimised so far?

Accounts of the planning initiatives must be provided by the beneficiary of the aid. Boverket (the (National Board of Housing, Building and Planning) withholds 25% of the awarded funds before the final accounts are made.

g) Does the aid differ according to technology?

The aid only applies to wind power.

h) What are the expected effects in terms of energy production?

The aid has no direct targets for wind power production; it is to facilitate the planning of wind power and thereby indirectly contributes to increased wind power production. Approximately 200 of Sweden's 290 municipalities have thus far expressed interest in the aid. In addition, 13 out of 21 county administrative boards have expressed interest in the aid. The fact that only 20 municipalities submitted final reports shows that there is a planning contingency for 16 TWh, which indicates that a planning framework of 30 TWh will be achieved with a wide margin

i) Is the granting of aid conditional on meeting energy efficiency criteria?

No.

j) Is it an existing measure? Could you please indicate which national legislation is regulating it?

Yes. The aid is regulated by förordningen (2007:160) om stöd till planeringsinsatser för vindkraft (Ordinance (2007:160) on support to planning efforts for wind power)) and by Boverket's (the (National Board of Housing, Building and Planning) föreskrifter om stöd till planeringsinsatser för vindkraft (BFS 2007:13 -VIND 1) (rules on aid to the planning efforts for wind power (BFS 2007:13 -VIND 1)).

k) Is this a planned scheme? When would it be operational?

No.

l) What start and end dates (duration) are set for the whole scheme?

The aid can only be provided for planning initiatives that have been decided on after the end of 2006 and which are intended to be completed prior to the end of 2011.

m) Are there maximum or minimum sizes of system which are eligible?

Under normal circumstances aid is provided at 50% of the total cost of the planning initiative.

n) **(n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?**

The aid does not apply to individual projects.

o) **Are there regional/local schemes? If so, please detail using the same criteria.**

The aid is national and is being targeted at municipalities and regional bodies.

Financial support 3. Market introduction of wind power

a) **What is the scheme called? Also provide a brief description.**

Market introduction of wind power (Wind pilot aid).

Aid for wind pilot projects is being provided in order to reduce the costs of establishing new wind power plants and to increase knowledge of the effects of establishment in certain environments. Aid is being provided for technology development and market introduction in collaboration with trade and industry as well as for environmental impact studies in order to obtain generalisable answers to the impact on humans, the environment and nature. The aid can either be classified as financial support for investment or technology procurement. Since the aid is regulated by the same ordinance as for technology procurements, questions about technology procurement are answered below.

b) **Is it a voluntary or obligatory scheme?**

It is a voluntary scheme.

c) **Who manages the scheme? (Implementing agency, regulatory authority)**

The Swedish Energy Agency.

d) **What are the measures taken to ensure the availability of necessary budget/funding to achieve the national target?**

The aid is limited and funds are allocated by the Swedish Parliament when it decides on the national budget. 2003-2007 SEK 350 million was allocated and 2008-2012 SEK 350 million was allocated. It is not at present possible to apply for aid since the limitation has in principle been reached.

e) **How is long-term security and reliability addressed by the scheme?**

The Swedish Parliament allocates funds in conjunction with its annual decision on the national budget.

f) **Is the scheme periodically revised? What type of feedback or adjustment mechanism exists? How has the scheme been optimised so far?**

There is annual feedback to the Government. During Stage 1 the primary focus was on offshore establishment and to a certain degree in mountain environments. During Stage 2 the focus will be on all of the areas in which the Swedish Energy Agency in assessing aid will focus the aid, primarily on woodland and mountain environments, where wind power will be primarily developed and the need for knowledge is greatest for future expansion. The studies within Vindval have also moved from an offshore and mountain focus to one on woodland environments and mountains.

g) **Does the aid differ according to technology?**

Yes, the aid will be provided for wind power projects that involve technology development.

h) **What are the expected effects in terms of energy production?**

Thus far granted projects between 2003 and 2012 are expected according to the table below to contribute a total of 1.44 TWh (the facilities also receive electricity certificates).

Compilation of granted projects between 2003 - 2012.

Project	Beneficiary	Aid [SEK million]	Expected electricity production	Commissioning date	Final report
Lillgrund	Vattenfall AB	213	0.33	2007	2009

			TWh/year		
Uljabuouda	Skellefteå Kraft AB	35	0.08 TWh/year	2009-2010	2010
Large-scale wind power plants in northern Sweden	Svevind AB	115	0.197 TWh/year	2009-2011	2011
Demonstration facility	Sveriges Vindkrafts-kooperativ (the Swedish Wind Power Cooperative)	10	0.0093 TWh/year	2010	2011
Large-scale wind power plants in the forest areas of southern Sweden	Arise Wind power AB	50	0.14 TWh/year	2009-2010	2011
Storrun	Storrun AB	26,25	0.08 TWh/year	2009	2011
Havsnäs	NV Nordisk Vindkraft AB	20	0.256 TWh/year	2009-2010	2011
Vindpark Vänern	Vindpark Vänern Kraft AB	40	0.089 TWh/year	2009-2010	2012
Large-scale wind power plants in mountain environments	o2 Vindkompaniet AB	72,5	0.26 TWh/year	2011	2012
Pilot studies at Kriegers Flak	Vattenfall AB	9,45	-	-	2009
Vindval	Naturvårdsverket (the Swedish Environmental Protection Agency)	70	-	-	-
Total		**661,2**	**1.44 TWh/year**	-	-

i) Is the granting of aid conditional on meeting energy efficiency criteria?

No.

j) Is it an existing measure? Could you please indicate which national legislation is regulating it?

Yes. The aid is regulated during Stage 1 in accordance with Förordning (2003:564) om bidrag till åtgärder för en effektiv och miljöanpassad energiförsörjning (Ordinance on grants for measures for efficient and environmentally-friendly energy). During Stage 2 the Ordinance was replaced by recommendations drafted by the Swedish Energy Agency.

k) Is this a planned scheme? When would it be operational?

No.

l) What start and end dates (duration) are set for the whole scheme?

The start date is 1 January 2003 and the end date is 31 December 2012.

m) Are there maximum or minimum sizes of system which are eligible?

No. However, the Swedish Energy Agency has decided to focus its attention on large-scale wind power establishments.

n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

Electricity certificates can be cumulated.

o) Are there regional/local schemes? If so, please detail using the same criteria.

No.

Specific questions for tendering:

a) What is the frequency and size of the tenders?

A total of four invitations to tender have been published since the start of the Vind pilot projects (which also includes the Vindval programme).

b) Which are the technologies in question?

Wind power.

c) Are they integrated with the grid development?

The grid development can be included as a cost eligible for aid.

Financial support 4. Governmental support for solar photovoltaic cells

a) What is the scheme called? Also provide a brief description.

Government aid for solar photovoltaic cells[32]

The aid applies to all types of solar photovoltaic cell systems connected to electricity grids. The contribution is at 60% (55% for large commercial enterprises) and applies to the entire solar photovoltaic cell installation, including materials and labour. All types of applicant may apply for aid. The maximum amount of aid is SEK 2 million per building. The total amount that has been allocated for aid is SEK 100 million during 2009 and SEK 50-60 million for 2010 and 2011.

The aid is valid from 1 July 2009 until 31 December 2011 inclusive.

The aid is limited, i.e. it can only be provided for as long as there are sufficient allocated resources.

Information on the aid is available from: http://www.energimyndigheten.se/Hushall/Aktuella-bidrag-och-stod-du-kan-soka/Stod-till-solceller/Hur-soker-man-stodet/

b) Is it a voluntary or obligatory scheme?

It is a voluntary scheme.

c) Who manages the scheme? (Implementing agency, regulatory authority)

[32] Förordningen (2009:689) om statligt stöd till solceller.(Ordinance concerning government support for solar photovolaic cells)

The county administrative boards decide on aid. Boverket (the National Board of Housing, Building and Planning) administers the payment of aid. The Swedish Energy Agency is the regulatory authority and publishes ordinances on the aid.

d) What are the measures taken to ensure the availability of necessary budget/funding to achieve the national target?

Funds are allocated by The Swedish Parliament when it decides on its national budget.

e) How is long-term security and reliability addressed by the scheme?

The Swedish Parliament allocates funds in conjunction with its annual decision on the national budget.

f) Is the scheme periodically revised? What type of feedback or adjustment mechanism exists? How has the scheme been optimised so far?

The aid scheme is followed-up on a continual basis. Monthly reports are available on the the Swedish Energy Agency's website. Those who are granted aid must submit reports at least three years from the granting of the aid.

g) Does the aid differ according to technology?

No, it applies to all types of solar photovoltaic cells.

h) What are the expected effects in terms of energy production?

The target is 2.5 GWh.

i) Is the granting of aid conditional on meeting energy efficiency criteria?

No.

j) Is it an existing measure? Could you please indicate which national legislation is regulating it?

There is an existing measure and this is regulated by förordningen (2009:689) om statligt stöd till solceller (Ordinance concerning government support for solar photovoltaic cells) and the national energy agency's föreskrifter och allmänna råd om statligt stöd till solceller (STEMFS 2009:4) (regulations and general guidelines concerning government support for solar photovoltaic cells)).

k) Is this a planned scheme? When would it be operational?

No.

l) What start and end dates (duration) are set for the whole scheme?

The start date is 01.07.09 and the end date is 31.12.11.

m) Are there maximum or minimum sizes of system which are eligible?

No minimum amount of aid has been determined, but there is a maximum amount of aid of SEK 2 million.

n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

Aid for solar photovoltaic cells and electricity certificates can be cumulated.

o) Are there regional/local schemes? If so, please detail using the same criteria.

No.

Specific questions about <u>financial support for investment</u>:

a) What is included in the aid scheme? (Subsidies, capital grants, low interest loans, tax exemptions or reductions, tax refunds),

The aid applies to the entire solar photovoltaic installation, including materials and labour.

b) Who can benefit from this scheme? Is it designed for specific technology(/ies)?

Everybody may benefit; both private individuals and commercial enterprises.

c) Are applications received and granted continually or are there periodic application periods? If the application periods are periodical, could you please describe the frequency and conditions?

Applications may be submitted continuously and if the applicant is a commercial enterprise must have been submitted prior to the commencement of the project, if the applicant is a private individual within six months after the commencement of the project.

4.4 Aid schemes to promote the use of energy from renewable resources in heating and cooling applied by the Member State or a group of Member States

Sweden chooses to open its replies by the specific questions about heating and cooling and will only then give an account of its replies in accordance with the general template under Chapter 4.3.

Specific questions about heating and cooling

a) **How are the aid schemes for electricity from renewable energy sources adapted to encourage the use of cogeneration production from renewable energy sources?**

The electricity certificate scheme, as has been described above, is a technology-neutral system that also promotes cogeneration production using biofuels. Biofuel-based cogeneration has up to now provided the majority of the electricity production within the electricity certificate scheme.

Fuels for electricity production are exempt from tax, but as fossil fuels for the production of heat are liable for tax, there is a steering through the tax system towards cogeneration based on biofuels.

b) **What aid schemes are in place to encourage the use of district heating and cooling using renewable energy sources?**

Exemption from energy and CO_2 tax for biofuels in accordance with the introductory section.
The electricity certificate scheme (refer to Section 4.3).
Aid for conversions from direct-acting electricity (see below).

c) **What support schemes are in place to encourage the use of small-scale heating and cooling from renewable energy sources?**

Exemption from energy and CO_2 tax for biofuels in accordance with the introductory section (applies to pellets, for example).
Investment aid for solar heating (see below).
Aid for conversions from direct-acting electricity (see below).

d) **What support schemes are in place to encourage the use of heating and cooling from renewable energy sources in industrial applications?**

Exemption from energy and CO_2 tax for biofuels in accordance with the introductory section.
The electricity certificate scheme (refer to Section 4.3).

Financial support 1. Tax exemption for biofuels

Refer to the introductory section on excise duties.

Financial support 2. Aid for investment in solar energy

a) **What is the scheme called? Also provide a brief description.**

<u>Aid for investment in solar energy.</u>

Government aid may be granted to those investing in solar heating technology in order to promote the use of this technology. This applies to glazed solar collectors that use liquid as the heat conductor. The solar collectors must fulfil certain quality requirements, such as Solar Keymark, and have installation, operating and maintenance instructions in Swedish.

Information on the aid is available from the Boverket (the National Board of Housing, Building and Planning) website:
http://www.boverket.se/Bidrag--Stod/Villa/Solvarmestod-nytt/

b) Is it a voluntary or obligatory scheme?

It is a voluntary scheme.

c) **Who manages the scheme? (Implementing agency, regulatory authority)**

Boverket (the National Board of Housing, Building and Planning) is the regulatory authority. Applications are to be submitted to the county administrative board.

d) What are the measures taken to ensure the availability of necessary budget/funding to achieve the national target?

The aid is limited and funds are allocated by The Swedish Parliament when it decides on the national budget.

e) How is long-term security and reliability addressed by the scheme?

The Swedish Parliament allocates funds in conjunction with its annual decision on the national budget.

f) **Is the scheme periodically revised? What type of feedback or adjustment mechanism exists? How has the scheme been optimised so far?**

The aim is followed-up and evaluated. A number of beneficiaries will need to provide information for follow-up and evaluation purposes after they have received their aid. Svensk Solvärme (industry association), Boverket (the National Board of Housing, Building and Planning) and the Swedish Energy Agency will jointly evaluate the aid.

g) Does the aid differ according to technology?

The solar collector must be glazed and have liquid as it heat conductor. The aid applies in general to all solar heating technologies that fulfil the following quality requirements.

h) What are the expected effects in terms of energy production?

The Swedish Energy Agency believes that the financial framework for 2009-2010 should provide approximately 28 GWh, if all of the funds are used.

i) **Is the granting of aid conditional on meeting energy efficiency criteria?**

Yes. The solar collector must be certified in accordance with the EU Solar Keymark label and an accredited test laboratory have calculated the annual heat exchange in accordance with Boverket's (the National Board of Housing, Building and Planning) ordinances.

j) **Is it an existing measure? Could you please indicate which national legislation is regulating it?**

Yes. The aid is regulated by förordningen (2008:1247) om stöd för investeringar i solvärme (Ordinance concerning support for investment in solar heating) and Boverkets föreskrifter och allmänna råd om stöd för investeringar i solvärme (BFS 2009:2 – HEL 1) the National Board of Housing, Building and Planning's regulations and general guidelines for investment in solar heating).

k) **Is this a planned scheme? When would it be operational?**

No.

l) **What start and end dates (duration) is set for the whole scheme?**

The start date is 1 January 2009 and the end date is 31 December 2010. There was a previous solar heating aid scheme between 2000 and 2008.

The installation work must not commence before 1 January 2009.

m) Are there maximum or minimum sizes of system which are eligible?

The size of the aid is dependent on the annual heat exchange of the solar collector. In principle aid is provided at a rate of SEK 2.50 for each kilowatt hour per year produced by the solar collector. The equation for the calculation is as follows:

The annual heat exchange of the solar collector module in kWh x the number of modules x SEK 2.50.
The size of the aid is limited to: a maximum of SEK 7,500 per apartment in single-family residences and a maximum of SEK 3 per project (e.g. pools or industries).

n) **Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?**

No.

o) **Are there regional/local schemes? If so, please detail using the same criteria.**

No

Specific questions about financial support for investment:

a) **What is included in the aid scheme? (Subsidies, capital grants, low interest loans, tax exemptions or reductions, tax refunds),**

Grants

b) **Who can benefit from this scheme? Is it designed for specific technology(/ies)?**

Everybody. The solar collector must be glazed and have liquid as its heat conductor and also fulfil certain quality requirements.

c) **Are applications received and granted continually or are there periodic application periods? If the application periods are periodical, could you please describe the frequency and conditions?**

Applications are received on a continual basis. Commercial enterprises may not commence work before submitting an application for aid. Other applicants must apply for aid within six months from the commencement of the work.

Financial support 3 - Aid for converting from direct-acting electrical heating in residential properties

a) What is the scheme called? Also provide a brief description.

Aid for converting from direct-acting electrical heating in residential properties.
When changing from direct-acting electrical heating to district heating, rock heat pumps, lake water heat pumps or geothermal heat pumps or biofuel and the installation of water-borne heating systems.

b) Is it a voluntary or obligatory scheme?

It is a voluntary scheme.

c) Who manages the scheme? (Implementing agency, regulatory authority)

Boverket (the National Board of Housing, Building and Planning) is the regulatory authority. Applications are received by the county administrative board.

d) What are the measures taken to ensure the availability of necessary budget/funding to achieve the national target?

The aid is limited and funds are allocated by The Swedish Parliament when it decides on the national budget.

e) How is long-term security and reliability addressed by the scheme?

The Swedish Parliament allocates funds in conjunction with its annual decision on the national budget.

f) Is the scheme periodically revised? What type of feedback or adjustment mechanism exists? How has the scheme been optimised so far?

The scheme has been followed-up on an annual basis by the Swedish Energy Agency and Energimarknadsinspektionen (the Energy Markets Inspectorate) in the heating markets follow-up jointly conducted by the authorities.

g) Does the aid differ according to technology?

When converting to district heating it is a requirement that the district heating accounts for a minimum of 70% of the calculated annual heating requirement of the dwelling or commercial property needed to heat the internal space. District heating must also account for the entire calculated annual heating requirement needed to heat the tap water, except where solar heating accounts for a proportion of this heating requirement.
When converting to heat pumps it is a requirement that electricity accounts for no more than 35% of the calculated annual heating requirement of the dwelling or commercial property needed to heat the internal space and the tap water, including electricity consumption during especially low outside temperatures (peak load). Aid is not provided for air heat pumps.
When installing a heating device using biofuel it is a requirement that biofuel accounts for a minimum of 70% of the calculated annual heating requirement of the dwelling or commercial property needed to heat the internal space and the tap water.

h) What are the expected effects in terms of energy production?

The aid is not primarily for "energy production" purposes, but instead for converting from direct-acting electricity to some renewable heat source in the building. The target for conversion aid is not clearly expressed in energy terms.

i) Is the granting of aid conditional on meeting energy efficiency criteria?

The size of the aid is determined on the basis of the calculated annual heat exchange of the solar collector.

j) Is it an existing measure? Could you please indicate which national legislation is regulating it?

Yes.
Förordningen (2005:1255) om stöd för konvertering från direktverkande elvärme i bostadshus (Ordinance concerning support for conversion from direct-acting electrical heating in residential buildings), Föreskrifter om ändring i Boverkets föreskrifter och allmänna råd (BFS 2006:2) om stöd för konvertering från direktverkande elvärme i bostadshus (BFS 2006:8 - DIREL 2) (Regulations and concerning amendments to The National Board of Housing, Building and Planning's regulations and general guidelines concerning support for conversion from direct-acting electrical heating in residential buildings,
Boverkets föreskrifter och allmänna råd om stöd för konvertering från direktverkande elvärme i bostadshus (BFS 2006:2 - DIREL 1) (The National Board of Housing, Building and Planning's regulations and general guidelines for support for conversion from direct-acting electrical heating in residential buildings)

k) Is this a planned scheme? When would it be operational?

No.

l) What start and end dates (duration) are set for the whole scheme?

The start date is 1 January 2006 and the end date is 31 December 2010.

m) Are there maximum or minimum sizes of system which are eligible?

A maximum of 30% of the costs are eligible for aid, but up to a maximum of SEK 30,000 per dwelling or associated premises.

n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

Support measures cannot be cumulated, but different parts of an investment in a heating system/labour costs may be awarded grants/tax relief from various schemes. Deductions are made at a rate corresponding to other governmental or municipal aid for the measures, e.g. relief for ROT (renovation, maintenance and conversion and modifications). However, special rules are applicable to solar heating as for the aid for solar heating above.

o) Are there regional/local schemes? If so, please detail using the same criteria.

No.

Specific questions about financial support for investment:

a) **What is included in the aid scheme? (Subsidies, capital grants, low interest loans, tax exemptions or reductions, tax refunds),**

The aid is provided as a on-off grant.

b) **Who can benefit from this scheme? Is it designed for specific technology(/ies)?**

Aim can be obtained for converting heating systems in single-family residences, multi-occupancy residences and associated premises.

c) **Are applications received and granted continually or are there periodic application periods? If the application periods are periodical, could you please describe the frequency and conditions?**

Applications are received and granted continually during the period of eligibility for aid.

4.5 Support schemes for the promotion of the use of energy from renewable sources in the transport sector applied by the Member State or a group of Member States

Sweden will open by answering the special questions regarding transport.
Specific questions for transport:

a) **What are the concrete obligations/targets per year (per fuel or technology)?**

Sweden does not apply quotas for renewable energy in the transport sector.

b) **Is there a distinction made to the aid according to fuel or technology type? Is there any specific aid available for biofuels that meet the criteria of Article 21(2) of the Directive?**

There is no specific aid available for biofuels that meet the criteria of Article 21(2). However, governmental aid is available for research and development and innovation in the energy sector, which includes aid for demonstration projects. This is regulated in förordningen (2008:761) om statligt stöd till forskning och utveckling samt innovation inom energiområdet (Ordinance (2008:761) on state aid to research and development and innovation in the energy sector)).

Financial support 1. Tax exemption for biofuels

Refer to the introductory section on excise duties.

Financial support 2. Financial support for investment for biogas production within Landsbygdsprogrammet (the Swedish Rural Development Programme)

a) **What is the scheme called? Also provide a brief description.**

Financial support for investment for biogas facilities.

Aid provided by Landsbygdsprogrammet (the Swedish Rural Development Programme) applies to all potential investments to produce, store and process biogas, e.g. equipment for pre-treating substrates, digestion chambers, gas stores, digestion residue stores and cogeneration or upgrading plants. The same applies to connection lines to an existing gas grid or an upgrading plant.

b) **Is it a voluntary or obligatory scheme?**

It is a voluntary scheme.

c) **Who manages the scheme? (Implementing agency, regulatory authority)**

Jordbruksverk (the Swedish Board of Agriculture) is the regulatory authority. Applications are processed by the county administrative board.

d) What are the measures taken to ensure the availability of necessary budget/funding to achieve the national target?

Within the framework of the budget for Landsbygdsprogrammet (the Swedish Rural Development Programme) 2009-2013.

e) How is long-term security and reliability addressed by the scheme?

The Swedish Parliament allocates funds in conjunction with its annual decision on the national budget.

f) Is the scheme periodically revised? What type of feedback or adjustment mechanism exist? How has the scheme been optimised so far?

Landsbygdsprogrammet (the Swedish Rural Development Programme) will be monitored, followed-up and evaluated in accordance with the rules contained in Council Regulation (EC) No. 1698/2005. Jordbruksverket (the Swedish Board of Agriculture) also held an administrators' meeting with representatives fro, the county administrative board in January 2010. Jordbruksverket (the Swedish Board of Agriculture) is also in the process of formulating an annex to the application form for commercial aid in order to obtain information on the substrate and energy flows of new plants to enable it to conduct follow-ups of benefit to the climate, etc.

g) Does the aid differ according to technology?

The aid applies to biogas (SEK 200 million has been earmarked).This will enable the funds that have been provided since 2010 (SEK 100 million) to provide support for rural investment in biogas and other bio energies.Jordbruksverket (the Swedish Board of Agriculture) is prioritising aid to plants that intend to use livestock manure as the substrate. However, so far no prioritisation has been needed.This will allow digestion residue wells (an example of something that is the subject of aid that does not actually produce any new gas/electricity/heat) to be awarded aid.The details of the prioritisation have not yet been clarified on the day that the funds are due to cease.**What are the expected effects in terms of energy production?**

The current target for the financial support for investment for biogas within the rural development programme is 0.3 TWh. A long-term target of 0.6 TWh has been expressed by Jordbruksverket (the Swedish Board of Agriculture), provided that the aid is extended and augmented by funds in the next rural development programme.

h) Is the granting of aid conditional on meeting energy efficiency criteria?

No.

i) Is it an existing measure? Could you please indicate which national legislation is regulating it?

Yes. The measures are being regulated by förordningen (2007:481) om stöd för landsbygdsutvecklingsåtgärder (Ordinance concerning support for rural development measures).

j) Is this a planned scheme? When would it be operational?

No

k) What start and end dates (duration) are set for the whole scheme?

The start date is 01.01.09 and the end date is 31.12.13.

l) Are there maximum or minimum sizes of system that are eligible?

Up to 30% of the costs or up to 50% if the business is located in northern Sweden. The same company may usually receive a maximum of SEK 1.8 million during the course of a three-year period in accordance with the rules on the de minimis rule for State aid.

m) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

It is not possible to receive aid for the same costs from different sources of finance. The aid is provided to commercial enterprises and not to projects.

n) **Are there regional/local schemes? If so, please detail using the same criteria.**

The level of aid may be higher in northern Sweden, as stated above.

Specific questions about financial support for investment:

a) **What is included in the aid scheme? (Subsidies, capital grants, low interest loans, tax exemptions or reductions, tax refunds),**

Grants

b) **Who can benefit from this scheme? Is it designed for specific technology(/ies)?**

Jordbruksföretag (the Swedish Board of Agriculture) and other commercial enterprises in rural areas that produce biogas.

c) **Are applications received and granted continually or are there periodic application periods? If the application periods are periodical, could you please describe the frequency and conditions?**

Applications are received on a continual basis.

Financial support 3. Financial support for investment for biogas and other renewable gases

a) **What is the scheme called? Also provide a brief description.**

Financial support for investment for biogas and other renewable gases.

The purpose of the aid is to promote energy technologies that are favourable from a climatic perspective but which are not yet commercially competitive. The aid will promote efficient and expanded production, distribution and use of biogas and other renewable gases. Evaluations will be made on the basis of the criteria specified in förordningen (2009:938) om statligt stöd till åtgärder för produktion, distribution och användning av biogas och andra förnybara gaser (Ordinance concerning support for measures for the production, distribution and use of biogas and other renewable gases) and in the Swedish Energy Agency's call for proposals text (Doc. No.: 2009-003837) av stöd till främjande av biogas eller förnybara gaser (of support for the promotion of biogas or renewable gases).

b) **Is it a voluntary or obligatory scheme?**

It is a voluntary scheme.

c) **Who manages the scheme? (Implementing agency, regulatory authority)**

The Swedish Energy Agency administers the aid but does receive input from förvaltar stödet men tar in synpunkter från Jordbruksverket (the Swedish Board of Agriculture), Naturvårdsverket (the Swedish Environmental Protection Agency) and Trafikverket (the Swedish Transport Administration) during processing.

d) **What are the measures taken to ensure the availability of necessary budget/funding to achieve the national target?**

The national target relates to biofuel as a whole and not just biogas. Therefore the budget for the national target as a whole must be considered besides this aid.

e) **How is long-term security and reliability addressed by the scheme?**

The Swedish Parliament allocates funds in conjunction with its annual decision on the national budget.

f) **Is the scheme periodically revised? What type of feedback or adjustment mechanism exists? How has the scheme been optimised so far?**

The experiences of the relevant authorities will be feedback after the end of each round of applications.

g) **Does the aid differ according to technology?**

No.

h) **What are the expected effects in terms of energy production?**

Increased and improved efficiency in the production, distribution and consumption of renewable gases Projects will be the technical prototypes and demonstration projects for other interested parties wishing to invest in biogas technology.

i) Is the granting of aid conditional on meeting energy efficiency criteria?

Yes, the implementation of such conditions has been planned in relation to the management of digestion residues. However, no resources have yet been allocated within the framework of this aid.

j) Is it an existing measure? Could you please indicate which national legislation is regulating it?

Yes. The support for investment will be allocated in two stages, subject to the resources having been placed at the Swedish Energy Agency's disposal. The call for proposals will be within the framework of förordningen om statligt stöd till åtgärder för produktion, distribution och användning av biogas och andra förnybara gaser (Ordinance concerning government support for measures for the production, distribution and use of biogas and other renewable gases) and in the first call for proposals round will comprise approximately SEK 100 million.

k) Is this a planned scheme? When would it be operational?

No.

l) What start and end dates (duration) are set for the whole scheme?

The start date is 01.01.09 and the end date is 31.12.11.

m) Are there maximum or minimum sizes of system which are eligible?

No, there are no minimum or maximum size requirements for the plants, all are eligible for aid.

n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

Aid may not be provided for projects that have received some other public financing or are being financed by the European Community. However, electricity production based on biogas that has received this production aid may receive electricity certificates.

o) Are there regional/local schemes? If so, please detail using the same criteria.

No.

Specific questions about <u>financial support for investment</u>:

(a) What is included in the scheme? (Subsidies, capital grants, low interest loans, tax exemptions or reductions, tax refunds),

Grants

b) Who can benefit from this scheme? Is it designed for specific technology(/ies)?

Private individuals, industry associations, commercial enterprises and municipalities that produce, distribute or consume renewable gas. The scheme is designed to promote efficient and expanded biogas technology.

c) Are applications continuously received and granted or are there periodical application periods? If the application periods are periodical, could you please describe the frequency and conditions?

The aid can be applied for in two rounds (in 2010 and in 2011), subject to the resources having been placed at the Swedish Energy Agency's disposal.

4.6 Specific measures for the promotion of the use of energy from biomass

4.6.1 Use of biomass: both domestic and trade

Table 7: Use of biomass 2006

Sector of origin		Quantity of domestic resources[33]	Imports		Exports	Net quantity	Primary energy production (ktoe)
			EU internal	EU external	EU internal/EU external		
A) Biomass from forestry[34]:	***Of which***	***22 951***	***175***	***175***	***129***	***23 172***	***8 206***
	1. Direct supply of wood biomass from forests and other wooded land for energy generation	**5 120**				**5 120**	**2 045**
	Voluntary – if information is available you may provide more detailed information on the quantity of raw material within this category: a) Deforestation b) residues from deforestation (tops, branches, bark, stumps) c) Residues from landscape management (wood biomass from parks, gardens, plantation of trees and bushes) d) Other (specify in greater detail)						
	2. Indirect supply of wood biomass for energy generation	**17 831**	**175**	**175**	**129**	**18 052**	**6 160**
	Voluntary - if the information is available you may provide more detailed information: a) Residues from saw mills, woodworking, furniture industry (bark, sawdust) b) By-products from the pulp and paper industry (black liquor, tall oil) c) Processed wood fuel d) Recycled wood after use (recycled wood for energy consumption, wood from household waste) e) Other (specify in greater detail)						
(B) Biomass from agriculture and fisheries	***Of which:***	***585***	***307***	***595***		***1 487***	***617***
	1. Agricultural crops and fishery products directly provided for energy generation	**258**	**307**	**595**		**1 160**	**423**
	Voluntary - if the information is available you may provide more detailed information: a) Agricultural crops (cereals, oilseeds, sugar beet, silage maize) b) Plantations c) Short-rotation trees c) Other energy crops (grass) d) Phytoplankton e) Other (specify in greater detail)						
	2. Agricultural by-products/processed residues and fishery by-products for energy generation	**327**				**327**	**194**
	Voluntary - if the information is available you may provide more detailed information: a) Straw b) Manure c) Animal fat d) Meat and bone meal e) Cake by-products (including oil seed cake and olive oil cake for energy)						

[33] The quantity of the resource is consistently given in 1000 tonnes of dry matter for all categories.

[34] Biomass from forestry includes biomass from forest-based industries. Under the category of biomass from forestry processed solid fuels, such as chips, pellets and briquettes are included in the corresponding subcategories of origin. Biomass from forestry should also include biomass from forest-based industries. Under the category of biomass from forestry processed solid fuels, such as chips, pellets and briquettes should be included in the corresponding subcategories of origin.

	f) Fruit biomass (including skin, kernel) g) Bio products from fish g) clippings form vines, olives trees, fruit trees h) Other (specify in greater detail)						
(C) Biomass from waste:	***Of which:***	***2 068***	***35***	***90***		***2 193***	***764***
	1. (1)Biodegradable fraction of municipal solid waste including bio waste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises as well as comparable waste from food processing plants) and landfill gas	918	14	36		968	357
	2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)	873	21	54		948	329
	3. Effluent sludges, biogas	276				276	78

Please explain the conversion factor/calculation methodology used above for the conversion of the amount of available resources to primary energy.

Category A) Biomass from forestry

Conversion of dimensions

Domestic resources are given uniformly in 1,000 tonnesDM (tonnes dry matter). The reason for the choice of accounting unit is that tonnes DM is a better unit of measurement compared with different raw material sources.

The following sources have been used for the conversion figures and ratios: Ratios between units of measurement m^3 and tonnes DM have been obtained from Praktisk skogshandbok (1992) (Practical forestry manual))[35]. Conversion figures between physical dimensions (m^3, tonnes) and units of energy have been obtained from Lehtikangas (1998)[36]. Conversion figures for black liquor have been obtained from Alakangas (2000)[37].

The following conversion figures have been used for wood fuels:

- Category A1: Deforestation residues, roundwood, etc. 4.65 MWh/tonnesDM.
- Category A2:
    - Sawdust and bark, etc. 4.5 MWh/tonnesDM,
    - Black liquor, etc. 3.6 MWh/tonnesDM
    - Pellets, etc. 4.9 MWh/tonnesDM
    - Recycled wood 4.9 MWh/tonnesDM

Information sources

The information on fuels from forestry comes from various sources:

[35] Sveriges skogsvårdsförbund (the Swedish Forestry Association). 1992. Praktisk skogshandbok 1992 (Practical forestry manual).

[36] Lehtikangas, P. 1998. Lagringshandboken (Storage manual). Sveriges lantbruksuniversitet (the Swedish University of Agricultural Sciences).

[37] Alakangas, E. 2000. Suomessa käytettävien polttoaineiden ominaisuuksia. Tiedotteita. 2045. VTT. Finland.

- Skogsstyrelsen, skogligstatistik (the National Board of Forestry, forest statistics)[38].
- Skogsstyrelsen (the National Board of Forestry), report to the FAO (the so-called 'JWEE form'[39]).
- The Swedish Energy Agency[40].
- Statistiska centralbyrån (SCB) (Statistics Sweden))[41].
- Svenska trädbränsleföreningen (Swedish wood fuel association)[42].
- Pelletsindustriernas riksförbund (PIR) (the Swedish Pellet Association))[43].

Raw materials/fuels included

The following wood fuels are included:

- Roundwood and fuelwood.
- Deforestation residues, such as branches, tops and (stumps).
- Solid by-products from the forestry industry, such as sawdust and bark.
- Liquid by-products from the forestry industry, such as black liquor and crude tall oil.
- Recycled wood, such as packaging, old furniture and waste shredders.
- Processed wood fuel, such as pellets and briquettes.

Imports

There are imports of different raw materials, but these cannot be reported separately, apart from pellets. There are also so-called 'indirect imports', i.e. the forestry industry importing roundwood for forestry industry purposes. When roundwood is processed, whether it is cut by mechanical processing in saw mills or processed for pulp, by-products will be generated that can be used to produce energy. There is an absence of reliable statistics on this.

Pellets are imported. The annual imports amount to 1.7-1.8 TWh (refers to the period 2006-2008). The imported quantity equates to approximately 20% of the market volume[44]. It is supposed that 50% of the imports originate from EU Member States (e.g. Finland and Estonia) and 50% from countries outside of the EU (e.g. Russia and Canada).

[38] Skogsstyrelsen (the National Board of Forestry). Skogligstatistik (forest statistics). Skogsstatistisk årsbok (Statistical yearbook for forests). www.svo.se.
[39] JWEE – Joint Wood Energy Enquiry.
[40] The Swedish Energy Agency 2006-. Various statistical publications. www.energimyndigheten.se.
[41] Statistiska centralbyrån (SCB) (Statistics Sweden)). Various statistical publications. www.scb.se.
[42] Svenska trädbränsleföreningen (Swedish wood fuel association). Annual statistics (Report to the Swedish Energy Agency). www.tradbransle.se.
[43] Pelletsindustriernas riksförbund (PIR) (the Swedish Pellet Association)). Current statistics. www.pelletsindustrin.org.
[44] Pelletsindustriernas riksförbund (PIR) (the Swedish Pellet Association)). Current statistics. www.pelletsindustrin.org.

Category B) Biomass from agriculture

Conversion of dimensions
Domestic resources are given in 1,000 tonnesDM (tonnes dry matter).

Translation from physical units of measurement (m^3, tonnes, tonnesDM) and units of energy (MWh, GWh) is performed on the basis of recognised conversion figures/ratios in agriculture according to Databok för driftplanering i jordbruket (1992) (Data manual for operational planning in agriculture))[45] and information from Bioenergiportalen (the Bioenergy Portal)[46].

Information sources
The information on fuels from agriculture comes from various sources:

- Jordbruksverket (the Swedish Board of Agriculture)[47],[48].
- Monitoring report on tax exemption for biofuels and alternative fuels 2008[49].
- Marknadsöversikt – Etanol, en jordbruks- och industriprodukt 2006 (Market overview – Ethanol, an agricultural and industrial product)[50].
- Transportsektorns energianvändning (Energy consumption in the transport sector) 2006[51].

Raw materials/fuels that are included
Domestic resources that are included are:

- Cereals.
- Seed oils.
- Straw.
- Short-rotation trees (Salix).
- Manure.
- Bio oils (animal and/or vegetable oils and fats).

[45] Sveriges lantbruksuniversitet (the Swedish University of Agricultural Sciences). 1992. Databok för driftsplanering i jordbruket (Data manual for operational planning in agriculture).
[46] http://www.bioenergiportalen.se.
[47] Jordbruksverket (the Swedish Board of Agriculture). 2006-. Annual agricultural statistics. www.jordbruksverket.se
[48] Jordbruksverket (the Swedish Board of Agriculture). 2009. Report to the Swedish Energy Agency for NREAP.
[49] The Swedish Energy Agency 2009. Monitoring report on tax exemption for biofuels and alternative fuels 2008. Doc. No.: 00-09-558.
[50] Jordbruksverket (the Swedish Board of Agriculture). 2006. Marknadsöversikt – Etanol, en jordbruks- och industriprodukt (Market overview – Ethanol, an agricultural and industrial product). Report 2006:11.
[51] The Swedish Energy Agency. 2008. Transportsektorns energianvändning 2006 (Energy consumption in the transport sector). ES 2008:01.

Imports

Imported ethanol (Brazil) is converted to sugar cane (tonnesDM) according to the database http://www.ecn.nl/phyllis/single.html (2009)[52], Ethanol from sugar beets (2007)[53] and Wikipedia (2009)[54].

Ethanol imports from the EU are converted to sugar beets and cereals according to the report Etanol från sockerbetor (2007) (Ethanol from sugar beets).

Imported rapeseed oil (from other EU Member States) is converted to rapeseed according to information from Bioenergiportalen (the Bioenergy Portal) [55].

Additional information

Cereals are used to produce energy in Sweden both for the production of ethanol and for small-scale firing (Jordbruksverket (the Swedish Board of Agriculture)).

Salix is the only commercially-grown energy crop in Sweden (approximately 14,000 hectares). Other energy crops (such as reed canary grass, hemp, etc.) are grown for test purposes (area 1,000 hectares).

The quantity of bio oils that are included in the assessment basis comes from report Hållbarhetskriterier ER2009:30 (Sustainability Criteria ER2009:30)[56].

Category C) Waste

Conversion of dimensions

The quantity of substrate that is used for the production of biogas is given in tonnes wet weight. The substrate is translated into tones dry matter on the basis of available facts about the biogas substrate. The choice of accounting unit depends on both the unit of measurement in which the waste/substrate is recorded in the existing statistics and on how the primary energy content of the waste/substrate can be calculated with the greatest certainty.

The following dry matter contents for the biogas substrate have been used: Effluent sludge 5%, Source separated food waste 18%, Waste foodstuffs 49%, Slaughterhouse waste 18% and Other[57] 2%. The information on dry matter contents has been obtained from Carlsson och Uldal (2009)[58], and from the report Produktion och användning av biogas år 2006 (Production

[52] http://www.ecn.nl/phyllis/single.html.

[53] County administrative board of Blekinge County. 2006. Ethanol from sugar beets – Förstudie om möjligheter till storskalig produktion i Blekinge (Pilot study of the opportunities for large-scale production in Blekinge). Report 2006:7.

[54] Wikipedia (Sockerrör / Sugarcane).

[55] www.bioenergiportalen.se.

[56] The Swedish Energy Agency 2009. Hållbarhetskriterier (Sustainability Criteria). Förslag till implementering av vissa delar av Europaparlamentets och rådets direktiv 2009/28/EG om främjande av användningen av energi från förnybara energikällor (Proposed implementation of certain parts of European Parliament and Council Directive 2009/28/EC on promoting the use of energy from renewable sources). Report ER2009:30.

[57] It is assumed here that the category “Other! Consists of industrial effluent sludge.

[58] Carlsson, M., Uldal, M. 2009. Substrathandbok för biogasproduktion (Substrate manual for biogas production). Svensk Gasteknisk Centrum (Swedish Gas Centre). Report SGC 200.

and use of biogas 2006)[59]. The net calorific values of the different substrates have been obtained from Carlsson och Uldal (2009), and Alakangas (2000)[60].

Information sources

Information on the quantity of substrate for the production of biogas comes from the publication Produktion och användning av biogas 2006 (Production and use of biogas 2006)[61].

The information on waste fuels and biogas comes from various sources:

- The Swedish Energy Agency[62].
- Avfall Sverige AB[63.]
- Produktion och användning av biogas år 2006 (Production and use of biogas 2006)[64].
- Produktion och användning av biogas år 2008 (Production and use of biogas 2008)[65].
- Basdata om Biogas 2006 (Basic Data on Biogas 2006)[66].
- Karakterisering av fasta inhomogena avfallsbränslen – inverkan av metoder för provtagning och provberedning, 2008 (Characterisation of solid non-homogeneous waste fuels – the influence of methods of sampling and sample preparation, 2008)[67].
- Den Svenska biogaspotentialen från inhemska råvaror, 2008 (Swedish biogas potential from domestic raw materials, 2008)[68].
- Substrathandboken (2009) (The Substrate Manual (2009))[69].
- Analys av den fossila andelen av norsk avfall med hänsyn till energiinnehåll, 2006 (Analysis of the fossil proportion of Nordic waste with regard to energy content, 2006) [70].

[59] The Swedish Energy Agency 2008. Produktion och användning av biogas 2006 (Production and use of biogas 2006). Report ER 2008:02.
[60] Alakangas, E. 2000. Suomessa käytettävien polttoaineiden ominaisuuksia. VTT tiedotteita 2045. Finland.
[61] The Swedish Energy Agency 2008. Produktion och användning av biogas 2006 (Production and use of biogas 2006). Report ER 2008:02.
[62] The Swedish Energy Agency 2006. Bearbetning av energistatistik för år 2006 (Processing of energy statistics for 2006).
[63] Avfall Sverige AB. Report to Energimyndigheten (the Swedish Energy Agency) for NREAP.
[64] The Swedish Energy Agency 2008. Produktion och användning av biogas 2006 (Production and use of biogas 2006). Report ER2008:02.
[65] The Swedish Energy Agency 2010. Produktion och användning av biogas år 2008 (Production and use of biogas 2008). ES2010:01 (being printed).
[66] Persson, M. 2006. Basdata om Biogas 2006 (Basic Data on Biogas 2006). Svensk Gasteknisk Center (Swedish Gas Centre).
[67] Avfall Sverige Utveckling. 2008. Karakterisering av fasta inhomogena avfallsbränslen – inverkan av metoder för provtagning och provberedning (Characterisation of solid non-homogeneous waste fuels – the influence of methods of sampling and sample preparation). Report F2008:05.
[68] Avfall Sverige Utveckling. 2008. Den Svenska biogaspotentialen från inhemska råvaror (Swedish biogas potential from domestic raw materials). 2008. Report 2008:02.
[69] Carlsson, M., Uldal, M. 2009. Substrathandbok för biogasproduktion (Substrate manual for biogas production). Report SGC 200. Svensk Gastekniskt Center (Swedish Gas Centre).

Raw materials/fuels that are included

Domestic resources that are included are:

- Biodegradable fraction of municipal solid waste, including bio waste.
- Biodegradable fraction of industrial waste.
- Landfill gas.
- For the production of biogas:
  - Effluent sludge and industrial effluent sludge.
  - Source separated food waste.
  - Waste foodstuffs.
  - Slaughterhouse waste.
  - Other.

Please specify on what basis the biodegradable fraction of municipal solid waste and of industrial waste was calculated.

The renewable fraction of waste has consistently been supposed to be 50%. This supposition is based on Profu (2008)[71]. The study was conducted in 2008 on behalf of the Swedish Energy Agency. The purpose of the study was to conduct random sampling. The results of the study show that the renewable proportion of waste lies in the interval 50 - 60%. Due to uncertainties in the underlying statistics a lower level in the interval has been chosen by way of precaution. The proportion may be modified when the data has been analysed in greater detail and the statistics in the area have been improved.
The renewable fraction of municipal solid waste, including biowaste and the biodegradable fraction of industrial waste in given in tonnes dry matter.

Additional information
The substrate for landfill gas cannot be calculated. Landfill gas is included as gas (production of landfill gas).

Please use Table 7a to give an estimated contribution of biomass energy use in 2015 and 2020. (Following the categorisation used in Table 7.)

Table 7a: Estimated biomass domestic supply in 2015 and 2020

Sector of origin	2015		2020	
	Expected	Primary energy	Expected	Primary energy

[70] Profu. 2006. Analys av den fossila andelen av norsk avfall med hänsyn till energiinnehåll (Analysis of the fossil proportion of Nordic waste with regard to energy content).
[71] Profu 2008. Analys av den förnybara andelen av avfall till förbränning i Sverige med hänsyn till energiinnehåll. (Analysis of the renewable proportion of waste for incineration in Sweden with regard to energy content).

		quantity of domestic resources	production (ktoe)	quantity of domestic resources	production (ktoe)
A) Biomass from forestry[1]:	**1. Direct supply of wood biomass from forests and other wooded land for energy generation**	6 166	2 463	6 819	2 724
	2. Indirect supply of wood biomass for energy generation	19 558	6 665	20 210	6 904
(B) Biomass from agriculture and fisheries[1]	**1. Agricultural crops and fishery products directly provided for energy generation**	693	288	867	374
	2. Agricultural by-products/processed residues and fishery by-products for energy generation	100	34	100	34
(C) Biomass from waste[1]:	**1. Biodegradable fraction of municipal solid waste including biowaste** (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises as well as comparable waste from food processing plants) **and landfill gas**	1 353	493	1768	637
	2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)	787	270	1 014	348
	3. Sewage sludge	576	163	767	217

[1]In the columns for the expected quantity of domestic resources the quantities are given in 1,000 tonnes DM.

Comments to Table 7A.
In the columns for the expected quantity of domestic resources the quantities are given in 1,000 tonnes DM. See the comments and clarifications for Table 7.

The table relates to the assessed usage for 2015 and 2020 of domestic biomass, i.e. it relates to usage and not the domestic supply or potential. Quantities for the assessed import have not been included.

The forecast for the calculated domestic supply of biomass for 2015 and 2020 is based on the Swedish Energy Agency's long-term forecast of 2008[72]. The long-term forecast has been updated with the most significant changes to instruments with regard to renewable energy known in June 2009. Refer also to the memorandum "särskilt prognosdokument" (special forecast document)[73], which was submitted in December 2009 in accordance with Article 4(3) of the Renewable Energy Directive.

What is the estimated role of imported biomass up to 2020? Please specify the quantities expected (ktoe) and if possible indicate the import countries.

Forests (import/facts)
According to Skogsstyrelsen (the National Board of Forestry)[74], the most recently reported import statistics for forestry products (roundwood and bio products) show that approximately 50% of the raw materials are imported from the Baltic States, approximately 40% from

[72] The Swedish Energy Agency 2009. Långsiktsprognos (Long-term forecast) 2008. Report Er 2009:14.
[73] The Swedish Energy Agency 2009. Memorandum concerning "särskilt prognosdokument" (special forecast document) dated 23 November 2009.
[74] Skogsstyrelsen (the National Board of Forestry) 2009. Skogsstatistisk årsbok (Statisitical yearbook for forests) 2009.

Finland, Norway and Russia (a third from each country) and approximately 10% from other EU Member States. It can be assumed that wood fuels/wood biomass will be imported from the same countries in the future. It is difficult to precisely specify possible import countries since there are no suitable customs statistics that would allow us to identify the purpose for which the material is intended.
The second problem relates to the production chain and the fact that it is not possible to determine which specific quantities (i.e. domestic or imported) are being processed/used in the industrial process itself. Imported roundwood is primarily used in industry, but various by-products are generated in different parts of the production chain that can be used for the production of energy, e.g.

- the wood pulp industry: roundwood à bark, roundwood à chemical wood pulp à black liquor, roundwood à chemical wood pulp à crude tall oil,
- saw mills: roundwood à bark à sawn wood products à wood chips à dry chips à sawdust à shavings.

Pellets
Pelletsindustriernas riksförbund (PIR) (the Swedish pellet Association)) continually publishes statistics on its website. The import of pellets amounts to 1.7-1.8 TWh (2006-2008), which corresponds to approximately 20% of the Swedish market. It is assumed that the import proportion will remain unchanged until 2015 but will increase to 25% in 2020.

Agriculture
Ethanol, RME and rapeseed oil are imported. The imported ethanol comes from Brazil (sugar cane ethanol) and from EU Member States (cereal, sugar beet and vine ethanol). The imported RME/rapeseed oil comes primarily from other EU Member States[75]. Certain biooils are also imported but cannot be reported. It is assumed that these are included in the quantity of domestic resources.

Waste
Certain imports of waste are assumed to occur in 2015 and 2020. Waste is currently imported from countries including EU Member States and Norway[76]. It is assumed that the import of waste will be approximately 23% in 2015 and 16% in 2020[77]. There is insufficient data to determine precisely from which country import will take place in the future. Here it is assumed that one half of the waste comes from EU Member States and the remainder from countries outside of the EU.

Biogas
The quantity of biogas substrate is based on information from the report Produktion och användning av biogas 2008 (Production and use of biogas 2008)[78].

[75] ÅF 2009. Report to the Swedish Energy Agency. Fuel markets, domestic production of biofuels and quota obligation schemes.
[76] Avfall Sverige. 2009. Rapportering till Energimyndigheten för den nationella handlingsplanen (Report to the Swedish Energy Agency for the national action plan)).
[77] Avfall Sverige. 2009. Rapportering till Energimyndigheten för den nationella handlingsplanen (Report to the Swedish Energy Agency for the national action plan)).
[78] the Swedish Energy Agency 2010. Produktion och användning av biogas år 2008 (Production and use of biogas 2008). ES2010:01.

Please describe the current situation of agricultural land used for dedicated energy production

Table 8: Agricultural land use for the production of energy crops 2006

Agricultural land use for the production of energy crops	Area (ha)
1) Land used for short-rotation trees (Salix)	14 000
2) Land used for other energy crops such as grasses (reed canary grass, hemp, grasslands)	1000
3) Land used for growing cereals (oats) for burning purposes	5 000
4) Land used for growing cereals (wheat) for the production of ethanol	25 000
5) Land used for growing oilseeds for the production of RME	25 000
6) Land where straw burning is conducted	30 000

Ref.:. Jordbruksverket (the Swedish Board of Agriculture) (2009))[79].

The production of ethanol from cereals more than tripled between 2006 and 2009. This means that in 2009 large areas of land were used for growing cereals for the production of ethanol in 2009, even though a proportion of the raw materials were imported.

4.6.2 Measures to increase biomass availability, taking into account other biomass users (agriculture and forestry-based sectors).

– **Mobilisation of new biomass sources:**

(a) Please specify how much land is degraded.

The degraded land in Sweden is probably primarily adjacent to mines and major commercial enterprises. Agriculture has not been conducted in such a way to deplete land of nutrients, erode the land or in any other way degrade it (which is the case in a number of other countries). Therefore no estimations are available of the area of degraded land.

b) (Please specify how much unused arable land exists.

The information provided by Riksskogstaxeringen (the National Forest Inventory)[80] on abandoned agricultural land is reported in MINT[81]. Former pastureland and former arable land are reported separately in Riksskogstaxeringen (the National Forest Inventory). A time limit of 20 years has been used in order to differentiate recently abandoned agricultural land from other areas of abandoned agricultural land. There is a relatively high uncertainty in the figures that apply to previously abandoned agricultural land since the field assessments are often difficult.

According to Jordbruksverket (the Swedish Board of Agriculture)[82] there is in the region of 600,000 to 700,000 hectares of agricultural land that has been taken out of production and which has not been transferred to other forms of land use. This area consists of land that is not being actively used, including the over-cultivation of pasture. The condition of the land is

[79] Jordbruksverket (the Swedish Board of Agriculture). 2009. Rapportering till Energimyndigheten för den nationella handlingsplanen (Report to the Swedish Energy Agency for the national action plan).
[80] http://www.riksskogstaxeringen.slu.se.
[81] Larsson et al 2009. Möjligheter till intensivodling av skog (Possibilities for the intensive cultivation of forests). From regeringsuppdrag (government mandate) Jo 2008/1885. SLU, Umeå.
[82] Jordbruksverket (the Swedish Board of Agriculture). 2008. Kartläggning av mark som tagits ur produktion (Identification of land that has been taken out of production). Report 2008:7, Jordbruksverket (the Swedish Board of Agriculture), Jönköping.

unknown. Minor changes are largely involved. The so-called wooded area was 146,500 hectares in 2008[83].

The area of recently abandoned former pastureland is approximately 72,000 hectares. According to estimations there are approximately 160,000 hectares of recently abandoned arable land. There are a further 63,000 hectares of arable land that has not been used for over 20 years. How large a proportion of this area is suitable and available for energy cultivation cannot be stated with any degree of accuracy.

c) Are any measures planned to encourage unused land, degraded land, etc. to be used for energy purposes?

Landsbygdsprogrammet (the Swedish Rural Development Programme) includes investment aid for energy forests that applies to all arable land. The target as regards multi-annual energy crops is that an area equivalent to 30,000 hectares is to be planted during the period of the programme, 2007-2013.

In the most recent review of the common agricultural policy within the EU factors including climate and renewable energy were highlighted as being challenges. This has resulted in the allocation of special funds in Landsbygdsprogrammet (the Swedish Rural Development Programme) for projects connected with these challenges during 2010 and 2013, totalling approximately SEK 470 million.

d) Is the use of certain already available raw materials (such as animal manure) planned for energy?

The Swedish rural development programme includes investment aid for biogas. A project called "Greppa Näringen" (Focus on Nutrients) is also being financed by Landsbygdsprogrammet (the Swedish Rural Development Programme). Greppa Näringen (Focus on Nutrients) is an information and advice project that will also address climate impact. This could also achieve positive results in biogas production from residues.

e) Is there any specific policy promoting the production and use of biogas? What type of areas of application are promoted *(local, district heating, biogas grid, natural gas grid integration)?*

Aid is available for the introduction of biogas vehicles, the expansion of the distribution infrastructure for biogas as vehicle fuel and within Landbygdsprogrammet aid is available for livestock manure digestion.
The Swedish Energy Agency has been given the task by the Government to develop in consultation with Jordbruksverket (the Swedish Board of Agriculture) and Naturvårdsverket (the Swedish Environmental protection Agency) a cross-sectoral long-term strategy that will in the short and long-term contribute to increased usage of biogas. The task will be reported on 31 August 2010.

f) What measures are planned to improve forest management techniques in order to maximise the extraction of biomass from the forest in a sustainable way?[84] How will forest management be improved in order to increase future growth? What measures are planned to maximise the extraction of existing biomass that can already be put into practice?

[83] Jordbruksverket (the Swedish Board of Agriculture). 2010. The Jordbrukverket (the Swedish Board of Agriculture) database. Jönköping.
[84] Recommendations can be found in the report issued by the Standing Forestry Committee ad hoc Working Group II in July 2008 on Mobilisation and efficient use of wood and wood residues for energy generation. The report can be downloaded at: http://ec.europa.eu/agriculture/fore/publi/sfc_wgii_final_report_072008_en.pdf

The extraction of forest residues (branches and tops0 and stumps can be increased for a short time as the demand for tree fuels increases. A new range that may become interesting if the price of wood fuels rises further is the removal of weak trunks or whole trees from land clearances and first thinnings. It is important, not least for biodiversity, that forestry is conducted so that sufficient quantities of dead wood and valuable biotopes are left. The biological usefulness of the dead wood is determined by the type of wood, the age of the wood and where and when it is left. The extraction of deforestation residues, stumps, small trees, etc. can be increased in conjunction with the leaving behind of suitable types and sufficient quantities of dead wood. Forestry can also promote generally increased growth through measures including the use of sufficiently dense regenerations, increased land clearance, manuring and by using processed plants that provide improved future deforestation opportunities.

The planting of short-rotation foreign tree species is at the pilot study stage and requires a change to the law if the introduction/use of foreign tree species is to increase. A few short-rotation broad-leafed trees that have been tested are poplar, hybrid aspen, aspen and alder. It is likely that the industry will prefer more short-rotation conifers. However, the broad-leafed trees can be advantageously planted on poorer quality arable land.

Forestry is actively involved in intensifying forest management in order to increase forest growth and thereby the potential extraction of both industrial and energy products from the forest. Management measures that are already in operation and which are being extended are: forest manuring, the use of processed plant material and ditch cleaning. These measures will in all probability allow the range of energy to be extracted from forests to be increased within the next ten years. Forest management methods have been proposed that under the current regulatory framework are not permitted in Sweden. The regulatory framework must be changed and simplified if these methods are to be deemed appropriate to use.

However, more intensive forestry within certain areas does place greater demands on the promotion of the biological diversity in certain other areas. An increase in the extraction of biomass from forests would also lead to an increase in the extraction of nutrients, which would then need to be compensated for, e.g. by the introduction of ash.

The Swedish Energy Agency and the forestry industry are together driving forward the technical development of forest fuel management via the Skogforsk programme “Effektivare skogsbränsleteknik” (More efficient forest fuel techniques). The results of the programme could contribute to increased profitability for the forestry industry and for forest fuel management in particular.

Research is being conducted firstly in order to increase the production of biomass in forests and secondly to develop and improve, from a technical/economic perspective, systems for managing forest residues (branches, tops and stumps). From a sustainability perspective, the need to take into consideration biological diversity and the necessity to introduce ash that is associated with an increase in the extraction of tree biomass such as forest residues (branches, tops and stumps), should be highlighted.

– **Impact on other sectors:**

a) How will the impact of energy use of biomass on other sectors based on agriculture and forestry be monitored? What are these impacts? (If possible, please also provide

information on quantitative effects.) Is the monitoring of these impacts planned in the future?

The cultivation of specific energy crops and the use of traditional agricultural crops for energy purposes currently equates to approximately 5% of the total cultivated land area in Sweden. Up to now Sweden has not had any cause to fear any potential negative effects outweighing the positive effects of agriculture gaining an additional consumer. It is hoped by Sweden that the increased use of biofuels in the long term, will include fuels produced from raw materials other than traditional food crops.

The consumption of roundwood, by-products, deforestation residues, etc. by the forestry and energy industries is being continually monitored in Sweden in order to ascertain the impact of an increased consumption of tree biomass on these industries.

The tree biomass that is used for energy purposes currently largely consists of solid by-products from the forestry industry (such as bark and sawdust), deforestation residues such as branches and tops, low-quality roundwood and liquid by-products from the forestry industry such as black liquor and crude tall oil. Forest residues (tops and branches) are not used as raw materials by the traditional forestry industry. However, should the consumption of roundwood increase significantly within the energy sector, there is a risk, with the current consumption of raw materials within the forestry industry, of future shortages.

It can be assumed that the consumption of biomass within the energy sector will increase both in Sweden and in particular in Europe (EU)[85] in the future. This may result in synergies between the traditional industries and the bioenergy system. The forestry industry could find a market for biomass that was previously left as residues and sawmills could achieve higher incomes from sawdust, bark, etc. At the same time an increase in demand and solvency on the part of bioenergy could lead to competition over pulpwood and thereby contribute to higher prices even on the biomass that will be used for industrial purposes (e.g. raw materials for the forestry industry).

The downturn in the global economy during the course of 2009 led to a reduced demand for round wood to be used for pulp in conjunction with an increase in the demand for biofuel. This resulted in an equalisation in the price difference between the ranges and the use of comparatively large quantities of round wood for energy purposes. There are concerns that this shift in ranges could become constant as the demand for biofuels increases as a consequence of the fulfilment of Sweden and the EU's energy targets.

There are no available studies into how an increased need for biomass for energy purposes in other EU Member States will impact upon the Swedish forestry industry and also the raw material supply and competitive position of the energy industry. How the need for biomass for renewable raw materials for industry, as a replacement for fossil-based raw materials, will impact upon the total picture of the production of biomass for different purposes also needs to be studied.

A more in-depth study of how Sweden's end use of renewable energy will be affected if the production of wood pulp decreases in Sweden. Since the forestry industry is a major

[85] European Parliament and Council Directive 2009/28/EG om främjande av användningen av energi från förnybara energikällor (on the promotion of the use of energy from renewable sources).

consumer of renewable energy, this also has a bearing on how Sweden will be able to fulfil its target of 49% renewable energy in its end use.

b) What kind of development is expected in other sectors based on agriculture and forest that could have an impact on the energy use? (E.g. could improved efficiency/productivity increase or decrease the amount of by-products available for energy use?)

The provision of by-products and residues to be used as, for example, energy, will enhance the financial situation of companies within both the forestry industry and the agriculture/food industry.

Improved productivity would increase the amount of residues, which in turn could be used to produce bioenergy based on domestic biomass.

The forestry industry is continually working with energy-saving methods. The industry is also continually striving to improve the utilisation of raw materials. Increased efficiency in the utilisation of raw materials in the main process could lead to lower by-product yields, for example in saw mills where increased saw yield (e.g. using thinner blades) leads to lower yields of sawdust, which is the raw material for pellets. The optimisation of processes often results in a decreased consumption of raw materials for the main product and therefore less by-products.

4.7 Planned use of statistical transfers between Member States and planned participation in joint projects with other Member States and third countries

4.7.1 Procedural issues

a) Describe the national procedures (step by step) established or to be established, for arranging a statistical transfer or joint project (including responsible bodies and points of contact).

It is too early for the Government to be able to describe this procedure (step by step).
During the course of May 2010 the Swedish Energy Agency reported on some of the assignment to investigate the design and analyse the consequences of an expanded electricity certificate market, etc.(Doc. No. 2010/773/E). The interim report contains an analysis of the opportunities and limitations of the collaborative mechanisms, how the collaborative mechanisms could operate in parallel with the electricity certificate scheme and how the conditions are changing for offshore wind power in the Swedish economic zone. The reports show in broad terms various alternatives for arranging a transfer of statistics and joint projects. The Swedish Energy Agency will report on other parts of the assignment concerning, inter alia, a joint electricity certificate scheme with Norway on 15 September 2010. The Government intends to submit the document for consideration during autumn 2010.

The Swedish Energy Agency has been appointed by the Government to be the national point of contact regarding concerted action for the Renewable Energy Directive. The concerted action project is expected to formally commence during autumn 2010 and its work will be conducted into, inter alia, collaborative mechanisms.

It is the opinion of the Government that work should also continue within the framework of the Nordiska ministerrådet (the Nordic Council of Ministers) into devising methods and guidelines for the application of the collaborative mechanisms. Nordiska ministerrådet (the Nordic Council of Ministers) decided in the work programme for the working group for renewable energy for 2010 to develop a two-year project (2010 and 2011) in order to take a closer look at the Nordic Region as a "Testing Ground". The goal of the project is to build capacity, competence and a common understanding for the collaborative mechanisms for renewable energy by devising potential methods and guidelines for the application of the collaborative mechanisms.

The Swedish Energy Agency is the energy agency responsible for reporting statistics and should therefore be the point of contact as regards renewable energy statistics statements for Eurostat.

b) Describe the means by which private entities can propose and take part in joint projects either with Member States or third countries.

Joint projects may be freely proposed, but there are currently no specified methods for how private entities may propose and take part in joint projects with Member States or third countries.

c) Specify the criteria for determining when statistical transfers or joint projects are to be used.

No such criteria have yet been devised.

d) What mechanism will be used to involve other interested Member States in a joint project?

No decision has been reached concerning such mechanisms.

e) Are you willing to participate in joint projects in other Member States? How much installed capacity/electricity or heat produced per year are you planning to support? How do you plan to provide support schemes for such projects?

It is the opinion of the Government that on the basis of the forecast reported in this action plan there is no need to participate in joint projects in other countries in order to fulfil either the national target of at least 50% renewable energy or the Swedish target under the Directive of 49% renewable energy by 2020. The forecast also shows that Sweden will exceed these targets according to the indicative trajectory up until 2020.

4.7.2 Estimated excess production of energy from renewable source compared to the indicative trajectory that could be transferred to other Member States

Please use Table 9 to enter the required information.

4.7.3 Estimated potential for joint projects

a) In which sectors can you offer renewable energy use development in your territory for the purpose of joint projects?

This has not yet been determined.

b) Has the technology that needs to be developed been specified? How much installed capacity/electricity or heat produced per year?

No, neither the specification of technology "that needs to be developed" or the quantification of volume. However, Sweden has a planning framework (physical and other planning-related

conditions) for wind power of 30 TWh of which 10 TWh will be offshore by 2020. According to the Swedish Energy Agency's forecast, Sweden will achieve just over 12 TWh wind power by 2020, which will be exclusively land-based.

c) How will sites for joint projects be identified? (For example, can local and regional authorities or project managers recommend sites? Or can any project participate regardless of its location?)

The Government has not reached a final decision in this matter. Investment will be generally driven by the market operators. The methods for identifying projects are not clear.

d) Are you aware of the potential for joint projects in other Member States or in third countries? (In which sector? How much capacity? What is the planned support? For which technologies?)

No, not at present.

e) Do you have any preference to support certain technologies? If so, which?

No, Sweden employs a general support system for the promotion of renewable electricity, the electricity certificate scheme. See the answer to Question b).

The connection with/difference to the electricity certificate scheme needs to be further investigated.

4.7.4 Estimated demand for energy from renewable source from sources other than domestic production

Please use Table 9 to enter the required information.

Table 9: Estimated excess and/or deficit in the production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States in [Member State] (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimated excess in the forecast document	162	194	227	259	291	324	356	389	421	453	486
Estimated excess in NREAP	162	194	227	259	291	324	356	389	421	453	486
Estimated deficit in the forecast document											
Estimated deficit in NREAP											

5 Assessments

5.1 Total contribution expected of each renewable energy technology to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable sources in electricity, heating and cooling and transport

The figures in Tables 10a and 10b are the Swedish Energy Agency's forecast and are consistent with the forecast that was submitted in accordance with Article 4(3) of the Renewable Energy Directive in December 2009. The forecast is based on model calculations with 2002 as their base year. After this the models forecasts outcomes for 2009, 2016 and 2023. Forecasts for other years are interpolated. The model that is used for the forecast calculations, the MARKAL-NORDIC model, has its strength in its long-term perspective. Therefore the forecast for the next few years may deviate from the actual outcome. In the model the distribution of the production between the different technologies is based on cost optimisation. The forecast is based on the target for the electricity certificate scheme of 25 TWh of new production eligible for certificates by 2020 compared with 2002 being reached. The contribution of the individual technologies in meeting this target is calculated in the model on the basis of assessed production costs and may therefore be revised in future forecasts. In the forecast no assessments have been made for small-scale hydroelectric power, pumping power, biogas or liquid biofuels. This is not considered to have a negative effect on target fulfilment but is rather a conservative assumption. As regards Table 11 for heating and cooling, no assessments have been made for solar heating or liquid biofuels. This is not considered to have a negative effect on target fulfilment but is rather a conservative assumption.

Table 10.a: Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology in Sweden to meet the binding 2020 targets and follow the indicative trajectory for the shares of energy from renewable resources in electricity 2010-2014

	2005		*2010*		*2011*		*2012*		*2013*		*2014*	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Hydroelectric power[1]:	16 345	72 874	16 350	71 249	16 351	70 924	16 352	70 600	16 353	70 275	16 354	69 950
1MW	*140*	*458*	*140*	*458*	*140*	*458*	*140*	*458*	*140*	*458*	*140*	*458*
1MW–10 MW	*765*	*3 027*	*765*	*3 027*	*765*	*3 027*	*765*	*3 027*	*765*	*3 027*	*765*	*3 027*
10MW	*15 397*	*69 318*	*15 402*	*67 693*	*15 403*	*67 368*	*15 404*	*67 043*	*15 405*	*66 718*	*15 406*	*66 394*
Of which is pumped	*43*	*71*	*43*	*71*	*43*	*71*	*43*	*71*	*43*	*71*	*43*	*71*
Geothermal energy:	-	-	-	-	-	-	-	-	-	-	-	-
Solar energy:	4.0	0.1	5.3	1.4	5.6	1.7	5.9	1.9	6.1	2.2	6.4	2.4
Photovoltaic cells	*4.0*	*0.1*	*5.3*	*1.4*	*5.6*	*1.7*	*5.9*	*1.9*	*6.1*	*2.2*	*6.4*	*2.4*
Concentrated solar power	-	-	-	-	-	-	-	-	-	-	-	-
Tide. wave and ocean energy	-	-	-	-	-	-	-	-	-	-	-	-
Wind power:	536	939	1 873	4 793	2 141	5 564	2 408	6 334	2 675	7 105	2 943	7 876
Onshore	*513*	*877*	*1 797*	*4 585*	*2 054*	*5 326*	*2 311*	*6 068*	*2 568*	*6 809*	*2 824*	*7 551*
Offshore	*23*	*62*	*76*	*208*	*87*	*237*	*97*	*266*	*108*	*296*	*118*	*325*
Biomass:	2 568	7 506	2 683	10 567	2 706	11 179	2 730	11 791	2 753	12 403	2 776	13 016
Solid	*2 526*	*7 452*	*2 641*	*10 513*	*2 664*	*11 126*	*2 688*	*11 738*	*2 711*	*12 350*	*2 734*	*12 962*
Biogas	*42*	*53*	*42*	*53*	*42*	*53*	*42*	*53*	*42*	*53*	*42*	*53*
Liquid biofuels[86]	-	65	-	65	-	65	-	65	-	65	-	65
TOTAL	**19 453**	**81 384**	**20 912**	**86 675**	**21 204**	**87 734**	**21 496**	**88 792**	**21 787**	**89 850**	**22 079**	**90 908**
Of which in cogeneration		*7 571*	*-*	*10 632*	*-*	*11 244*	*-*	*11 856*	*-*	*12 468*	*-*	*13 080*

[1] 2005 was a wet year with unusually high production of electricity by hydroelectric power while the forecast assumes a normal year with lower production. This is why hydroelectric power appears to have reduced production with a slight increase in the installed power output. Table

[86] Take into account only those complying with the sustainability criteria (cf. Article 5(1) last subparagraph of Directive 2009/28/EC).

10.b: Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology in Sweden to meet the binding 2020 targets and follow the indicative trajectory for the shares of energy from renewable resources in electricity 2015-2020

	2015		***2016***		***2017***		***2018***		***2019***		***2020***	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Hydroelectric power[1]:	16 355	69 625	16 356	69 300	16 357	68 975	16 358	68 650	16 359	68 325	16 360	68 000
1MW	*140*	*458*	*140*	*458*	*140*	*458*	*140*	*458*	*140*	*458*	*140*	*458*
1MW-10 MW	*765*	*3 027*	*765*	*3 027*	*765*	*3 027*	*765*	*3 027*	*765*	*3 027*	*765*	*3 027*
10MW	*15 407*	*66 069*	*15 408*	*65 744*	*15 409*	*65 419*	*15 410*	*65 094*	*15 411*	*64 769*	*15 412*	*64 444*
Of which is pumped	*43*	*71*	*43*	*71*	*43*	*71*	*43*	*71*	*43*	*71*	*43*	*71*
Geothermal energy:	-	-	-	-	-	-	-	-	-	-	-	-
Solar energy:	6.7	2.7	6.9	3.0	7.2	3.2	7.5	3.5	7.7	3.7	8.0	4.0
Photovoltaic cells	*6.7*	*2.7*	*6.9*	*3.0*	*7.2*	*3.2*	*7.5*	*3.5*	*7.7*	*3.7*	*8.0*	*4.0*
Concentrated solar power	-	-	-	-	-	-	-	-	-	-	-	-
Tide, wave and ocean energy	-	-	-	-	-	-	-	-	-	-	-	-
Wind power:	3 210	8 646	3 478	9 417	3 745	10 188	4 012	10 959	4 280	11 729	4 547	12 500
Onshore	*3 081*	*8 292*	*3 338*	*9 034*	*3 595*	*9 775*	*3 852*	*10 517*	*4 108*	*11 258*	*4 365*	*12 000*
Offshore	*129*	*354*	*140*	*383*	*150*	*412*	*161*	*442*	*171*	*471*	*182*	*500*
Biomass:	2 799	13 628	2 822	14 240	2 845	14 852	2 868	15 464	2 891	16 077	2 914	16 689
Solid	*2 757*	*13 574*	*2 780*	*14 187*	*2 803*	*14 799*	*2 826*	*15 411*	*2 849*	*16 023*	*2 872*	*16 635*
Biogas	*42*	*53*	*42*	*53*	*42*	*53*	*42*	*53*	*42*	*53*	*42*	*53*
Liquid biofuels	-	65	-	65	-	65	-	65	-	65		65
TOTAL	**22 371**	**91 966**	**22 662**	**93 025**	**22 954**	**94 083**	**23 246**	**95 141**	**23 538**	**96 199**	**23 829**	**97 258**
Of which in cogeneration	-	*13 693*	-	*14 305*	-	*14 917*	-	*15 529*	-	*16 141*		*16 754*

[1] 2005 was a wet year with unusually high production of electricity by hydroelectric power, whereas the forecast assumes a normal year with lower production. This is why hydroelectric power appears to have reduced production with a slight increase in the installed power output.

Table 11: Estimation of total contribution (final energy consumption [87]) expected from each renewable energy technology in [Member State] to meet the binding 2020 targets and follow the indicative trajectory for the shares of energy from renewable sources in <u>heating and cooling</u> 2010-2020 (ktoe)

	2005	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	2018	*2019*	*2020*
Geothermal (excluding low temperature geothermal heat in heat pump applications)												
Solar energy	6	6	6	6	6	6	6	6	6	6	6	6
Biomass:	7013	7817	7978	8139	8300	8461	8622	8783	8943	9104	9265	9426
Solid	6992	7800	7961	8123	8284	8446	8607	8769	8930	9092	9254	9415
Biogas	21	17.5	16.9	16.2	15.6	14.9	14.3	13.7	13.0	12.4	11.8	11
Liquid biofuels[88]	65	65	65	65	65	65	65	65	65	65	65	65
Renewable energy from heat pumps:	0	349	418	488	558	627	697	767	837	906	976	1046
- of which aerothermal (air heating)	0	50	60	70	80	90	100	110	120	130	140	150
- of which geothermal (ground heating)	0	272	326	381	435	489	544	598	652	707	761	815
Of which hydrothermal (water-borne heating)	0	27	32	38	43	48	54	59	64	70	75	80
TOTAL	7084	8237	8467	8698	8929	9159	9390	9620	9851	10082	10312	10543
Of which district heating[89]	2505	2717	2759	2802	2844	2886	2929	2971	3014	3056	3098	3141
Of which domestic biomass[90]	1043	1089	1098	1107	1116	1125	1134	1143	1153	1162	1171	1180

87 Direct use and district heating as defined in Article 5(5) of Directive 2009/28/EC.

88 Take into account only those complying with the sustainability criteria (cf. Article 5(1) last subparagraph of Directive 2009/28/EC).

89 District heating and/or cooling from total renewable heating and cooling consumption. (Renewable energy sources– district heating)

90 From the total renewable heating and cooling consumption.

Table 12: Estimation of total contribution expected from each renewable energy technology in Sweden to meet the binding 2020 targets and follow the indicative trajectory for the shares of energy from renewable sources in the <u>transport sector</u> 2010-2020 (ktoe)[91]

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bioethanol/bio-ETBE (ethyl-tertio-butyl-ether)	144	251	273	294	315	337	358	379	401	422	443	465
Of which biofuel[92] Article 21(2)	0	0	0	0	0	0	0	0	0	0	0	0
Of which imported[93]	117	140	161	121	143	164	185	207	228	249	271	292
Biodiesel	9	89	105	122	138	154	170	186	202	219	235	251
Of which biofuel[94] Article 21(2)	0	0	0	0	0	0	0	0	0	0	0	0
Of which imported[95]	0	0	0	0	0	0	0	0	0	0	0	0
Hydrogen from renewable energy sources	0	0	0	0	0	0	0	0	0	0	0	0
Renewable electricity	121	147	152	157	162	168	173	178	183	188	193	198
Of which road transport	0	3	4	4	5	5	6	6	7	8	8	9
Of which non-road transport	121	144	149	153	158	162	167	171	176	180	185	190
Others (e.g. biogas, vegetable oils, etc.) - please specify.	13	40	46	51	56	62	67	73	78	83	89	94
Of which biofuel[96] Article 21(2)	13	40	46	51	56	62	67	73	78	83	89	94
TOTAL	288	528	579	624	672	720	768	816	864	912	960	1008

<u>Assumptions and clarifications regarding Table 12:</u>

The figures are only forecast for 2020. The years between 2005 are only interpolerisations of the values for 2005 and 2020.

No ethanol or FAME is assumed to come from prioritised raw materials.

The imported quantity of ethanol for 2005 is an estimation based on the assumption that Agro-ethanol produced around 55,000 m3. For 2010 it is assumed that Agro-ethanol will produce ethanol at full capacity in Norrköping (210,000 m3). In 2012 it is assumed that Nordisk Etanolproduktion will start production at full capacity in Karlshamn (130,000 m3). Between 2012 and 2020 it is assumed that the total domestic production will be constant (i.e. 340,000 m3). The remainder will be imported (from other EU Member States or from countries outside of the EU).

Please note that this table does not reflect how great a proportion of the raw materials for the biofuels are imported but instead only the quantity of finished

91 For biofuels take into account only those compliant with the sustainability criteria (cf. Article 5(1) last subparagraph).

92 Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

93 From the whole amount of bioethanol/bio-ETBE.

94 Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

95 From the whole amount of biodiesel.

96 Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

biofuels that is coming in. The raw materials for domestic production may therefore be imported.

The line “other” only includes biogas and all biogas is assumed to come after prioritised raw materials.

5.2 Total contribution expected from energy efficiency and energy saving measures to meet the binding 2020 targets and the indicative trajectory that are applicable until further notice for the shares of energy from renewable resources in electricity, heating and cooling and transport.

The answer to this requirement should be included in Table 1 of Chapter 1.

The Swedish Energy Agency’s forecast for the additional energy efficiency scenario does not fully take into account all of the energy efficiency measures that will be implemented between 2009 and 2020 since the Agency bases its forecasting methodology on decisions that have already been reached on instruments and measures. Furthermore, many of the conditions for the forecast were set both prior to the economic crisis and prior to the Government’s increased investment in energy efficiency was known.

However, the reference scenario, which will attempt to exclude all energy efficiency investment from 2009, will result in very high total energy consumption. Table 1 shows the differences.

The Swedish Energy Agency has therefore carried out a single calculation example that is based on maintained total energy consumption (the 2005 level). In the calculation example only the denominator is changed, while the numerator (i.e. the renewable energy consumed) is kept constant for the respective sectors. It is of course a gross simplification, but the outcome in renewable shares for the sectors can illustrate the importance of energy efficiency as a means of achieving targets for renewable energy.

Table: Single calculation example of the effect on the share of renewable energy with changes in the final consumption (here final consumption is given in TWh)

Extra energy efficient (as in Table 1)	***2020***		***2020 (TWh)***
Share of renewable energy sources	50.2 %	Total final energy consumption	456
Renewable energy sources in heating and cooling	62.1 %	Total consumption in heating and cooling	197
Electricity generation from renewable sources	62.9 %	Total electricity consumption	154
Renewable energy sources in transport	13.8 %	Total consumption within the transport sector	94

Reference scenario (as in Table 1)	***2020***		***2020 (TWh)***
Share of renewable energy sources	44.5 %	Total final energy consumption	516
Renewable energy sources in heating and cooling	53.7 %	Total consumption in heating and cooling	228
Electricity generation from renewable sources	55.8 %	Total electricity consumption	174
Renewable energy sources in transport	12.6 %	Total consumption within the transport sector	103

Maintained energy consumption (the 2005 level)	***2020***		***2020 (TWh)***
Share of renewable energy sources	52.5 %	Total final energy consumption	436
Renewable energy sources in heating and cooling	64.8 %	Total consumption in heating and cooling	189
Electricity generation from renewable sources	64.4 %	Total electricity consumption	151
Renewable energy sources in transport	14.9 %	Total consumption within the transport sector	87

5.3 Impact assessment (Optional)

Table 13: Estimated costs and benefits of the renewable energy policy support measures:

Measure	Expected renewable energy consumption (ktoe)	Expected cost (in Euro) – specify timeframe	Expected reduction in greenhouse gas emissions per gas (tonnes/year)	Expected number of jobs created

5.4 Preparation of the National Renewable Energy Action Plan and the follow-up of its implementation

a) **How were regional and/or local authorities and/or cities involved in the preparation of this Action Plan? Were other stakeholders involved?**

The Government gave the Swedish Energy Agency the task of devising a basis for the National Renewable Energy Action Plan. The Swedish Energy Agency has employed a broad consultation procedure in devising the basis for the Action Plan. The Government has considered the majority of the authority investigations that were conducted between 2009 and 2010. The organisations that were invited to participate in consultation with the Swedish Energy Agency included the county administrative boards, represented by Länsstyrelsen i Dalarna (the County Administrative Board of Dalarna) and Sveriges Kommuner och Landsting (SKL) (.

In addition to aforementioned authorities with whom the Swedish Energy Agency consulted, most of the relevant industry organisations have also contributed by providing the Swedish Energy Agency with data. Around 40 individuals from different authorities and organisations attended a hearing that was held on 11 January 2010.

The Government referred the documentation submitted by the Swedish Energy Agency for consideration with 93 bodies on 1 February 2010. Replies to this were received during April 2010. 70 of these bodies have replied. A compilation of referrals submitted for consideration is available from Näringsdepartementet (the Ministry of Enterprise, Energy and Communications) (N2010/742/E). A further three bodies have on their own initiative provided their opinions.

During its consideration of the documentation provided by the Swedish Energy Agency a meeting was held with the Swedish representatives of the REPAP2020 (Renewable Energy Policy Action Paving the Way towards 2020) project.

b) **Are there any plans to develop regional/local renewable energy strategies? If so, could you please explain these in greater detail? If relevant powers have been delegated to regional/local levels, what mechanism will ensure national target compliance?**

The county administrative boards are responsible for devising regional energy and climate strategies. These also include renewable energy. At a

local level a large majority of the country's municipalities are working on these issues. See also the reply under, inter alia, Point 4.2.3.

c) Please explain the public consultation procedure carried out for the preparation of this Action Plan.

See reply above.

d) Please indicate your national point of contact/the national authority or organisation responsible for the follow-up of the Renewable Energy Action Plan?

The Swedish Energy Agency has been given the task of having overall responsibility for preparing documentation in accordance with the Renewable Energy Directive.

e) **Do you have a monitoring system, including indicators for individual measures and instruments, to follow-up the implementation of the Renewable Energy Action Plan? If so, could you please describe it in greater detail?**

The majority of instruments and measures are regularly followed-up in the annual budget process and through assignments given to competent authorities, to Statskontoret (the Swedish Agency for Public Management) or on the initiative of Riksrevisionen (the Swedish National Audit Office).

Following-up developments in the energy sector and associated statistics is the responsibility of the Swedish Energy Agency. The EC energy statistics ordinance also regulates the transfer of statistics to Eurostat. The Swedish Energy Agency has also the annual recurrent task of devising indicators for the energy sector. See for example Energiindikatorer (Energy indicator) 2008, ET 2008:08, which had the theme of renewable energy.