

Residential Prosumers in the European Energy Union

EAHC/2013/CP/04

Mapping the legal and regulatory framework in the 28 Member States, Iceland and Norway

Sweden



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National report on the regulatory framework for residential prosumers: Sweden

General Description of the national legal and regulatory framework

General

Structure of the electricity system

In Sweden, electricity is transported from the major power stations to the regional electricity grids (40–130 kV) via the national grid (220 kV and 400 kV). From the regional grids, electricity is transported via local grids (40 kV or less) to the electricity consumers. The voltage in the wall sockets in Sweden is 230 V.

The backbone of the electrical grid, the national grid, is owned by the government and managed by the Swedish National Grid (*Svenska Kraftnät*), whereas power utility companies own the regional and local grids. The Energy Markets Inspectorate (*Energimarknadsinspektionen*) is the regulatory authority over the electricity market. Since the grid is a monopoly, there is only one network owner in each area that is licensed.

The base price of the electricity is daily set by the Nordic electricity retailing market, Nord Pool. Electricity trading companies then use this price as basis for their pricing in the competition for customers. The Swedish electricity market was deregulated in 1996, which resulted in that the customers could change their electricity supplier more easily.

There are about 120 electricity trading companies and 160 grid owners. However, the Swedish market is dominated by three companies; Vattenfall, Fortum and E.ON, that are all active in all of three sub markets; generation, transmission and retailing, and therefore have a big influence on the overall electricity market.

1. What types of residential prosumers are there in your country on the basis of type of RES used and size of the installation?

Answer:

There is no official information on the number of prosumers in Sweden. However, some information may be derived from the database on electricity certificates ¹. However, it should be borne in mind that consumers and households can also choose not to apply for these green certificates and may prefer that in order to avoid taking on the administrative duties attached to the system. Therefore the electricity certificate database is likely not to contain information on all prosumers.

Based on a preliminary estimate of the list of approved installations with an electricity certificate, filtered for installations owned by private persons, with installed power of <225 kW for solar energy and <125 kW for wind power, the overwhelming majority (over 3000 vs less than 70) of the installations on the list are for solar power. A very small number (1-10) of installations on the list, owned by private persons and with less than 50 kW, are reported as based either on water or on biomass, peat or fossil fuels.

¹ Approved installations for the allocation of an electricity certificate (13 January 2017), available at: <http://www.energimyndigheten.se/fornymarknadsstatistik/>.

2. What is the institutional framework & division of competences regarding residential prosumers in your country?

Answer:

The Swedish Energy Markets Inspectorate (*Energimarknadsinspektionen* or *Ei*) is a government authority responsible for monitoring the energy markets and the monopolised activities of the grid operators in order to ensure reasonable fees and a good quality of supply. Homeowners can also apply to Ei for an assessment of the connection fee in relation to connecting one's house to the electricity grid, if the fee is considered as unjustified. Ei also supervises the compliance of electricity and gas markets with the laws and regulations, considers and issues network concessions to construct and run electricity and gas grids, proposes legislative changes and possible ways to develop the energy markets. In addition, Ei provides consumer information and a price comparison site for electricity supply offers at elpriskollen.se.

The Swedish Consumer Agency (KoV) is a government authority responsible for consumer markets. With regard to the electricity and gas markets, including district heating, KoV audits the marketing of companies for misleading advertisement and checks the contracts used by companies in order to prevent unfair treatment of consumers. Consumers can report companies to KoV for misleading or aggressive marketing, unreasonable contractual terms or insufficient price information. KoV has also negotiated, together with representatives of the electricity and gas industry, a number of agreements applying to companies when selling electricity and gas to their clients. These include general contractual terms and conditions for both the electricity and gas industries and guidelines for direct sales in the electricity industry.

The Swedish Consumer Energy Markets Bureau is an independent agency providing information, advice and guidance in electricity and gas market matters (including the market for district heating), free of charge. The authorities on the board are the Swedish Consumer Agency, Ei, the Swedish Energy Agency, while the industry associations on the board are Swedenergy, the Swedish Gas Association and the Swedish District Heating Association. Consumers can contact the Bureau for questions or complaints regarding invoices or other consumer matters, for information regarding contracts, current prices and price trends, debiting, changing electricity or gas suppliers, contract formats, laws and contractual terms and conditions.

The Swedish Energy Agency is a government authority whose goal is to create conditions for efficient and sustainable energy consumption as well as a cost-efficient and secure energy supply. It is intended to assist the industry and the public sector in reaching the objectives set by the Swedish *Riksdag* for more efficient energy consumption and a growing proportion of renewable energy. Being the expert authority on wind power, the Agency has been commissioned by the government to promote a substantial expansion of Swedish wind power. In addition, the Agency acts as the administrative authority for the supply and consumption of energy, which entails ensuring both short and long-term energy supply and promoting the entire energy sector having a sufficient ability to prevent vulnerabilities and all consumers being able to alleviate the consequences of disturbances in the energy supply.

The National Board for Consumer Disputes (ARN) is a government authority that examines disputes between electricity and gas companies and consumers, free of charge. Individual consumers involved in a dispute can submit a report to the ARN to trigger the examination of a dispute. The ARN examination is quick and easy, but still a legally secure alternative to a process in court. The ARN will not perform an investigation but it is up to the parties to submit background information to the dispute, and the Board will then base its assessment on the currently applicable law, including legislation and legal practice. The ARN only gives recommendations on how to solve the dispute. Some types of disputes the ARN will not examine, such as electricity supply matters where the dispute relates to the consumption of electrical power or the reasonability of a debited grid fee.

Svenska Kraftnät (SvK) is a state-owner public utility that acts as a Transmission System Operator. Its activities are financed through the fees paid by regional grids and major electricity producers in order to use the national grid. SvK transports electricity through the national grid where the electricity is taken from large power stations to the regional grids. **Grid operators** are responsible for the transport on the regional and local grids. SvK ensures the balance between production and consumption by monitoring the national grid. It is also the authority responsible for electricity preparedness and national dam safety.

Electricity grid operators own the electricity grid and are responsible for transporting power from the production facilities to consumers across regional and local grids. All electricity grid operators must have a network concession to construct and operate power supply lines, issued by **Ei** after an assessment. Ei also evaluates the equity of the total revenue that the grid operators may charge their clients.

Electricity suppliers with balance responsibility are electricity suppliers that have a financial responsibility to ensure the maintenance of a balance in the amount of electricity added and withdrawn at the infeed and outtake points falling under that balance responsibility. Obtaining a balance responsibility requires a contract with **SvK**. Electricity suppliers can also outsource the management of balance responsibility to other suppliers or specialised companies.²

Specific Questions on the regulatory framework for residential prosumers

3. What is the regulatory framework for residential prosumers in your country?

General

Residential prosumers largely operate within the general regulatory framework for renewable electricity producers, with some differences in taxation and permitting which are due to the small-scale nature of the electricity production by prosumers.

3.1. What is the existing legislative framework regulating Renewable Energy Projects in your country?

The relevant legal acts concerning renewable energy projects currently in force are:

- Ellag (1997/857) (Electricity Act)
- Elförordning (2013:208) (Electricity Regulation)
- Förordning (1994:1806) om systemansvaret för el (Regulation on the system responsibility for electricity)
- Förordning (2014:520) med instruktion för Statens energimyndighet (Regulation with instructions for the State's energy authority)
- Förordning (1998:899) om miljöfarlig verksamhet och hälsoskydd (Regulation on environmentally hazardous activities and health protection)
- Förordning (1998:940) om avgifter för prövning och tillsyn enligt miljöbalken (Regulation on information for testing and monitoring in accordance with the Environmental Code)
- Förordning (1999:716) om mätning, beräkning och rapportering av överförd el (Regulation on the measurement, calculation and reporting of transmitted electricity)
- Förordning (2007:215) om undantag från kravet på nätkoncession enligt ellagen (1997:857) (Regulation on exceptions from the grid concession requirement in accordance with the Electricity Act)

² A description of the general institutional framework for electricity is given in *Energimarknadsinspektionen*, Descriptions of the actors on the electricity and natural gas markets, PM 2012:07.

- Ledningsrättslag (1973:1144) (Act on rights of way)
- Miljöbalk (the Environmental Code)
- Plan- och bygglag (2010:900) (Planning and Building Act)
- Lag (2006:985) om energideklaration för byggnader (Act on the energy declaration for buildings)
- Lag (2012:838) om certifiering av vissa tjänster på energiområdet (Act on the certification of certain services in the energy sector)

Regulatory framework on incentives:

- Lag (2011:1200) om elcertifikat (Electricity Certificate Act)
- Lag (2010:601) om ursprungsgarantier för el (Act on guarantees of origin for electricity)
- Förordning (2010:853) om ursprungsgarantier för el (Regulation on guarantees of origin for electricity)
- Statens energimyndighets föreskrifter om ursprungsgarantier för el (STEMFS 2010:3) (Regulations of the State energy authority on guarantees of origin for electricity)

Regulatory framework on taxes:

Lag (1994:1776) om skatt på energi (Energy Tax Act)

Recent changes in the regulatory framework:

Since 1 January 2012, in reaction to the CJEU Case C-274/08 *European Commission v. Sweden*, the *Energimarknadsinspektionen* has regulated the revenues of electricity network companies over a four-year supervisory period. The principal rule is that revenues should cover the reasonable costs of running a network as well as provide a reasonable return on capital ³.

The framework agreement on Swedish energy policy, concluded between the government, the Moderate Party, the Centre Party and the Christian democrats in 2016, contains an overall objective of 100% renewable electricity production by 2040. It mentions the following planned measures:

- Reviewing regulations in the energy area with a view to developing the energy system based on a variety of large and small scale renewable production tailored to local and industrial needs. Energy policy should be converted from focusing almost exclusively on the amount of energy delivered (TWh) to also ensuring sufficient output (MW).
- Small-scale production of electricity: there will be an inquiry into how existing regulatory frameworks and tax legislation can be simplified and adapted to make it easier for new products and services in the areas of energy efficiency, energy storage and small-scale sales of electricity, and the electrification of the transport sector.
- Abolition of fees for marine-based wind power plants to connect to the national grid.
- The electricity certificate system will be extended and expanded by 18 TWh of new electricity certificates until 2030, while the level of ambition will not be raised further before 2020. The Swedish Energy Agency will be tasked with producing proposals on the design of quotas for electricity certificates beyond 2020 and will optimise the system to ensure the most cost-effective electricity production.
- Implementation of measures to achieve effective demand flexibility
- Abolition of the tax on thermal output and reduction on the property tax on hydropower plants will be financed through an increase in energy tax.
- Development of the transmission system to increase transmission capacity within Sweden and between Sweden and neighbouring countries.
- Swedish Energy Policy Commission will produce a special background report outlining facts and effects related to various possible future market designs ⁴.

³ Ibid.

⁴ Framework agreement between the Swedish Social Democratic Party, the Moderate Party, the Swedish Green Party, the Centre Party and the Christian Democrats, available at:
<http://www.government.se/49d8c1/contentassets/8239ed8e9517442580aac9bcb00197cc/ek-ok-eng.pdf>.

Other planned changes:

The government has announced that the production of solar electricity for own use will be entirely exempt from taxes, from 2017 ⁵.

From 1 January 2017, companies with a revenue of up to 30 000 kr per year can apply for release from the duty to register for VAT. This concerns also for example microproducers of renewable electricity that sell their overproduction ⁶.

3.2. Does the Renewables National Action Plan include any objectives for residential prosumers (if so, please specify)

The 2010 National Renewables Action Plan does not include any objectives specifically for residential prosumers.

3.3. Is there a definition (legal or regulatory) of residential prosumers (or self-consumption) in your country? If so, state it and describe the elements of this definition?

No official definition of prosumers or self-consumption was identified. The Electricity Act mentions 'electricity users who have the right to the tax reduction for the microproduction of renewable electricity' in accordance with the Income Tax Act (1999/1229)⁷. The Income Tax Act provides in 27 § 'Microproduction of renewable electricity' that a tax reduction applies to natural or legal persons who:

1. produce renewable energy;
2. feed in renewable electricity and take out electricity in a single connection point;
3. have a fuse of a maximum of 100 amperes at the connection point, and;
4. have notified to the grid concession holder that renewable electricity is produced and fed into the connection point.

In addition, the Electricity Act defines small generation installations, which do not need to pay a charge for feeding electricity into the grid, as electricity consumers subscribing to a fuse of at most 63 amperes and producing electricity for which infeed can be performed with a capacity of at most 43.5 kW ⁸.

11 Kap. 2 § of the Energy Tax Act is also considered relevant in this context, as it provides that the energy tax does not apply to electricity which is produced in a system of installed generator capacity below 50 kW or by a legal person who possesses a total installed generator capacity of less than 50 kW, and that has not been transferred to a grid subject to the grid-concession stated in the Electricity Act. This is understood to mean that electricity produced in a small-scale installation and consumed by the producers themselves is not subject to energy tax.

As mentioned above, installed generator power of 50 kW corresponds to 125 kW for wind or wave power or to 255 kWp for a PV system, and to 50 kW for other energy sources without a generator.

⁵ <http://www.thelocal.se/20161121/sweden-to-ditch-tax-on-solar-energy-in-renewables-push>; Regeringskansliet, Fakta-PM: *Så tar regeringen bort skatten på solen* (21 November 2016) available at:

<http://www.regeringen.se/4ad0bb/globalassets/regeringen/dokument/finansdepartementet/pdf/2016/pm/fakta-pm-solel>.

⁶ Regeringskansliet, *ibid*.

⁷ Inkomstskattelagen (1999/1229).

⁸ 4 Kap. 15 § of the Electricity Act.

4. What are the permitting requirements for each type of residential prosumer?

General

Solar electricity prosumers

According to the Planning and Permitting Act Kap. 9 2§, a building permit is required in case of a new construction, and extension or another modification of a building, where the latter means that the building changes colour, façade or roof coverings or the building's exterior appearance is significantly affected in other ways. According to a guidance document issued by the city of Malmö, installing a solar energy plant normally entails a considerable impact on the exterior of a building, and such a measure normally requires a building permit within zoned areas. Solar energy plants placed on the ground may also require a building permit, and it is recommended to contact the City Planning Office ⁹.

Local authority municipalities are responsible for handling building permits and spatial planning ¹⁰.

Wind electricity prosumers

The Environmental Code regulates the environmental permitting for wind energy installations. Generators taller than 50 meters require to be notified to the Environmental Bureau of the municipality (*miljökontor*), and a notification is also required for two or more generators in a group as well as for new installations standing together with previous installations. An environmental permit is required for two or more generators whose total height exceeds 150 meters and for seven or more generators whose total height exceeds 120 meters. An environmental permit is also needed for new generators that together with the pre-existing generators exceed the previously mentioned limits ¹¹.

According to the Planning and Building Act, a building permit is required for wind generators with a turbine which is larger than 3 meters, has a height of over 20 meters, is mounted on top of a building or placed at a distance from the property line which is smaller than the height of the installation from the ground¹². Where the wind power generator or installation requires application for an environmental permit, it is exempt from the requirement to apply for a building permit ¹³. Wind power owners must adhere to the applicable noise restrictions, which will be taken into account during the permitting and notification processes for new wind turbines. The noise level within a housing area must not be higher than 40 dBA . In some areas this may be reduced to 35 dBA. If the wind turbine emits clearly audible tones (so-called pure tones), the noise level must be 5 dBA lower ¹⁴.

All prosumers

The grid company must be notified of the installation of new production. The company must approve the connection of the installation into the grid. The connection into the grid must be done by a qualified electrician, who will usually also be the one maintaining communication with the grid company ¹⁵.

⁹

http://malmo.se/download/18.16ac037b154961d02871654e/1464267018794/Solenergi+och+arkitektur_r%C3%A5d+och+riktlinjer.pdf.

¹⁰ 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, Decision No. 2010/742/E (23 June 2010).

¹¹ <http://www.eskilstuna.se/bygga-bo-och-miljo/stadsplanering-och-byggande/stadsplanering/oversiktsplanering/oversiktsplan-2030/del-2-grunddrag-i-mark--och-vattenanvandning/teknisk-forsorjning/vindkraft/allmant-om-vindkraft-och-vindkraftverk.html>.

¹² 6 kap. 1 § of the Planning and Building Act (2011:338).

¹³ <http://www.vindlov.se/sv/lagar--regler/lagar-forordningar-och-foreskrifter/plan--och-bygglagen/>.

¹⁴ <http://www.naturvardsverket.se/Stod-i-miljoarbetet/Vagledning/Buller/Buller-fran-vindkraft/buller-vindkraft-riktvarden/>.

4.1. Does your country recognize certain forms of self-consumption and subject prosumers to certain

- requirements,
- application fees and
- one-off costs

in order to give them a **permit or licence to generate energy?**

As a general rule, the Electricity Act requires a licence (network concession) from Ei for the building and use of all electrical heavy-current cable. However, the exceptions to this principle include the case of an internal network which is located on or within a building. Therefore heavy-current cables may be built and used in a household without the need for a network concession¹⁶. The exceptions apply automatically, but the consumer can apply to Ei for a decision on how the exception should be interpreted, in case of uncertainty. Ei determines whether a power line or a grid is covered by the exemption from the concession or not.

Self-consumption of electricity is allowed in Sweden, but no national net-metering system exists. However, several utilities offer agreements, including net-metering, for excess electricity produced by micro-producers¹⁷.

4.2. Does the national legal/regulatory framework determine the contractual conditions under which prosumers are allowed to feed or sell their surplus back into the grid or to other consumers?

According to the Electricity Act, owners of a production installation are entitled to remuneration from the grid concession holder to whose pipeline system the installation is connected. The compensation shall be equal to

1. the value of the reduction of energy losses that the supply of electricity from the installation brings to the grid of the concession-holder, and
2. the value of the reduction of the concession-holder's charges for having their grid connected to the grid of another concession-holder, which have been avoided due to the connection of the installation to the grid¹⁸.

The first point relates to the energy losses occurring in the grid, their size depending on the voltage of the power line and the distance between the power plant and the electricity consumer. For example, using local electricity producers diminishes the energy losses occurring due to distance. The second point concerns the charges paid by a local grid concessionaire for transporting electricity to the regional grid. The amount of the charges depends on the amount of power that needs to be transferred. Where the amount of these charges is reduced to the connection of an installation, this "profit" should accrue to the owner of the installation¹⁹.

The Act notes also that the government may adopt more detailed regulations on the calculation of the compensation.

Disputes related to the remuneration are handled by the grid authority.

¹⁵ <https://www.natverketforvindbruk.se/PageFiles/54/Marknads%C3%B6versikt%20sm%20vindkraftverk%202016-12-30.pdf> p. 21.

¹⁶ Förordning (2007:215) om undantag från kravet på nätkoncession enligt ellagen (1997:857).

¹⁷ Swedish Energy Agency, National Survey Report of PV Power Applications in Sweden (2015), p. 33.

¹⁸ 4 Kap. 15 § of the Electricity Act.

¹⁹ Tore Wizelius, "Vindkraft tillsammans: Handbok för vindkooperativ", p. 56, available at: <https://www.natverketforvindbruk.se/Global/Aktiviteter/Projekt/Vindkraft%20tillsammans.pdf>.

It should be noted that currently Sweden does not have a national net metering system, due to the government's view that a net metering system would conflict with the VAT Directive ²⁰. However, instead some electricity traders and grid companies have introduced different forms of net metering on their own initiative ²¹.

5. What are the rules applicable to the access to the grid?

General

According to the Electricity Act, the owner of the electricity grid or line is, in the absence of a specific reason, obliged to connect an electricity installation to the grid on reasonable terms. This applies to all types of power plant independent of their size. A concession-holder for a line may only carry out the connection with the consent of the concession-holder for the region. The connection shall be implemented within a reasonable time.

Disputes concerning the duty to connect are handled by the grid authority (Svenska Kraftnät), and its decisions are binding immediately ²².

The holder of a grid concession is also under an obligation to conduct metering of the quantity of electrical power transmitted and its distribution over time. If an electricity consumer subscribes to a fuse of at most 63 amperes, the network concessionaire shall instead first preliminarily compute the quantity of electrical power transmitted and its distribution over time (preliminary consumer profile computation), second finally meter the quantity of electrical power transmitted and compute its distribution over time (final consumer profile computation). This does not apply to an electricity consumer that has requested that the quantity of electrical power transmitted and its distribution over time shall be metered. More detailed regulations concerning the said obligations shall be made by the Government or the authority appointed by the Government ²³.

Electricity consumers who request that their electricity consumption be metered in another way than in accordance with the regulations made under the previously mentioned obligation, shall be charged by the network concessionaire for the additional costs of this metering and for the reporting of the results of this metering. If the metering of the electricity consumer's consumption thereby requires other metering equipment than under the normal case, the electricity consumer shall be debited with the cost of the meter and associated collection equipment and for its installation at the outtake point. Other costs for metering than those referred to here may not be debited to individual electricity consumers ²⁴.

The costs of a meter and associated collection equipment and for its installation at the infeed point with an electricity producer shall be debited to the producer by the network concessionaire. This does not apply to those electricity producers referred to in Chapter 4, Section 10 ²⁵.

²⁰ SOU 2013:46,

<https://www.natverketforvindbruk.se/Global/N%C3%A4ringsliv/Nettodebitering/Beskattning%20av%20mikroproducerad%20el.pdf>, p. 24.

²¹ <https://www.natverketforvindbruk.se/sv/Naringsliv/Smaskalig-vindkraft/Nettodebitering/>.

²² 7 Kap. 6-7 §§ of the Electricity Act.

²³ 4 Kap. 10 § of the Electricity Act.

²⁴ 4 Kap. 11 § of the Electricity Act.

²⁵ 4 Kap. 14 § of the Electricity Act.

5.1. What is the inter-connection configuration used for each type of residential prosumer?

The Swedish electricity grid is divided into three levels depending on the voltage level: transmission, subtransmission (regional) and distributional (local) level. SvK operates the transmission level with lines with a voltage of 220 or 400 kV. The regional grids link the transmission and distribution levels and normally have a lower voltage, usually 40-130 kV. Local grids typically operate with a voltage level of 0,4-20 kV and consumers are normally connected to this level²⁶. Some larger customers and some generation (e.g. many wind farms) are connected directly to this system level²⁷.

5.2. Does the competence to determine the inter-connection configuration lie at State level or at a regional/lander level?

The national TSO *Svenska Kraftnät* has issued the regulations which must be fulfilled in order to connect into the grid²⁸.

5.3. Are there any rules to ensure that prosumers are inter-connected to the distribution network/the grid?

The way to ensure that prosumers are inter-connected to the distribution network/the grid is achieved by the general obligation on grid concession-holders to connect all installations on reasonable terms.

5.4. What are the grid access and grid use principles and rules for the energy generated by each type of residential prosumer?

Balance responsibility

According to the Electricity Act, an electricity supplier may only supply electricity in the connection points where someone has assumed the financial responsibility that as much electricity is fed into the system as is taken out at the connection point²⁹. In practice, this is considered to mean that residential prosumers must always collaborate with an electricity company.

5.5. What are the network costs and charges for each type of residential prosumer?

Grid tariffs

Grid tariffs are the payments which the grid company charges customers to cover the costs of operation and the maintenance of the network as well as give the company a reasonable return. The Electricity Act provides more detailed instructions on this, as well as regulations on an overall revenue cap of the grid company. According to the Electricity Act 3. Kap. 9 §, the grid company is obliged to transfer electricity on behalf of others on reasonable terms.

Prosumers with installations classified as smaller production installations under the Electricity Act³⁰ can be connected to the grid without paying for the connection fee. The following conditions apply:

²⁶ http://www.nordicenergyregulators.org/wp-content/uploads/2013/02/Economic_regulation_of_electricity_grids_in_Nordic_countries.pdf, pp. 17-18.

²⁷ https://www.ltu.se/cms_fs/1.156688!/file/Carl-Johan%20Wallnerstr%C3%B6m%20-%20Full%20text.pdf pp. 1-2.

²⁸ http://www.svk.se/siteassets/om-oss/foreskrifter/svkfs2005_2.pdf

²⁹ 8 kap. 4 § of the Electricity Act.

³⁰ 4 kap. 10 § of the Electricity Act.

- The installation power output must be a maximum of 43,5 kW and the fuse a maximum of 63 amperes;
- The electricity consumption of the prosumer must be higher than their production of electricity per calendar year.

Moreover, for installations that can deliver power output of up to 1500 kW will pay only that part of the tariff that corresponds to the annual costs of measuring, calculation and reporting on the concession-holder's grid. The owner must also pay a one-time fee for connection.

Otherwise network tariffs for connection to a line or grid will apply. According to the Electricity Act, these should cover the reasonable costs of the connection. The geographical location of the connection point and the contracted power therein should be given special consideration.

6. What are the incentives (e.g through taxes or tariffs) for each type of residential prosumers?

The following incentives have been identified for consumers to become prosumers in Sweden:

Tax credit for micro-producers

From 1 Jan 2015, the amended Income Tax Act has entitled micro-producers to a tax credit of 0.60 SEK/kWh for renewable electricity fed into the grid. This applies to both physical and legal persons, where the PV system owner:

- Feeds in the excess electricity to the grid at the same connection point as where the electricity is received;
- Does not have a fuse that exceeds 100 amperes at the connection point;
- Notifies the grid owner that renewable electricity is produced at the connection point.

The basis for the tax reduction is the number of kWh that is fed into the grid at the connection point under a calendar year. However, the maximum number of kWh for which a system owner can receive the tax credit may not exceed the number of kWh bought within the same year. In addition, one is only obliged to a maximum of 30 000 kWh per year. The grid owner will file the measurement on how much electricity that has been fed into and out of the connection point in one year and the data will be sent to the Swedish Tax Agency (Skatteverket). The tax reduction will then be included in the income tax return information, which should be submitted to the Swedish Tax Agency in May the next year.

The tax credit of 0.60 SEK/kWh is received on top of other compensations for the excess electricity, such as compensation offered by electricity retailer utility companies, the grid benefit compensation, and revenues for selling green electricity certificates and guarantees of origins. The tax credit system can be seen as a FiT for the excess electricity. However, unlike the FiT systems of e.g. Germany, the Swedish tax credit system does not offer a guaranteed purchase agreement over a specific time period. This means that the extra income a micro-producer receives from the tax credit system when feeding electricity to the grid can be withdrawn quickly. The Swedish Government intends to evaluate the system when it has been applied for at least two calendar years.

Direct capital subsidy for PV installations

The programme has been running since 2006 and has been extended until 2016. The applications are handled by the county administrative boards (länsstyrelser) and the waiting time varies but can in some cases be longer than 2 years. The effect of the waiting times and the lack of budget has been identified as a critical issue for further PV development in Sweden.

Green electricity certificates

Producers of renewable electricity are eligible to receive one certificate from the government for each MWh produced, while certain electricity stakeholders are obliged to purchase certificates

representing a specific share of the electricity they sell or use, the so-called quota obligation. The price of the certificates is ultimately passed onto consumer prices. Energy sources entitled to receive certificates are wind power, some small hydro, some biofuels, solar, geothermal, wave and peat in power generation, and each production facility can receive green electricity certificates for a maximum of 15 years. The quota-bound stakeholders are; electricity suppliers, electricity consumers who use electricity that they themselves produced if the amount of electricity used is more than 60 MWh per year and if it has been produced in a plant with an installed capacity of more than 50 kWp, electricity consumers that have used electricity that they have imported or purchased on the Nordic power exchange, and electricity-intensive industries that have been registered by the Swedish Energy Agency (Energimyndigheten).

Until 2006 there were no solar systems in the electricity certificate system, but the number of approved PV installations has increased and the majority of approved plants in the certificate system are now PV systems. However, these systems only make up for a small part of the total installed power and produced certificates. At the end of 2015 only 38 % of the total installed PV capacity was in the certificate system. The reasons for why it has been difficult for PV to take advantage of the electricity certificate system is that many owners of small PV systems do not consider the income that certificates provide is worth the extra administrative burden. Moreover, it can be difficult for an individual to find a buyer for only a few certificates. However, more and more utilities have begun offering to purchase certificates from micro-producers, which may lead to a change in this situation.

Guarantees of origin

Electricity producers have the right to voluntarily apply for a guarantee of origin from the government. The applications are handled by the Swedish Energy Agency ³¹. Guarantees of origin can then be sold on an open market, where the usual buyers are utility companies wanting to sell that specific kind of electricity. Utility companies buy guarantees of origin corresponding to the amount of electricity they would like to sell. Guarantees are issued for all types of power generation.

Guarantees of origin are nullified when the electricity supplier has bought the guarantees and sold the electricity to a customer. This ensures that the amount of electricity sold from a specific source is equivalent to the amount of electricity produced from that source. In 2015, 19 052 guarantees of origin from PV were issued, 12 767 were transferred and 7 238 were nullified. Some utility companies have offered to buy PV guarantees of origin at a fairly high price in order to get the trade going, but the volumes are currently still too small for a working trading market and the real value of guarantees of origin from PV in Sweden is still uncertain.

Interest deduction

There is a general interest rate deduction, which amounts to 30 % of the interest paid during the income year and is deductible from the tax payable. This can apply also in case one takes out a loan in order to buy and install a renewable energy installation such as a PV system. For interest expenses exceeding 100 000 kr during the same income year, the excess part is eligible for a 21 % deduction only ³².

Energy storage subsidy for households

Sweden has very recently introduced a government subsidy that will cover 60 % of the cost of installing a residential energy storage system, up to a maximum of 50 000 kr. The credit applies to the battery, wiring, control systems, smart energy hub and installation work for homes with rooftop solar systems. The incentive programme will be in effect until December 31, 2019 ³³.

³¹ <http://www.energimyndigheten.se/fornybart/ursprungsgarantier/mer-om-ursprungsgarantier/vem-gor-vad/>.

³² Swedish Energy Agency, National Survey Report of PV Power Applications in Sweden (2015); <http://www.xn--hattapivatln-0fb.se/artiklar/lanfakta/ranteavdraget>.

³³ <https://www.metering.com/news/sweden-energy-storage-subsidy/>.

6.1. Does your country apply specific tariffs to prosumers

- to charge them for the electricity they draw from the grid for consumption?
- or to compensate them for the electricity they feed back into the grid?

Answer:

The electricity charges on prosumers for electricity they draw from the grid for consumption are determined by the contract terms offered by electricity companies to prosumers.

As for the reimbursement for electricity fed into the grid, according to the Electricity Act, owners of a production installation are entitled to remuneration from the grid concession holder to whose pipeline system the installation is connected. The compensation shall be equal to

1. the value of the reduction of energy losses that the supply of electricity from the installation brings to the grid of the concession-holder, and
2. the value of the reduction of the concession-holder's charges for having their grid connected to the grid of another concession-holder, which have been avoided due to the connection of the installation to the grid.

The first point relates to the energy losses occurring in the grid, their size depending on the voltage of the power line and the distance between the power plant and the electricity consumer. For example, using local electricity producers diminishes the energy losses occurring due to distance. The second point concerns the charges paid by a local grid concessionaire for transporting electricity to the regional grid. The amount of the charges depends on the amount of power that needs to be transferred. Where the amount of these charges is reduced to the connection of an installation, this "profit" should accrue to the owner of the installation³⁴.

The Electricity Act notes also that the government may adopt more detailed regulations on the calculation of the compensation.

Disputes related to the remuneration are handled by the grid authority.

6.2. Does your country

- tax prosumers in a specific way?
- allocate to them a certain part of the cost to upgrade the grid to accommodate the extra generation they feed into the grid?

Answer:

There are no prosumer-specific taxes in Sweden. However, the following taxes tend to apply to prosumers:

Energy tax

Under the rules applying from 1 July 2016 non-professional producers of renewable electricity are no longer exempt from energy tax. Self-consumption of electricity is still exempt from energy tax, as long as the following requirements are fulfilled:

- The electricity is produced in a system of installed generator capacity below 50 kW,
- by a legal person who possesses a total installed generator capacity of less than 50 kW, and
- that has not been transferred to a grid subject to the grid-concession stated in the Electricity Act.

³⁴ Tore Wizelius, "Vindkraft tillsammans: Handbok för vindkooperativ", p. 56, available at: <https://www.natverketforvindbruk.se/Global/Aktiviteter/Projekt/Vindkraft%20tillsammans.pdf>.

An installed generator power of 50 kW shall correspond to:

- 125 kW for Wind- or wave power,
- 255 kWp for a photovoltaic system, and
- 50 kW for other energy sources without a generator.

When electric power is produced from various sources, the installed power should be added together.

As mentioned earlier, the new rules have restricted the tax exemption for self-consumed electricity, all of which was previously considered as exempt from energy tax. However, the Ministry of Finance has announced that solar energy produced for self-consumption will once again be fully exempt from energy tax starting in 2017³⁵.

Income tax

Owning a PV system is not regarded as a business from a legal point of view. Revenue from the sale of excess electricity will be taxed as capital income from a private residence, subject to a standard deduction of 40 000 SEK which can be subtracted from the total income of each residence³⁶. Normally the sale of electricity from a residential system will not result in exceeding this limit, in the absence of other significant sources of capital income.

VAT

Since after the judgment C-219/12 Fuchs, residential prosumers have been obliged to register for VAT. However, since January 2017, registration for VAT is no longer required for small-scale electricity producers whose annual revenue amounts to less than 30 000 SEK³⁷.

Cost of upgrading the grid:

In Sweden, the expenses of grid operators are mainly intended to be covered by the grid tariffs charged for use of the grid. In addition, prosumers must pay a fee for connecting into the grid. The amount of the connection fee varies according to the voltage level of the fuse.

7. A What are the conditions that may encourage residential prosumers (to entry into activity or during functioning)?

General

The Swedish government has introduced a number of incentives for residential prosumers. However, due to the differing criteria and administrative requirements for each incentive, the system is perceived as somewhat cumbersome, and many prosumers do not make use of all the available incentives. Please find more information in section on incentives above.

B. What are the conditions that may encourage or act as barriers for residential prosumers (to entry into activity or during functioning)?

General

System prices for solar energy generators

Since 2008, Sweden has experienced a large decrease in PV system prices since 2008, mainly due to Sweden catching up with the international market and the fact that the international market prices for modules and balance of system (BoS) equipment has dropped as well. In late 2015 the

³⁵ <http://www.thelocal.se/20161121/sweden-to-ditch-tax-on-solar-energy-in-renewables-push>.

³⁶ Swedish Energy Agency, National Survey Report of PV Power Applications in Sweden (2015), p. 33.

³⁷ <http://www.vvsforum.se/nyheter/2016/mars/mikroproducenter-av-solel-slipper-moms/>;
<http://www.regeringen.se/pressmeddelanden/2016/03/skatteforslag-for-okad-ateranvandning-och-momsbefrielse-for-solelproducenter-m.fl/>.

number of active companies selling or installing modules or PV systems in Sweden was estimated as 154, compared to 37 in 2010. However, the fast decrease of prices has slowed down in the last few years. In the market segment of small residential systems, the prices stagnated in 2015 and ended up at 15.0 SEK/Wp, which is within the marginal error range of the weighted average price of 14.9 SEK/Wp from 2014.

Some clear differences of the cost structures of a small residential system and a larger commercial system can be distinguished. Most notably, a private person has to pay VAT when installing a system, which a company usually does not have to do. Secondly, a larger commercial PV system usually needs more design and planning work, and such a post has been added in that cost structure.

Overall almost all costs items are lower for the larger commercial system due up-scaling benefits. Most noticeable is the lower costs for inverters, installations work and profit margin ³⁸.

Project times for residential systems

Another possible reason for the stagnation of the residential system prices is the long project times for residential systems in Sweden. In a survey made in which 15 Swedish installation company participated revealed that the average of the estimated times from first contact with the customer to the completion of a small residential systems was 127 days. Of this time the customer's decision process takes the most time with an average of the estimated times of 84 days (variation of between 550 to 0 days was reported). Once the customer has decided to install PV, the average time from the signed contract to completed PV system is about 44 days according to the answers in the survey (variations between 90 to 14 days was reported by the different companies).

The overall project total project time from first contact to a completed system was 35 days in Germany in 2013. The **significantly longer project times** in Sweden have effects on financing costs for purchased materials, the volume of annual installations and the relative costs to operate an installation company. The major reason for the long times from first contact to signed contracts was in the survey reported to be the long waiting times for a decision about direct capital subsidy³⁹.

Wind energy considerations:

It appears that the significantly longer timelines required for permitting and installation of wind turbines can act as a barrier for the use of this energy type among prosumers. However, on the basis of the information available it has not been possible to give a more accurate estimate. It may be that much of the complexity involved may be unavoidable, due to environmental and noise considerations related to installing wind power.

- 7.1. What are the metering systems for each type of residential prosumer? Do these systems provide adequate conditions for prosumers integration in the market?

For ordinary electricity consumers, usually the only thing measured is how much electricity they purchase from the grid. For prosumers selling surplus electricity to the grid, a meter measuring the sold electricity can be installed by the grid company. This renders the prosumer eligible to apply for electricity certificates through the grid company, but only for the electricity sold to the grid. Therefore, prosumers who produce a lot of electricity for self-consumption may deem it worthwhile to invest in a separate hour meter which measures the total production of electricity from the wind turbine or solar panel. While the prosumer must pay for the meter themselves, it enables them to apply for electricity certificates for the total amount of electricity produced ⁴⁰.

³⁸ IEA, National Survey Report of PV Power Applications in Sweden (2015), pp. 31-32.

³⁹ Ibid.

⁴⁰ <https://www.natverketforvindbruk.se/PageFiles/54/Marknads%C3%B6versikt%20sm%20vindkraftverk%202016-12-30.pdf> p. 8.

7.2. What are the billing conditions for each type of residential prosumer?

These are subject to the contract with the electricity company. The following general conditions apply:

Electricity trading⁴¹

Electricity trading takes place on a free competitive market open to any new participants, through either bilateral agreements or the Nord Pool Nordic electricity exchange. Generally speaking, trading companies do not generate electricity but instead purchase it from electricity generators. Electricity trading is subject to legislative requirements as well as private regulations issued e.g. by the Nord Pool. The applicable legislation also provides for consumer protection.

Nord Pool, which is the world's first international power exchange, facilitates electricity trade within the Nordic Region. It consists of a physical spot market for power trading on an hourly basis and a financial futures market for trading in futures contracts for up to three years ahead, as well as a clearing service. Nord Pool has adopted its own rules and agreements for traders active on this exchange.

Bidding zones

From 1 November 2011, the Swedish transmission system operator SvK divided Sweden into four bidding zones, with borders drawn in the locations where transmission constraints or bottlenecks exist. As a result, electricity prices can vary between the four zones at different points in time. This is intended to create incentives to build new power plants where there is a shortage of electricity and to reinforce the grid to transport more electricity within Sweden.

Grid tariffs

These include the charges and other conditions imposed on the transmission of electricity and the connection to a power line or a power grid. Payment of grid tariffs entails access to the entire transmission system and the entitlement to buy and sell electricity through the electricity market area. Regional and national grid charges are included in the local grid charges. Grid tariffs are calculated so as to cover the reasonable costs of operating the network. Distribution system operators in Sweden are subject to a revenue cap determined by the Ei, which has an impact on the tariffs.

7.3. Are there measures to encourage the creation of energy communities at municipal level, or other schemes to encourage inclusive development of the market?

Wizelius notes that in some areas of Sweden either the municipalities themselves or municipality-owned companies are supporting wind power projects as co-financiers. This has been done e.g. in the Karlstad and Hammarö municipalities through the municipality-owned energy and housing companies. As wind turbines are estimated to cost around SEK 30-35 million, and 20% of this is required as a down payment when ordering the turbine, financial support from a local company may be critical for the success of a wind cooperative ⁴².

⁴¹ Sweden – Legal and Regulatory Framework Overview (2008), European Energy Review 2008, p. 344, available at: <http://www.vinge.com/Global/Publikationer/Artiklar/Overview%20of%20the%20legal%20and%20regulatory%20framework%20in%20Sweden.pdf>.

⁴² Tore Wizelius, "Lokalt ägd vindkraft", available at: <http://docplayer.se/7922371-Tore-wizelius-lokalt-agd-vindkraft.html>.

- 7.4. Are there rules facilitating the creation of energy cooperatives to provide a legal entity to energy communities? Are there measures facilitating other type of schemes and if so which ones?

No such schemes have been identified on the basis of information available.

- 7.5. What are the procedures/provisions for establishing cooperatives for prosumers? Are they more simple/less costly than those for other schemes?

According to Wizelius, there are two organisation forms to choose from for a cooperative wind power association: a joint property unit⁴³ or an economic association. However, new joint property units for wind craft have not been built since the 90's and this form is considered to have played out its role. An economic association is a cooperative where members collectively own and operate an activity they themselves benefit from. The association promotes the interests of its members and takes part in the activity through buying, selling or producing resources or services. As opposed to a limited liability company, it is the work or cooperation which is central to an economic association, rather than capital. Surplus will be divided among the members every year. Wind power cooperative is a type of combined cooperative, as the members together both own the production installation and use the electricity produced⁴⁴.

Economic associations are regulated by the Act on economic associations as well as the Regulation on economic associations⁴⁵. According to 2 kap. of the Act on economic associations, in an economic association there must be at least three members who are not investor members. The members shall adopt the association's statute (which is subject to certain information requirements also set out in the Act) and select the Board and auditors. The association must be submitted for registration no later than 6 months after the decision was made to form it. The issue of the association's establishment fails if the registration is not made within the time limit or if the registration authority through a legally binding decision has written off such a notification or refused registration.

The statute of the association will specify the size of the contribution required to become a member. In addition, a fee must be paid to the registration authority (Bolagsverket) when the association is notified for registration⁴⁶. Currently this fee is between EUR 1100-1400, where the lower fee applies to applications filed electronically⁴⁷.

8. Other questions on the regulatory framework

- 8.1. What are the complaint handling procedures for each type of residential prosumer?

There are no specific complaint handling procedures for prosumers. General procedures for electricity consumers apply.

- 8.2. Are there any specific redress procedures available only to residential prosumers?

No information on such procedures was identified.

⁴³ This is an unofficial translation of the term "samfällighet", which is used in Swedish law to refer e.g. to land belonging to several properties.

⁴⁴ Tore Wizelius, "Vindkraft tillsammans: Handbok för vindkooperativ", p. 56, available at:

<https://www.natverketforvindbruk.se/Global/Aktiviteter/Projekt/Vindkraft%20tillsammans.pdf>.

⁴⁵ Lag (1987:667) om ekonomiska föreningar; Förordning (1987:978) om ekonomiska föreningar.

⁴⁶ <http://www.bolagsverket.se/fo/foreningsformer/ekonomisk/starta/forening-1.1797>.

⁴⁷ <http://www.bolagsverket.se/pb/priser/ekonomisk>.

Country fiche (Summary and ranking)

The **country fiche** below summarises the information from the report and ranks the **level of favourable impact** of measures in relation to its favourable impact to the take up of residential prosumers.

Country fiche	Ranking Low/Medium/High
General Description of the national regulatory framework - Types of residential prosumers The main types of residential prosumer in Sweden, based on the information available on electricity certificates, are those with solar and wind energy production. Other types of RES installations for private households are very rare. - Institutional framework The most important institutions in Sweden include the <i>Energimarknadsinspektionen</i> (Ei) which has the powers to supervise electricity, natural gas and district heating markets. Its assignments are decided by the Swedish Parliament and Government. The state-owned <i>Svenska Kraftnät</i> is the transmission system operator and responsible for developing the high-voltage network and maintaining the power balance and operational security. - Applicable legislation, plans and objectives The current regulatory framework applicable to prosumers in Sweden is relatively complex and entails differing tax and other cost considerations for prosumers of different types and production scales. Some of the incentives and measures provided applicable framework are seen as cumbersome and partially overlapping. There have also been many changes in the past few years, particularly in tax treatment. Promoting small-scale renewable energy production is, however, identified as a priority development area by the Swedish government, and the Ei has been commissioned to develop a strategy for increasing the use of solar energy in Sweden. - Definition of residential prosumers Such an official general definition does not exist in Sweden. Instead, a number of different definitions are used, entailing also different applicable criteria and legal treatment.	Medium Medium Low Low
Specific Questions on the regulatory framework for residential prosumers	
Permitting requirements for each type of residential prosumer Permitting requirements are partially determined at the national level and partially within the competence of each municipality. All new installations must be notified to the grid operator before installation, independent of the type of RES. Solar panels may require a building permit depending on its position, location and the requirements of the municipality. Wind turbines are	Medium

[illegible]

Executive Summary

Residential prosumers in Sweden operate within the **general legal and policy framework** applicable to electricity producers and consumers, which however provides some favorable treatment to small-scale producers and producers of renewable energy. There is not a unique definition of prosumer, but different ones, entailing also different applicable criteria and legal treatment. The **types of incentives** available in Sweden include tax reductions as well as direct capital subsidies. In addition, residential prosumers may be eligible to apply for green certificates and guarantees of origin, should they wish to sell some of their excess electricity. In terms of **permitting**, residential prosumers would often need to acquire a building permit, or in very rare cases they might need an environmental permit.

Access to the grid is guaranteed, as the grid operators are obliged to connect all electricity installations to the grid on reasonable terms. However, according to the terms of the Electricity Act, supply of electricity at the connection points is only allowed where someone has assumed the **financial responsibility** to ensure that as much electricity is fed into the system as is taken out at the connection point. This means that in practice residential prosumers must always collaborate with an electricity company. The costs of the grid operator are covered by grid tariffs, while these entities are subject to a nationally regulated revenue cap. Prosumers with installations classified as smaller production installations can however be connected to the grid without paying for the connection fee. Overall, while the Swedish government has recently identified prosumers as a priority area and carried out some tax reforms in recent years, the **system remains somewhat complicated** and many prosumers may not make use of all the available incentives.