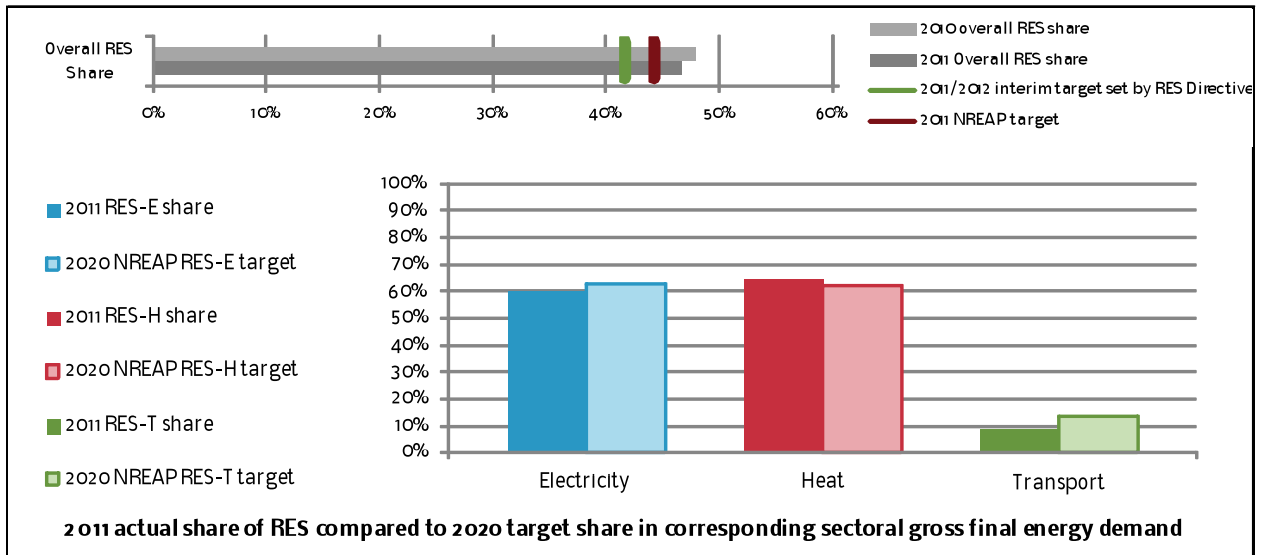


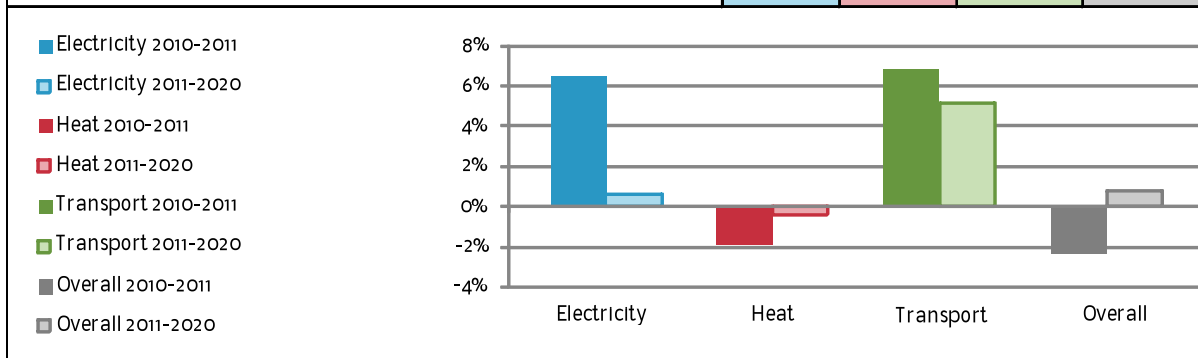


J. SWEDEN

1. NATIONAL DEVIATIONS REPORT



	Electricity	Heat	Transport	Total
2011 actual share of RES in sectoral gross final energy demand	59.6%	64.5%	8.8%	46.8%
2011 NREAP target	55.7%	57.6%	8.1%	44.2%
2011/2012 Interim target set by RES Directive	-	-	-	41.6%
2020 NREAP target	62.9%	62.1%	13.8%	50.2%
Percentage of sector consumption in total final energy consumption in 2011	37%	36%	26%	99%
2011 Production [ktoe]	7,331	8,196	550	16,077
2010 Production [ktoe]	7,247	9,878	491	17,615
2005 Production [ktoe]	6,980	7,608	0	14,588
2020 NREAP target production [ktoe]	8,356	10,543	1,008	19,709
Deviation [%] of actual from planned share in 2011	7.03%	12.04%	8.64%	5.83%



- Sweden is well on track, even though its RES share has decreased slightly since last year. It achieves both its 2011/2012 interim target and its NREAP 2011 target.
- The overall growth of RES slowed down from 2010 to 2011 compared to the prior 6-year average due to deceleration in the heat sector.
- The overall negative growth rate needs to be reversed, but preliminary statistics for 2012 show that this is the case.



2. NATIONAL BARRIERS REPORT

The Swedish RES-E Sector

Support schemes

In Sweden renewable electricity is supported through a quota system. This scheme obliges energy suppliers to prove that a certain amount of the electricity supplied by them was generated from renewable energy sources. Energy suppliers shall provide this evidence by presenting tradable certificates allocated to the producers of electricity from renewable sources.

Apart from that electricity generated from wind energy is eligible for tax privileges consisting in a reduction of the real estate tax, and a reduction of the energy tax. Furthermore Sweden grants subsidies for photovoltaic installations.⁸⁶

Barriers to RES-E

Low profitability of RES-E investments

The most severe obstacle for the deployment of renewable energy sources in electricity sector is the existing **support scheme of quota system with tradable green certificates, which is regarded as insufficient**. It hampers the ability and willingness to increase the production of electricity. The possible investors are reluctant to start an investment in new RES-E installations because the profitability is too low. This barrier concerns all RES-E technologies. However, especially the development of smaller, not market-mature technologies is hindered.

The quota system as the one used in Sweden has been considered as not as effective as the feed-in system used in e.g. Germany and Finland. The system has led to a rapid expansion for some years but it supports primarily big investors and only the market-mature technologies like on-shore wind. The low level of the financial support and its incalculability constitute a substantial barrier for smaller and medium-sized enterprises, which are willing to invest in renewable energy. Moreover new technologies, which are not yet market-mature, have little chance of development in country using quota system as a support scheme. Above all, it is difficult to obtain bank loans for investment in facilities that produce renewable energy, as one cannot predict the value of the certificates in the future.

The Swedish government is not willing to change the support scheme, mostly because of its emphasis on nuclear power, which already delivers 40% of electricity in Sweden and in the next years will be developed even further (Bryntse, Karlsson, SERO).

The insecurity of the investment into RES is even higher because of the **low price of electricity** on the energy market. The surplus of electricity caused by a high share of nuclear power contributes to decrease of the price of electricity power in Sweden. The RES-E plant operators receive on one hand money for the electricity they sell at the market and on the other hand the revenues from selling the green certificates. The low price of electricity at the market combined with the insecurity of the certificate price (barrier already described above) hinders investments in renewable electricity sector. Also this barrier concerns all RES-E technologies (Persson, Bryntse, SERO).

Military resistance to wind turbines

Another barrier concerns only wind energy plants, both on-shore and off-shore. Obstacle is caused by the Swedish Armed Forces, which believe that wind turbines may interfere with the JAS aircraft. Affected is around 50% of Sweden's total area. The concerned part is the southern part of Sweden, which is the area with most cities and industries - the electricity consumers. The expansion of wind turbines in southern Sweden is severely hampered (Bryntse, SERO).

Costs for small-scale electricity producers

The small-scale electricity producers can use the electricity they generated without additional costs (e.g. tax on electricity) only if the electricity is used directly. In Sweden there is no net-metering scheme in place, so if an electricity producer does not use the whole produced electricity directly, he cannot feed it into the grid and use its

⁸⁶ Source: RES LEGAL Europe (<http://www.res-legal.eu>)



equivalent at any other time without paying additional costs of sales tax, energy tax and certificate fee. Additionally if the small-scale electricity producer generates more electricity in a year than he consumes he should also pay an additional measurement cost (Jansson, Swedenenergy; Ehrenberg, Egen EI).



The Swedish RES-H Sector

The small scale market (single family houses) uses a lot of electric heating and heat-pumps. Furthermore 10% of small houses are connected to district heating (DH) network.

In the bigger buildings market (i.e. apartment and office buildings) almost all buildings are connected to DH-network. District heating plants are combined heat and power plants (CHP). In these plants more than 70% of used fuels is biomass (solid biofuel, biooils, pallets). Some of the others also use waste heat from industry. Only 5% of district heating plants use fossil fuels.

In the total heating market, around 50% comes directly (e.g. heat-pumps) or indirectly (DH) from bioenergy.

Support schemes

Renewable energy sources used for heating purposes are supported through numerous tax exemptions. First of all renewable energy sources are exempt from energy, carbon dioxide and nitrous oxide taxes. Furthermore the installation of renewable energy devices and the replacement of conventional heating sources with renewable ones may be deducted from tax for households.⁸⁷

Barriers to RES-H

Electricity as heating source

The most severe barrier to deployment of renewable energy sources in heating sector is the electric heating, which is used in small scale market (single family houses). The introduction of this kind of heating occurred in the 1980s and 1990s when Sweden developed a lot of nuclear power plants. Almost all single family houses come from that period. Since there is a surplus of electricity in the country, the price of the power is very low. It is therefore very hard to convince house owners to change the heating system in their houses. Some owners of the houses, where the electric heating is spread in the house using water pipelines, decided to change the heating source into heat-pumps. But if the house is heated with electric radiators, there are only two ways to change the heating system for the one using renewable energy sources. You can either put a small pallet oven in a living room or to put water piping in the house. The first solution is based on air heating, which is very limited and may require using another heating source in the other rooms. The second option - putting water piping in the house - is a very expensive option. The government awarded investment grants for that purpose, but these have been put on hold, because of the political decision on not phasing out the nuclear power plants in Sweden (Andersson, Svebio).

Prohibition on heat pumps in some municipalities

This barrier does not really constitute an obstacle for usage of renewable energy sources in the heating sector, but rather favours one type of heating system (district heating) over another (heat-pumps).

Some municipalities in Sweden force property owners to connect their houses to the district heating network and thus prevent the property owner from installing heat pumps. House owners are hindered in installing heat pumps, as they are forced to invest in a district heating connection, even if they do not intend to use that it. The reason for that is that some municipalities believe that heat pumps not as environmentally friendly compared with district heating. However, this situation is relatively rare and occurs only in a few municipalities.

Energy Agency and the Environmental Court have already acted in the problem. According to a ruling of the Environmental Court, a heat pump installation cannot be considered as less environmentally friendly than district heating (Forsén, SVEPINFO).

⁸⁷ Source: RES LEGAL Europe (<http://www.res-legal.eu>)



The Swedish RES-T Sector

Support schemes

The main incentive for renewable energy use in transport is an exemption from energy and carbon dioxide taxes. The exception concerns biofuels.⁸⁸

Barriers to the transport sector

Absence of policy instruments for biofuels from 2013

In Sweden biofuels are the most important renewable energy source used in the transport sector. They are currently supported through tax exceptions. This regulation may not be continued because of the concerns from the European Commission. The Commission wants to stop this tax exception, because of the rules for state aid. As for now there is no clear information on policy instruments for biofuels after 2013. This hampers investments in new facilities producing biofuels. If this support scheme cease to exist, investments in producing biofuels will not be economically feasible any more. The Swedish market for biofuels is very uncertain right now. The state aid is still very important for the deployment of this market, since it is not mature yet. At the present state all investments in new facilities for the production of biofuels are withheld, because of this uncertainty (Andersson, SVEBIO; Johansson, Lund University).

⁸⁸ Source: RES LEGAL Europe (<http://www.res-legal.eu>)



Common barriers for the electricity, heat and transport sector

The 2020 RES target already reached

Sweden already reached its 2020 RES target of 49% in the year 2012. This success is at the same time the most severe barrier for further deployment of renewable energy sources in all energy sectors (electricity, heating & cooling and transport) in Sweden. This target has from the beginning been set too low. In fact, the share of RES was already 48% in 2009, according to the Swedish Energy Agency.⁸⁹ So there has been not enough room for the development of new RES installation. This barrier is also a cause of almost every other barrier to development of RES in Sweden.

Since the set target has been reached already 8 years before the deadline, there is no incentive for the Swedish government to invest and support the deployment of new RES investments. To get started with reasonable discussions of policy instruments for RES, as well as increased investment and technology development, the Swedish government has to raise the targets to a sensible level.

Unknown is the reason why the Swedish government set such a low target, since the RES capacity in the country is estimated at the level of 70%. As long as the government will not set new, more ambitious goal, it cannot be expected that Sweden will introduce any new encouraging policies, support schemes or development programmes. It may also mean that the government will not intend to make much effort to solve the issues that are barriers to RES today (Mattison, SERO).

Insufficient financial support

Clear consequence of the barrier described above are insufficient financial support schemes for new renewable energy investments. This barrier will be described more detailed in the sector specific paragraph (Bryntse, Danielsson, SERO).

⁸⁹ Source: European Renewable Energy Council: Mapping Renewable Energy Pathways towards 2020.



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