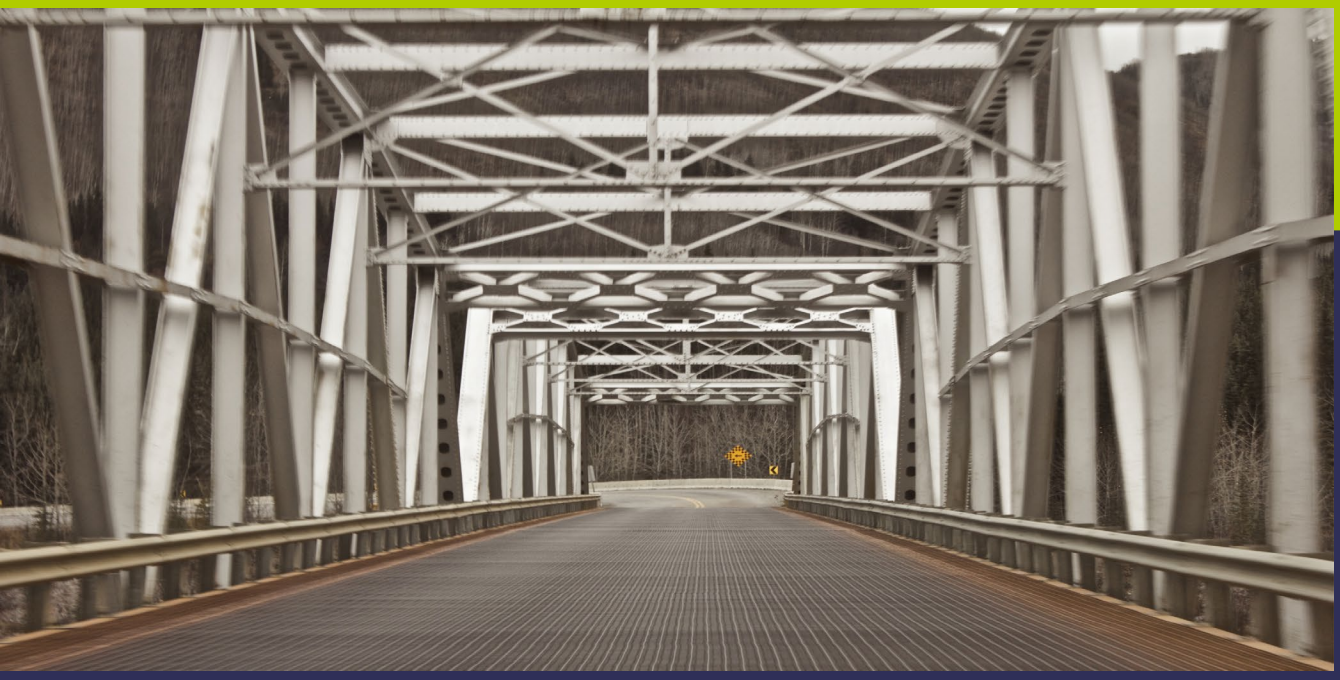
European Commission

EUROPEAN BARRIERS IN RETAIL ENERGY MARKETS



SWEDEN
Country Handbook

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Energy

EUROPEAN BARRIERS IN RETAIL ENERGY MARKETS PROJECT: Sweden Country Handbook

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Please note that this and the other country handbooks form just part of the deliverables of the “European Barriers in Retail Energy Markets” project. For more detail on methodology, Europe-wide results and the Barriers Index, please refer to the following associated reports: “Final Report of the European Barriers in Retail Energy Markets Project”; “Report on the European Retail Energy Market Barriers Index”

SUMMARY

Project Outline

The following project outline describes the overall European Barriers in Retail Energy Markets Project. It relates to all the countries and markets which are the focus of the project.

The Context

European retail energy market liberalization is now well into its third decade in the most mature markets. Customers of electricity and gas are now free to choose their electricity and gas suppliers in nearly all markets across the EU and in a number of other European markets. At the same time, the European Commission and national European regulators have created a basis for non-discriminatory market access for energy suppliers through a series of regulations and directives. In theory at least, the European retail energy market is a place where new suppliers and providers of retail services can enter the market and compete relatively freely and on equal terms for customers in the market; a place where formerly incumbent electricity suppliers can compete for gas customers and where gas suppliers can compete for electricity customers; a place where a supplier from one region or jurisdiction can compete in another, without facing unreasonable or excessive barriers; a place where a capacity aggregator or other innovative business model can compete to provide its services to retail energy customers.

Objective

The European Barriers in Retail Energy Markets project was established to research the extent to which the theory is the case in practice; the extent to which energy suppliers across Europe face a variety of barriers to enter and compete in the market; to identify which barriers exist and to provide some suggested solutions to those barriers. The project thereby aims to support the European Commission and Member States in developing policy and implementing actions to reduce barriers.

This project has also designed and calculated a performance index that ranks different countries according to how easy it is to do business in the retail energy segment by combining a selection of measurements into a single score. The project is on the other hand, not intended as a measure or indicator of the ‘competitiveness’ of any given market, and it does not in this respect judge the effectiveness of regulatory authorities or governments, many of which have put great effort into developing their markets.

It is also important to note that all the markets included in this research are continuously evolving. Changes are being planned and improvements (and in some cases additional barriers) are possible as a result. While this project highlights and considers known future changes, it cannot make assumptions as to the effectiveness and outcomes of those changes. This project is therefore weighted in the present, based on the actual context in the market, whilst accepting that the present context may change, in some cases imminently.

Competitor Perspective

What sets this project apart from previous Europe-wide projects looking at the issue of barriers is above-all that it primarily takes the perspective of the competitor rather than any objective view of regulators, economists or academics. This is an important distinction since it requires an acceptance that even if the existence of specific barriers may not seem logical or rational, and even if they are not permitted or legal, even if they were supposed to have been eradicated, those barriers are significant at least in the experience or expectations of competitors in the market.

Notwithstanding this however, the project does not simply accept whatever competitors claim. On the contrary, the researchers have gone to great lengths to ensure that claims are challenged and justified. Cooperation with regulatory authorities to understand the regulatory context of claims, along with survey and interview feedback from competitors (including incumbent suppliers) with alternative perspectives or points of view, have also been considered to ascertain a balanced evaluation of the barriers in any given market. This approach may therefore be of value to policy makers, and complementary to other studies addressing market outcomes.

In some cases, claims by respondents have been made which cannot be corroborated. For instance, there have been claims by many respondents across Europe about integrated utility behaviours that represent barriers to independent suppliers in the markets. Barriers apparently resulting from a lack full ownership unbundling. Such behaviours may well be regulated against, may even be considered illegal, and authorities may have powers to investigate them – and maybe do so. They are impossible to prove given the mandate and resources of the researchers of this project, yet they are widely reported by respondents and broadly documented in other researches. Such barriers may be considered allegations by the respondents, but where they appear to merit further consideration they have been raised since their potential impact on competition is substantial.

Scope & Scale of Research

The project focuses on electricity and (in most cases) gas markets in 30 European countries, namely the EU27 states plus Great Britain, Norway and Switzerland. It was conducted over the course of more than a year with the cooperation and assistance of nearly all of the relevant national regulatory authorities (the report does not however represent their views and has not been ratified by them), around 150 suppliers and many other stakeholder organizations, across all focus markets. Great Britain was included in the project and cooperation was received from numerous suppliers, the regulator (OFGEM) and other stakeholders. Switzerland and Malta were included to a lesser extent since they are not yet open markets for household customers.

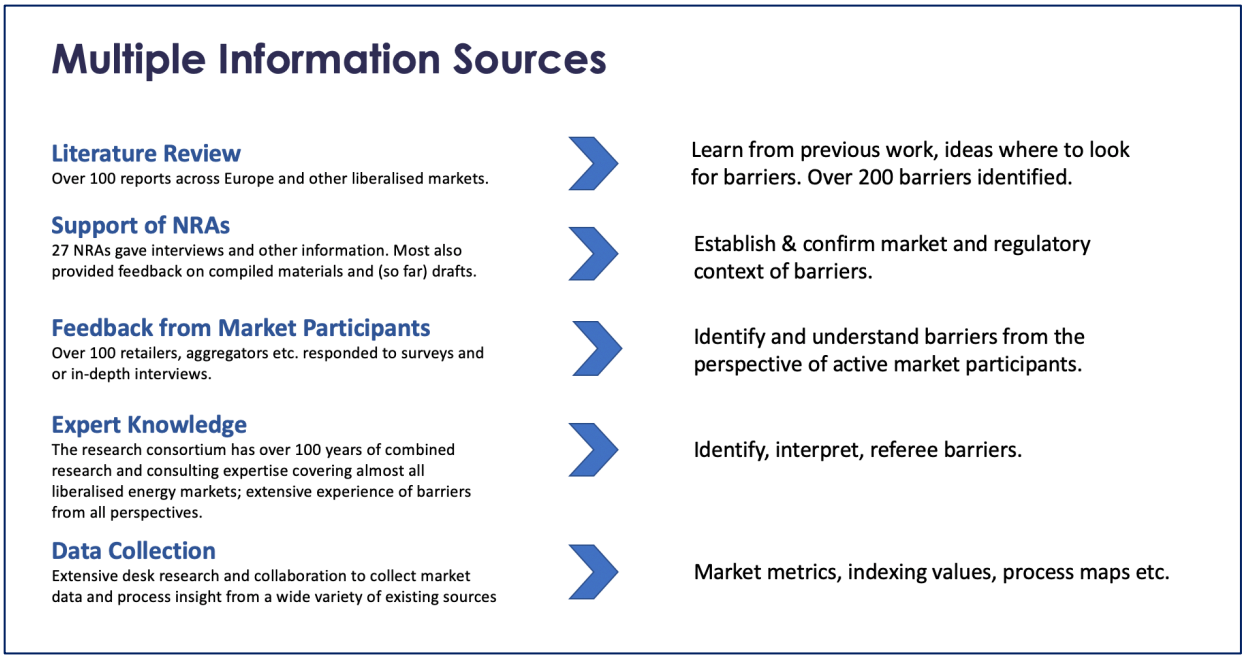
The project focuses on retail (supply), including also demand aggregation services, other additional offerings and new model retail, especially relating to the household segment customers (in some markets households and smaller SMEs may be difficult to distinguish). The project additionally concentrates primarily on barriers that are specific to the energy (electricity and gas) retail market – as opposed to barriers that are true of most markets, such as basic business costs and risk - and it gives priority to barriers for which a potential solution might be sought, as opposed to barriers which are a fact of any energy market and which could not realistically be overcome (such as the barriers relating to the core price volatility of energy as a commodity). The project does not aim to list every possible barrier in the market, however small.

Sources of Information

Many sources of information were used as part of the project. These included an extensive literature review of over 100 public reports, to assist in the targeting of survey questions; interviews with national regulatory authorities (NRAs) to understand the regulatory context in markets; feedback from market participants (suppliers and other competitors) and extensive data gathering for the purpose of collecting market metrics, market processes and

index values. For the latter the task of identifying sources that could deliver comparable and reliable index values was a key challenge of the researchers. The expert knowledge of the project consortium (which has extensive experience from the markets and issues concerned was also used to add judgement to the process. Specifically, the core project team comprised over a dozen researchers and experts from nine European countries, including international experts who have analysed Europe's energy markets since even before they liberalized.

Figure 1 - Multiple Information Sources



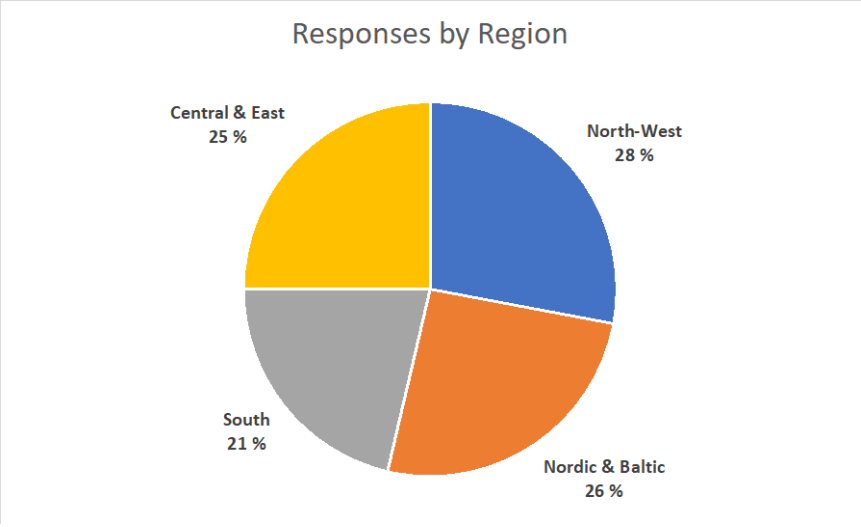
Surveys & Interviews

The primary research mediums used in the project were an extensive questionnaire and in-depth interviews. The purpose of the questionnaire, which contained separate questions depending on the type of respondent, was to provide a comprehensive and structured identification, weighting and magnitude of the barriers as experienced and perceived by suppliers and other competitors. Questions were categorized and broken down according to what was known through the body of existing literature and the experience of the project consortium, ensuring that all known barriers were addressed by the questionnaire. The questionnaire additionally facilitated the identification of barriers that hitherto had not been revealed by the literature review, or which were country specific. Interviews provided additional support and clarification to the findings from the questionnaire as well as allowing respondents to focus on top-of-mind barriers and the interviewers to dig deeper into key and / or unclear issues. While some respondents provided both questionnaire and interview responses, many provided one or the other.

The survey was publicly and widely promoted (via web sites, social media and by other direct means) to potential respondents from 17th June until late October 2019 but remained open until late February 2020 so that stakeholders contacted during Country Handbook development had the chance to respond. The dissemination of information on the project was further facilitated by a widely promoted public website through which over 300 people subscribed.

The Competitor Sample

143 questionnaire and interview responses were received representing 120 unique market-specific responses covering 28 focus markets. 71% of responses were through questionnaires versus 29% through interviews. Malta (a closed market for household customers) and Slovakia were the only markets from which responses were not received, although three additional markets received a level of response which was considered insufficient on which to conclude barriers based solely or primarily on respondent feedback. In these markets, namely Bulgaria, Cyprus, Czech Republic, the project consortium applied their expert insight and additional desk research to support the analysis of the markets. Switzerland, also a closed market for household customers, also naturally received insufficient response. The responses from 24 markets were therefore considered sufficient for the purpose of interpreting the barriers within those markets primarily based on respondent feedback. It is important to note that the response rate in no way impacted the index, which is not dependent on responses.



Analysis of the sample shows that responses were spread evenly among the regions. 66% of responses were non-incumbent competitors compared with 34% which were former incumbents in the markets concerned. In many cases the former incumbents are only former incumbents in one region within the overall country they are in. A large proportion of the former incumbents are furthermore active across multiple regions and countries, and therefore are both incumbents and non-incumbents, defenders and challengers. Among the non-incumbent players were a mix of more established competitors and more recent new entrants, along with more traditional supplies, new model suppliers and aggregators.

More information on the nature of the sample and responses can be found in the Final Report for this project.

Confidentiality

The importance of data protection and anonymity within the project cannot be stressed enough. Most respondents provided information on condition of anonymity. It was promised by default to questionnaire respondents and was in most cases explicitly requested by interviewees. Many participants additionally stated that they were nervous to respond at all since they were active in a market where there were only a handful of suppliers (or at least independent suppliers) which they felt meant that their responses could easily identify them. This risk was perceived as even greater in cases where the participant had made public statements on issues that would be contained in the research (the risk of readers putting two and two together was a concern). In some cases, respondents stated that they even feared a backlash from other stakeholders if their identity was revealed, or (for

e.g. a brand-new entrant in a market with one brand-new entrant) stated that if we revealed that they were a new entrant the market authority would instantly know who they were and that they were afraid it might inhibit their entry process.

Under such circumstances, it was decided that not only would all responses be anonymous, but also that the type of respondents would not be revealed in connection with given responses on a country level. It has been claimed by a handful of market authorities that this policy reduces the value of the research. The researchers feel that it in fact increases the value of the research since it has allowed respondents to provide information in an uninhibited fashion in a European market where, by and large, independent suppliers – and especially independent new entrant suppliers – are few and far between.

Deliverables

The project has three key deliverables:

- **28 country specific handbooks** detailing the barriers identified in each country together with suggestions for possible solutions. While most of the handbooks cover electricity and gas markets, some only cover electricity or cover gas to a lesser extent due to the absence or limited presence of gas. Additionally, two countries, Malta and Switzerland do not have country reports due to their closed nature with respect to household customers.
- **A robust, peer-reviewed barriers index** of how easy it is to do business in each country. The European Retail Energy Market Barriers Index, contained in the separate European Retail Energy Market Barriers Index Report, allows the objective comparison of market barriers across the focus markets. The report also includes a ranking of the focus markets.
- **An overall Final Report** containing a full project description and bringing together the findings and common learnings from all countries.

The Barrier Index and Ranking

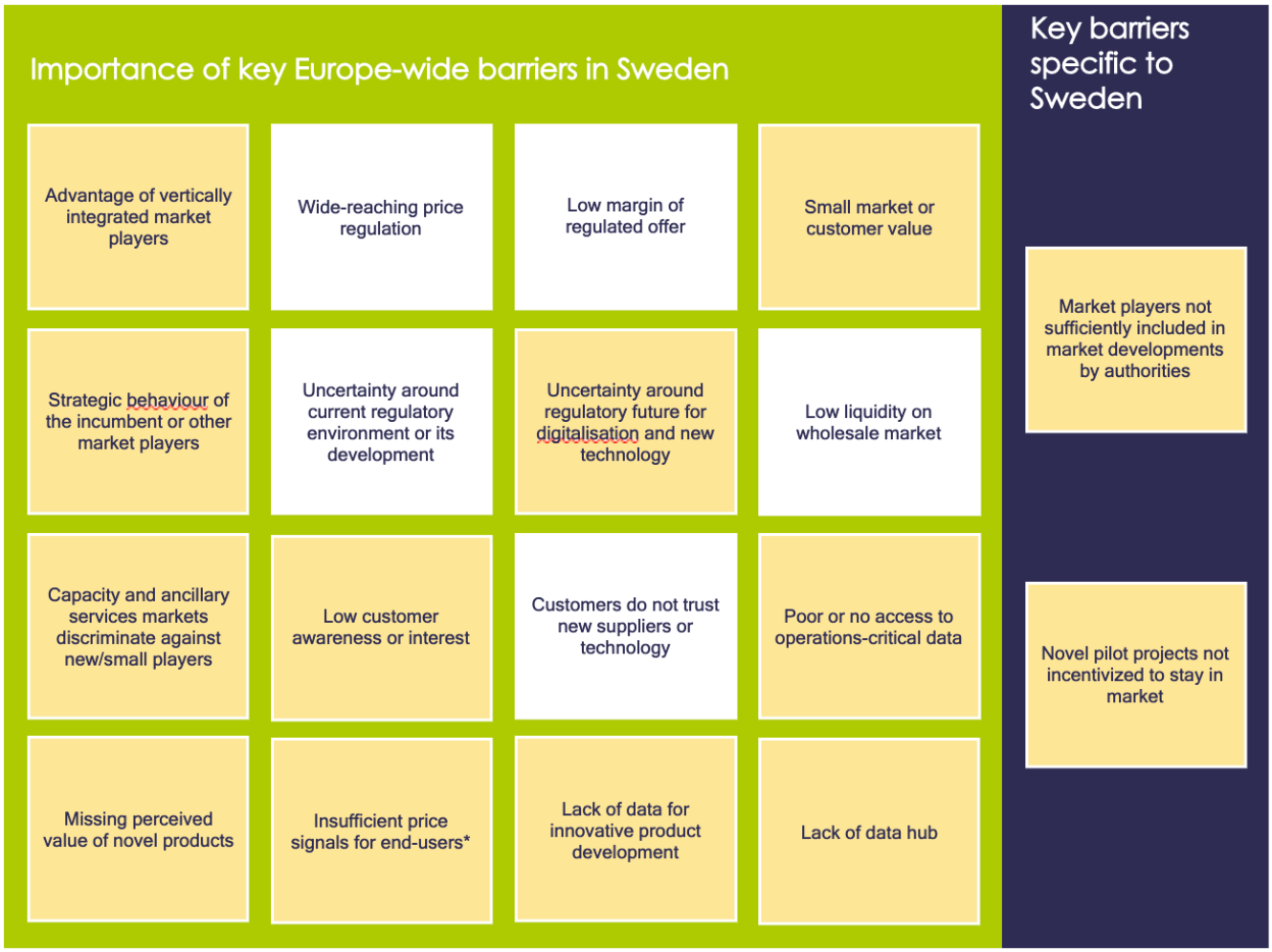
The purpose of the 'European Retail Energy Market Barriers Index' is to enable a degree of comparability between the barriers' context in each of the markets. It is based on metrics that can be collected for all markets, metrics for which available data currently exists. As such it provides a simple, best-available proxy benchmark measure for each of the categories of barriers identified by the project, for each market, and thereby ranks each market. It is intended to be used as an evolving periodical index and ranking on a European and national level.

The index and ranking should, however, presently be considered more of an approach and an indication than an absolute or definitive ranking. It represents the current state of market monitoring data in Europe and will evolve over time as data availability improves. Over time we would expect and recommend that governments and NRAs advance new metric collection to better enable future editions of the index and ranking.

A full description of the Index, its methodology and detailed findings and the ranking can be found in the separate Index report for this project. Within each country handbook the index values for that given country is presented.

Key barriers in the Swedish market

The following figure highlights the key barriers in the Swedish market. Please note, the terms are generic across all researched markets.



* Note that in Sweden end-user prices are in general closely tied to wholesale prices; this barrier arises when looking forward to more dynamic products that require closer to real-time market signals.

LEGEND

Has not been raised, indicated or identified as a barrier in this country

Has been raised or indicated as an issue in this country

- May include issues that still are present in the country or are experienced by suppliers even though regulation to address the issue has been enacted by the regulator and effects still awaited; reporting a lag between the regulatory framework structure and its awaited effects
- May include issues where suppliers suffer the effects despite the country being relatively advanced on this topic compared with other EU countries, pilot projects being in place or institutions working to overcome the problem.

Has been identified as an issue in this country and is supported by facts, data or substantial respondent evidence in light of limited initiatives deployed by institutions to control or overcome the issue.

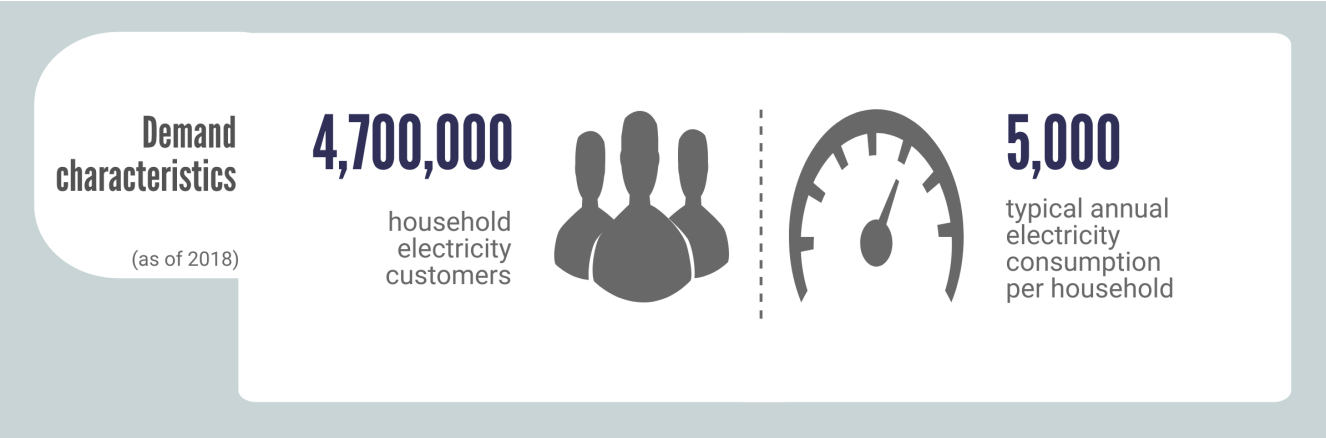
Key recommendations

The Swedish market is relatively active and has been for approximately two decades. A substantial proportion of customers have switched electricity supplier. However, the market remains characterized by many small, local DSOs, vertically integrated or otherwise bundled with or ownership related to suppliers. The number of independent and new entrant suppliers is relatively low, as is their market share. This would indicate a market with many successes, but nevertheless significant remaining barriers hindering entrants from establishing and operating effectively.

- **Vertical integration.** Access to data can be seen as difficult for independent, especially with smaller DSOs. The coming data hub should solve this issue to a large extent. Other inequalities arising from ownership bundling would arguably require complete unbundling to level the playing field for all market players in a lasting way.
- **Barriers to innovation.** While market players are ready to offer innovative services, particularly in flexibility, the market environment can be seen as challenging fo innovation. Identified issues arguably include market processes, e.g. new models not fitting current regulations, and access to balancing markets. Countries that have already taken big steps to welcome innovation onto e.g. the balancing markets, such as Finland, could possibly serve as guidance on this issue.
- **Uncertainty and lack of inclusivity in market developments.** Some suppliers felt that Ei did not include market players sufficiently in discussions around market developments, and that details and timetables of how several proposed changes will be implemented are unclear. Improved communication by Ei with market actors would go a long way to improving this atmosphere and facilitating business planning for the future regulatory landscape.

MARKET OVERVIEW

As one of the earliest markets to deregulate and liberalise (1999), Sweden is generally regarded as one of the most developed, efficient and mature electricity markets in Europe with a highly effective and liquid wholesale market (part of the Nordic wholesale market) and an active level of competition. Despite having less than five million household electricity customers and a practically insignificant gas market (the gas market is therefore not covered by this report), it can also be seen as a relatively large market in terms of electricity network size, capacity, generation and consumption.



Given it's wealthy and digitalised customer base, its proximity to the relatively similar neighbouring Nordic markets of Finland, Norway and Denmark, and a somewhat liberal, yet responsive and evolutionary approach to regulation, the Swedish Electricity energy market is therefore often seen as an attractive market for aspiring new entrant competitors, despite its relatively modest size and competitive prices. It is also a market where rooftop solar, EV and other electricity related offerings are gaining momentum.

In light of this, it is perhaps somewhat surprising that the Swedish market has had relatively few new entrants other than through acquisition and the entry of a handful of large players from other Nordic countries. While the majority of customers have switched supplier at least once, former incumbent retailers have managed to retain the vast majority of Swedish customers and new entrants have not managed to organically grow to a large size. What's more, the State has retained substantial interests in the market with the single national TSO, Svenska Kraftnät, and the largest generator, Vattenfall – also one of the two largest network and retail businesses, owned by the government. There is also very extensive municipal (mostly integrated, bundled or otherwise related) ownership of networks, retail and generation (often as part of district heating schemes).

Background

The Nordic wholesale electricity market

Norway set the model for deregulation in 1991 when Statnett was created an independent transmission system operator (TSO); point access to networks was introduced which allows a generator or consumer to pay one charge to access the whole market; and the former cooperative energy only power pool was opened to all comers. Sweden followed with similar changes over the period 1992-96, and a jointly owned market company, NordPool, was created which ran a spot market and managed congestion between price-areas. Finland joined the Nordic market in 1998 and Denmark in 1999-2000. The Baltic states integrated successively into the Nord Pool-area since 2010. The Nordic market coupling to Europe was formally completed 2014, following numerous market and price coupling landmarks with Germany, Netherlands and Poland in the preceding years. Critical features that create an integrated wholesale market are 1) a common point access or “entry/exit” basis for charging for the use of the networks; 2) Elspot, which has a monopoly of the physical spot market, is a unifying factor of the market; 3) there is free flow between the areas of the four system operators; and 4) the system operators in each country are bound together through a System Operation Agreement.

The market has no centralised dispatch; the generation companies and other market participants both schedule and dispatch themselves. But “balance responsible parties” have a legal obligation to submit balanced schedules for each hour (which is the settlement period of the market) for each price area in which they are active.

The common Nordic retail electricity market

NordREG, the association of Nordic regulators has long been working towards a common Nordic retail market. Sweden is in the process of discussing or developing several aspects of harmonization identified by NordREG in 2016, namely a “supplier centric” model, where customers in most cases only have to contact the supplier and have combined billing for energy and network charges. Ei (the Swedish regulator (see below) has proposed a supplier centric model to the government and is waiting for a response. A data hub, being developed in Sweden but also Finland and already live in Norway and Denmark, Finland is expected to support this transition as well as providing other benefits for competition.

The Swedish electricity market

In 1909 the government created what became Statens Vattenfallsverk, the Swedish State Power Corporation, which built generation and had sole responsibility for developing the high voltage transmission system. The responsibility for distribution was largely municipally based and some of the distributors went on to develop generation, particularly in the 1960s.

Restructuring in Sweden for competition was a relatively lengthy process. In 1992 Vattenfallsverk was split into production, Vattenfall AB, and transmission and system operations, Svenska Kraftnät, both of which are government owned. The 1995 Electricity Act provided for point access charging. Also, all network services must be affiliate unbundled from generation and electricity sales and held in separate network companies. The Act created a regulatory authority which has evolved into Energimarknadsinspektionen (Ei; The Energy Markets

Inspectorate), Its initial responsibility was regulating network charges, but with the introduction of the EU Directive "Concerning common rules for the internal market in electricity" of 26 June 2003, it expanded its activities to include the balancing market and ancillary services. In 2008 it was made into a separate agency. The Swedish Competition Authority (Konkurrensverket) is responsible for enforcing competition law in the energy market.

Swedish Liberalisation timetable

While household customers could switch supplier already in 1996, it was not until 1999 when the costly need for a new meter had been removed, that the market could be considered truly liberalised. It was nevertheless among the earliest retail electricity markets in Europe to fully liberalise.

- **01.01.1996:** I&C and household customer allowed to switch supplier, but new meters required for switchers from incumbents.
- **01.11.1999:** I&C and household customers allowed to switch supplier without requirement of new meters.

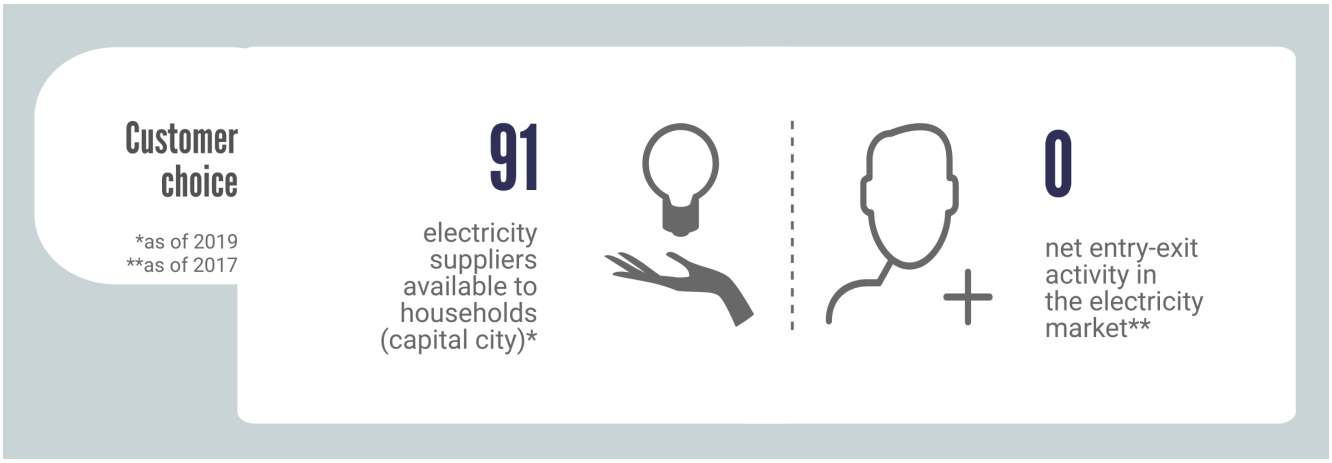
Market structure

Svenska Kraftnät, owned by the government, is the TSO. There are about 170 DSOs, the majority of which are municipally owned, but a few are privately owned such as Stockholm Energi acquired by Fortum (majority owned by the Finnish state). They have been both merging and also selling themselves to the larger companies. The majority operate district heating schemes. DSOs must be legally unbundled from any supply business: the Swedish Electricity and Natural Gas Market Act 2018 states, "A legal entity that owns a distribution system operator (DSO) may not generate or trade in electricity, and legal separation is required between retailing and DSOs". There are regulations requiring transparency and non-discriminatory behaviour by DSOs. All companies running network operations and are part of the same group as a company that produces or trades in electricity must compile a monitoring plan in accordance with the Electricity Act. The companies must also publish an annual report describing the measures they have implemented according to the plan. The board members, CEO or company signatories of any DSO must not simultaneously hold any of these roles in a company that trades in electricity.

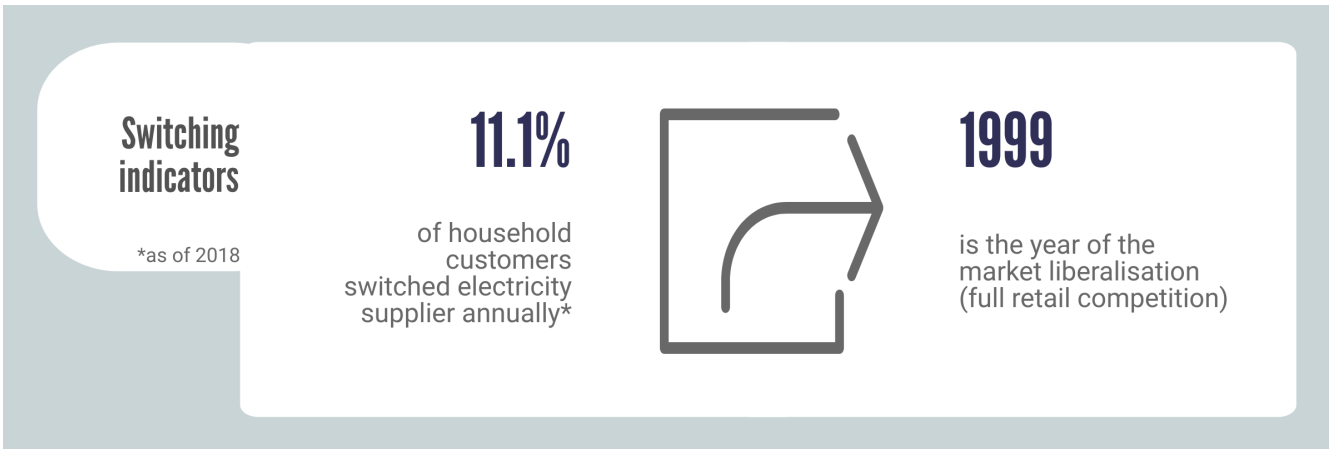
If the electricity retailer and the DSO belong to the same parent company the customer usually receives one bill; if a customer switches retailer (s)he often gets two separate bills (one from the supplier and one from the DSO).

Sweden has an annual consumption of electricity of about 145 TWh with significant consumption by pulp and paper companies. The electricity generation system is built around large-scale hydro generation mainly in the north, and nuclear in the south. Nuclear power has long been controversial and while no new plants will be built, Swedish policy about closing them has been cautious. Thus far under Danish pressure the two reactors at Barsebäck were closed, while due to declining profitability and increasing costs Ringhals 1 and 2 will be closed by 2020 (but Ringhals 3 and 4 are going to be upgraded). Generation is dominated by a small number of major companies. Vattenfall alone is responsible for more than 40 per cent of production, and together with Fortum and

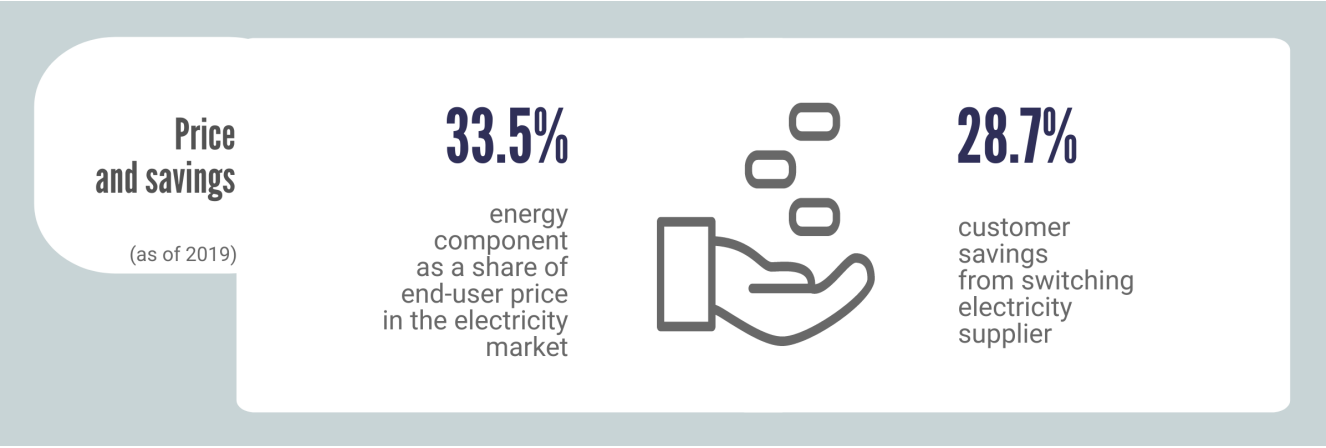
Uniper (formerly E.On) the three have a market share of more than 70%. The majority of the remaining 30% is owned by municipalities (often as part of district heating schemes) and new entrant renewables generators. More than 2.4 million apartments (out of almost 2.5 million), and more than 250 000 individual houses (out of 2 million) are connected to district heating schemes. Controllable generation capacity has been steadily decreasing for some time, while intermittent renewables are increasing, and hence there is a challenge in ensuring adequate capacity into the future.



In 2019 Sweden had 129 electricity suppliers, 91 of which offer to customers nationally or at least in the capital Stockholm. The three largest are subsidiaries of large companies – Vattenfall, Fortum, and Uniper (formerly E.On) – and have a market share of 46%. Smaller players have also had considerable success in the market: for example, since the earliest days of competition in Sweden, Telge Energi has been an active and innovative retailer, growing from a small municipal player to a major national competitor selling renewable electricity to 170,000 customers. Other successful players have included, for example, Storuman, Skellefte Kraft, Jämtkraft and Bixia. However, it is important to note that these aforementioned players are former incumbents (or owned by incumbents or groups of them as in the case of Bixia). Typically, there are less than a handful of independent supplier entrants and exits each year. In fact, the majority of suppliers in Sweden are neither independent nor so active, they are local and municipal suppliers who may or may not have a profit seeking objective and many aim to provide electricity at or near cost in their home areas. Much of their electricity is generated as a joint product in district heating schemes.



There are 4.7 million household customers in Sweden who consume an average (not the same as typical) 7000kWh annually. Average all-in price for end-users in Sweden is low (0.284 SEK/kWh or 2.69 €c/kWh in 2017). Dwelling type has a large impact on consumption patterns: apartments have a nominal annual consumption of 2000 kWh/year (costing EUR 425), detached houses without electric heating 5000 kWh/year, and detached houses with electric heating 20,000 kWh/year (costing c. EUR 2,940). In 2019 the end user price consists of 33.5% electricity supply cost; 28.3% network charges; and 38.2% electricity/energy taxes and VAT. The most common contract type (49% of contracts) is a monthly variable tariff, with fixed price over 1 or 3 years and default/assigned contracts (provided to inactive customers) making up 10-14% each. There is a trend for customers to move from fixed-price and assigned contracts to variable price contracts. 11.1% of customers switched supplier in 2018, a rate that has changed relatively little since liberalisation.



Sweden relies mainly on district heating and electricity for heating homes and buildings.

Regulatory and Political orientation

Although the authorities' market developments could arguably initially have been quicker to facilitate effective competition upon liberalization, the market is now relatively well-functioning thanks to a pro-competitive regulatory ethos. While barriers to competition persisted in the first years of an open market, allowing incumbents to exploit their position, initiatives by smaller players coupled with the unpopularity of the industry due to poor customer service and error prone and untimely billing encouraged the authorities to be more proactive.

The electricity market is under the supervision of three regulatory authorities, each with its own sphere of responsibility:

- The Energy Markets Inspectorate Energimarknadsinspektionen (Ei) is the Swedish National Regulatory Authority, a separate independent agency. Ei supervises the electricity, gas and district heating markets, and handles specific customer-related issues. It also regulates the DNOs to ensure that their network

tariffs are reasonable. The retailers are, however, free to set their prices for electricity. Ei runs the Elpriskollen price comparison website.

- The Swedish Consumer Agency (Konsumentverket) is headed by a Director General who is also Consumer Ombudsman. It represents consumer interests to the business world and pursues legal action on behalf of consumer interests. It provides a price comparison service based on voluntary information provided by retailers.
- The Swedish Consumer Energy Markets Bureau (Konsumenternas energimarknadsbyrå) is an independent bureau which provides advice and guidance to consumers. The principals are the three authorities the Swedish Consumer Agency, the Swedish Energy Agency and the Energy Markets Inspectorate together with the industry organizations Swedenergy and the Swedish Gas Association. It is funded by the energy industry to provide advice and guidance to customers on various matters about the energy markets (e.g. bills and contracts for supply) and offers information about retailers and their prices, and how to switch.

The supply market can be considered a regulation-light, reactive-regulation market. There is no explicit license required to begin supply operations, only registrations with relevant authorities (see Appendix 1: Processes), and there is no price regulation. The regulatory environment is currently changing with several significant developments in the pipeline, notably the launch of a Datahub and moving to a supplier-centric market model. These will serve to improve market functioning but create a measure of uncertainty in the meantime (see Barriers chapter below).

Context for aggregation/demand response

Following issues around data problems resulting from late and inaccurate billing when the mass market was liberalized, Parliament mandated in 2002 that by 2009 customers should receive monthly bills based on meter readings. However, the functionality of the meters was not specified, so in consequence there was a mixture of approaches driven by the distributors. Subsequently there has been extensive re-metering and now over 90% of Sweden's electricity meters are smart meters with provision for maximum hourly measurement. Infrastructure for demand-side management and aggregation is already in place.

Meters are to be upgraded to 15-minute metering by the end of 2024, which should open up possibilities for more active participation from the customer side, and hence create business opportunities for demand response by aggregators. It is, however, not currently possible for a company to act as an independent aggregator because it requires the agreement of the retailer - who is a potential competitor – to access customers. Demand response products (smart homes, vehicle charging, explicit DR services) were felt by most respondents in this study to constitute some of the most important recent innovations in the Swedish energy market. The smart home automation company Tibber has received particular attention in the industry. However, most practical experiences remain demonstration/pilot projects rather than commercial ventures.

Sweden's energy policy has for many years aimed to achieve a sustainable energy system with a focus on energy efficiency and household renewable energy production, and the authorities are in principle in favour of DR. Household DR is still small, but is likely to generate more customer interest and uptake as electric vehicles become more widespread. Indeed in 2017 Ei published a comprehensive analysis on "Measures to increase demand side flexibility in the Swedish electricity system". Ei estimates that the technical potential for demand side flexibility from households that use electricity for heating or run heat pumps - the largest customer segment with DR potential - ranges from 1800MW in the summer to 5800MW in the winter, most of which is in detached homes with electric heating. On the markets, all reserves are in theory open to demand-side bids, included aggregated demand, but in practice participation in reserves other than the frequency containment reserve is limited by high minimum bid sizes. Demand also participates in the Nord Pool spot markets to some extent.

BARRIERS

The European Barriers to Entry and Competition in Retail Energy Markets project has researched barriers across 30 European markets. From this research, barriers to entry have been identified and grouped into four over-arching pan-European barriers' blocks.

Over-arching pan-European barrier blocks

Barrier Blocks		
	1	Regulatory disincentivisation
	2	Market inequality
	3	Operational and procedural hinderance
	4	Customer inertia

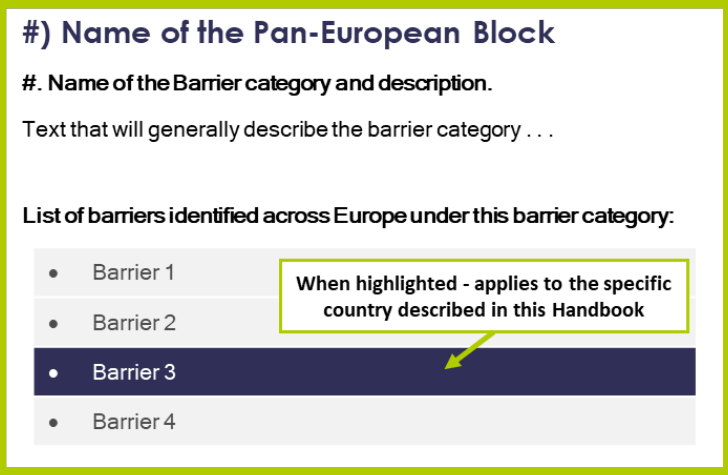
Description of the four-over-arching pan-European barrier blocks:

1. **Regulatory disincentivisation:** barriers arising as a consequence of the general regulatory framework of the electricity retail markets. We address the impact of price regulation, burden (-sharing), regulatory unpredictability and access to innovation. All these items may disincentivize competition within the electricity retail markets, as well as entrance by new suppliers.
2. **Market inequality:** barriers arising from an uneven playing field for different types of suppliers. Often, certain market players already have a competitive advantage by being very close to the formerly integrated DSO (or still being vertically integrated in case the de-minimis rule applies), controlling a large amount of generation capacity or having a large market share. If market rules do not prevent this, such players can exercise their market power to treat other market players in a discriminatory way, creating market barriers. We examine issues related to unbundling, historical roles and access to market mechanisms.
3. **Operational and procedural hindrances:** barriers arising as a consequence of the complexity and national/regional differences in standards and procedures in different process areas, affecting how easily new entrants can enter and operate in the energy retail market. We look at issues and differences in licensing, signing up and operations compliance, as well as data access, processes and data management from the suppliers' point of view.
4. **Customer inertia:** barriers arising due to customer behaviour and attitude. For the energy market to function, end-users must be willing and able to switch supplier. If customers do not switch supplier, suppliers need not worry about losing customers, so there is no incentive for suppliers to improve their services, minimize prices or innovate to compete for customers. We examine barriers related to customer inactivity or disinterest in the energy markets.

Within each of these high-level blocks are contained sub-categories, which are also mostly pan-European in nature. Each of these sub-categories contain the specific barriers which relate to individual markets as described in the following chapter. Altogether, we identified 45 barriers, most of which broadly across Europe. Only a selection of them apply to the Swedish case as reported in the following chapters of this handbook.

HOW TO READ AND INTERPRET THE FOLLOWING SECTIONS

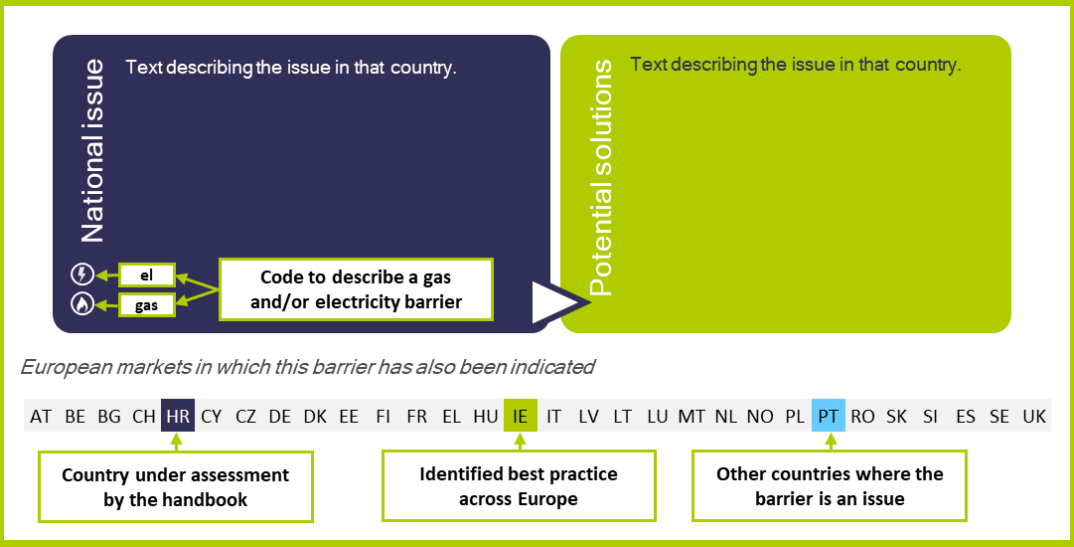
Each of the following four chapters explores one of the four pan-European blocks of barriers and report how each sub-category barrier apply to Sweden. When a barrier applies to Sweden, it will be highlighted in the table following a general description of the barrier itself as shown in the example below:



As shown in the figure above, the table lists all the barriers we have identified in Europe within the specific barrier category. **Only where a sub-category barrier is highlighted in the table does it indicate that suppliers raised it as a barrier, and it is a prevalent issue in Sweden.**

Highlighted sub-category barriers are then briefly described following a twofold methodology which:

- reports what the suppliers are experiencing in the market as a national issue and
- suggests potential solutions to the problem as depicted in the figure below.



At the end of each chapter, Sweden's performance within the category, according to quantitative indicators, is then presented.

For additional market context, please see Appendix 1: Processes, which gives a high-level graphical overview of the most critical steps involved in establishing and operating as a supplier in the national market.

1) Regulatory disincentivisation

Within regulatory disincentivisation, barriers across Europe have been sub-categorised into four areas encompassing 17 specific barriers[1]:

1. **Price regulation.** Regulated prices usually refer to regulation or control of end-user's prices by a public authority, usually the National Regulatory Authority (NRA). Price regulation can take different forms, such as setting or approval of prices, price caps or various elements of these. In Europe, there still exist Member States which have maintained end-user regulated prices during the market opening process and after, in the intention of protecting households or even non-household customers from significant increases in energy prices, especially in a context of limited competition. In some cases, this regulation has led to below cost prices and to low margin to cover the supplier activity risk, discouraging investments and the emergence of newcomers.
   According to CEER[2], 14 European countries out of 27 answering a recent CEER survey have price intervention in electricity for household consumers. Where regulated prices remain, NRAs tend to consider them as a significant barrier to entry for alternative suppliers. All Member States, where NRAs consider regulated prices as a significant barrier, are planning to remove them, at least for non-household customers. Across Europe, the following specific barriers related to price regulation were detected by this study. Those highlighted in blue have been raised, indicated or identified as barriers in Sweden:
   - Price regulation discriminates against certain suppliers.
   - High penetration of price regulation
   - Low margin of regulated offer (margin squeeze)

2. **Burden sharing.** Energy suppliers across Europe are often required to collect payments for services not part of their business, or to provide other services such as services related to energy efficiency, or to manage assets such as those of the metering system. These requirements can pose a barrier for suppliers' operation on the retail market by raising their costs and distracting focus from their core business and might deter entry into the retail market by newcomers. Across Europe, the following specific barriers related to "burden(-sharing)" were detected by this study. Those highlighted in blue have been raised, indicated or identified as barriers in Sweden:
   - Obligation to collect tariffs unrelated to energy on behalf of others
   - Obligation to keep a minimum-security stock as a gas reserve

3. **Regulatory unpredictability.** The establishment of an internal natural gas and electricity market in the European Union is an ongoing process. European legislative packages are boosting this process, making

[1] Please note: these definitions are Europe focused, not Sweden specific. Highlighted barriers have been identified as country specific.
[2] Monitoring Report on the Performance of European Retail Markets in 2018. CEER Report 4 November 2019.

market regulation evolve rapidly. Transposition of regulation into the national regulatory frameworks is not always smooth and NRAs' actions are sometimes unpredictable. This leads to uncertainties for suppliers related to unclear and unknown future developments of the regulatory framework, including the attitude of the institutions that regulate the retail market and oversee market operation and organization. This uncertainty is a barrier that impacts suppliers' business, preventing their entrance in the market, making strategic business planning difficult or forcing them to adopt different approaches during operation. Across Europe, the following specific barriers related to "unpredictability of regulatory framework" were detected by this study. Those highlighted in blue have been raised, indicated or identified as barriers in Sweden:

- Suppliers face uncertainty because of a newly liberalized regulatory environment or uncertain future development of the regulatory framework
- Uncertainty caused by industry actors influencing legislation, e.g. incumbent or associations shape legislation
- Uncertainty regarding future regulatory developments, especially in the field of digitalization and new technology
- Attitude of authorities hinders development of the market
- Uncertainty regarding environmental obligations and non-renewable generation capacity

4. **Access to innovation.** Most European energy market are currently designed based on practices as they were during the period of national monopolies by what today are incumbent suppliers. Allowing suppliers and new entrants to be innovative depends not only on the opportunity to compete on prices, but also to diversify, welcoming new products, market actors and business models. When national regulatory frameworks do not take into account innovation in the retail market (regarding e.g. availability and functionality of smart metering, the possibility of flexible contracting and tariffs, or whether the demand side can bid in the balancing system), this may pose a barrier for new market entries, particularly more modern players. If new entrants are to be enabled in order to increase the level of competition in the retail market, regulations must accommodate future developments on the energy markets, especially considering that in the future new entrants may not only be electricity and gas suppliers but also act as aggregators or energy service companies (ESCOs). Across Europe, the following specific barriers related to "innovation-friendliness" were detected by this study. Those highlighted in blue have been raised, indicated or identified as barriers in Sweden:

- Data protection issues
- Lack of incentivisation for novel pilot projects or post-pilot market rollout
- Lack of data for innovative product development
- No fit between new business models and existing regulation/obligations
- Missing flexibility in tariff structures
- Missing information and incentives for demand-side grid management
- Market structures do not incentivize novel products (missing perceived value)

1.1 Description of regulatory disincentivisation barriers in Sweden: Price regulation

Prices in Sweden are fully deregulated. Hence, no barriers relating to price regulation were identified in this market.

1.2 Description of regulatory disincentivisation barriers in Sweden: Burden (-sharing)

No barriers related to burdens on suppliers or burden-sharing were identified in Sweden.

1.3 Description of regulatory disincentivisation barriers in Sweden: Regulatory unpredictability

Uncertainty regarding future regulatory developments, especially in the field of digitalisation and new technology. In the research this barrier was identified as an issue in Sweden. Regulatory uncertainty regarding the future of demand response aggregation or other novel services can hinder investment/innovation in these areas. A clear regulatory vision gives market actors confidence to roll out new technological advances without excessive business risk. This issue tends is heightened in Sweden because it is a highly digital society where there are innovative players in a position to offer advanced digitalized services.

National issue

Much new legislation is currently under development or proposed, and its implementation is not yet clear. For example, legislation around the supplier-centric market (to be launched in tandem with the Datahub) is not yet finalized but will entail substantial changes to market roles and functioning. The role of DSOs in the proposed supplier-centric market is unclear. The switching and moving processes will probably change with the introduction of the Datahub.

Potential solutions

Although market players are informed about what sort of changes to expect, more sharing of details would benefit market players' ability to plan. Similarly, publishing clear and realistic timelines - and following them stringently - as part of this information would be valuable in giving suppliers something concrete to plan around.

European markets in which this barrier has also been indicated

AT	BE	BG	HR	CY	CZ	DE	DK	EE	FI	FR	EL	HU	IE	IT	LV	LT	LU	NL	NO	PL	PT	RO	SK	SI	ES	SE	UK

Attitude of authorities hinders development of the market. In the research this barrier was identified as an issue in Sweden. An atmosphere of perceived mistrust toward new products and services, or an apparent reluctance to involve market players in designing market developments, can discourage new entrants and novel developments. Raised examples / claims included: when the Swedish implementation of the Electricity Directive was conducted by the Energy Market Inspectorate a reference group was organised, but the participation from the market players was indirect, via the representatives of Swedenergy, and it is claimed that while the Energy Market Inspectorate listened to the feedback and proposals from Swedenergy, in the updated proposals the suggestions were not

addressed, and no explanation was given to the fact that no changes based on the input were made; a similar situation occurred during the process to develop legislation for a supplier centric model in Sweden, e.g. regarding how the new credit risks between suppliers and DSOs should be managed. Swedenergy created a special working-group for this and representatives from the Energy Market Inspectorate were invited to a meeting – it is claimed that while they listened, the Energy Market Inspectorate did not find a satisfactory solution in their final proposal; the Energy Market Inspectorate has organized well attended open seminars on different matters (the "Smart Grid Forum"), but the perceived objective from some participants is that the seminars have been informative more than co-operative, informing participants of largely finished proposals, rather than enabling co-creative dialogue and collecting input from participants; demands for detailed information on invoices have been perceived by some as required without sufficient analysis of whether it is the best way to empower customers.

As one player summarized it, "we would wish to see a much tighter and more dynamic dialogue between the authorities and the market players. An iterative process the authorities use to collect ideas and knowledge from the market players early in the process, test different ideas, collect feedback in a much more structured and open way than today… unfortunately our feeling is that the authorities lack trust in the players on the electricity market. This distrust unfortunately does not contribute to a constructive dialogue between the authority and the market participants".

National issue

Some substantial suppliers commented on an apparent reluctance of Ei to involve them as much as they could within market developments. One commented that while the NRA aims to cooperate with market actors, this is not working in practice. This can in the views of some lead to developments that appear unnecessarily complex. DSOs, as regulated actors, were felt by suppliers to be met with less suspicion by the regulator.

Potential solutions

Respondents who raised this barrier were comparing to other Nordic markets, which present a high standard to meet as they are well-functioning and communicative compared to most other European markets. Nonetheless, it was felt that a more cooperative and trusting approach to market players from Ei would facilitate cooperation between all parties with roles in the market and hence innovation.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

1.4 Description of regulatory disincentivisation barriers in Sweden: Access to innovation

Lack of incentivisation for novel pilot projects or post-pilot market rollout. In the research this barrier was indicated as an issue in Sweden. Lack of financial incentives, including the possibility of remaining on the market after project completion, can be a major barrier for conducting pilot projects in DR and other novel technologies, discourages participation in such experimental work as there is no immediate commercial reward for the risk borne by the supplier.

National issue

Pilot projects have been constrained by explicit rules prohibiting them staying active and becoming commercial after pilot completion.
In addition, the approach of Ei towards innovative companies was raised as somewhat problematic, for example taking a long time to respond to queries and applications, although processing of applications was not considered an issue.

Potential solutions

Pilot projects would be encouraged by the opportunity to stay active and commercialize upon project completion, as is done for example in Finland. Part of such enabling could involve authorities such as the Energy Agency reviewing funding sources, for example to include more venture capital (and hence commercial interest) in pilots rather than relying on national and EU government support, as is common currently.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

FINLAND BEST PRACTICE CASE: Incentivizing novel projects

Finland was raised by respondents as the best example among the Nordic countries of authorities encouraging pilot projects in novel services/products, mainly due to the practice of encouraging post-market roll-out of the service/product upon project completion. This raises market players' confidence that the authorities take seriously the need for integrating novel players into the system, and the potential for soon becoming commercially active naturally acts as a strong attraction for companies to get involved in such pilots. Encouraging participation in this way benefits the energy system by making it more likely that projects and players providing crucial new developments will be found. Under the Finnish approach, with good opportunities for suppliers to cooperate with the TSO, flexibility development happens through pilots. Indeed, Finland's energy system is felt to be the most conducive (at least in the Nordics) for products such as DR and aggregation, indicating lessons have been learnt effectively from pilots.

Lack of data for innovative product development. In the research this barrier was indicated as an issue in Sweden. Smart meters are opening up opportunities for novel demand-side and aggregation services, but aggregators must be able to access customers and their data independently of suppliers, who in effect constitute a competitor for the DR provider/aggregator.

National issue

Regulatory and infrastructure-related barriers related to insufficient data were reported to hinder suppliers in offering DR.
A key barrier is that independent aggregators are not in effect allowed in customer-side demand flexibility. Only one actor can be the balance responsible party (BRP) for each metering point, so any aggregation has to be undertaken by, or contracted by, the supplier. which effectively excludes independent aggregators. Moreover, the BRP is usually the supplier who may be a competitor, which creates a conflict in procuring such services.

Potential solutions

Timely implementation of updated Energy Directive rules, requiring aggregators to be allowed to act independently of the supplier, will address the issue of customer access. In the meantime, it would be beneficial to clarify the role of DSO in, and their scope for obstructing, novel services.
Data issues should be resolved by the Datahub (2022; see section 3.2) and 15 minute data from smart meters (2024).

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

No fit between new business models and existing regulation/obligations. In the research this barrier was raised as an issue in Sweden. Regulatory frameworks need to provide an environment that allows for further advances of novel models, products and services without risking either grid stability or confusion around market role definitions for all parties acting in the system (further details in "Market structures does not incentivize novel products" below). Without this clarity, it is challenging for novel services to enter and grow.

National issue

Suppliers felt hindered by missing or unclear regulations around more innovative products and services. In addition, the TSO was reported to appear hesitant about DR because it is concerned about its effects on grid functioning.

Potential solutions

More pilot schemes or other studies could be sponsored, e.g. by the Swedish Energy Agency, to identify the issues that must be resolved, including the concerns of the TSO.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

Missing flexibility in tariff structures. From our studies of this market, it appears that this could pose a barrier in Sweden. The potential of tariff structures to be flexible (or simply innovative) is a main driver of new models and especially demand flexibility as it allows the design of dynamic and other innovative tariffs that encourage customers to consume at periods of lower demand or enable or encourage suppliers and consumers to manage demand while delivering peace of mind or convenience to customers. Rigid structures hinder new and innovative demand-shifting offerings on the market. For instance, it was highlighted that payment models such as flat-rate have not been accepted by the Energy Market Inspectorate, and it was claimed that EU directives have in some cases arguably been "over-implemented", e.g. with the implementation of the Energy Efficiency Directive, prepayment was prohibited for suppliers (but not for DSO). It has been claimed that such inflexibilities create an unnecessary regulatory burden for incumbents and a barrier for entry for new players.

National issue

While total grid income is set by Ei, the tariffs are set by the TSO and DSOs. Although regulations allow flexibility in tariff structures, suppliers reported that tariffs tend to be too rigid to adequately reflect network congestion, security, etc. This hinders demand aggregation by not pricing the value it brings to grid function. It also hinders new models based on e.g. flat prices or pre-payment.

Potential solutions

Ei is currently elaborating secondary legislation on tariffs contributing to an efficient use of the grid. In this work, Ei is consulting an expert group consisting of stakeholders and in 2019 held a number of bilateral and open meetings with stakeholders on the topic.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

LATVIAN BEST PRACTICE CASE: Grid tariff flexibility

Inflexible tariffs can **no longer pose a barrier** to innovative products in Latvia, as recent regulatory changes enabled networks to charge more dynamically for distribution. In 2016 **differentiated distribution tariffs** were introduced for electricity market, which have been shown to **reduce end-user costs**. In 2019 differentiated distribution tariffs were introduced in natural gas market. Through these tariffs, end users are incentivised to decrease their connection capacities if appropriate, reducing their distribution costs and freeing up system capacity both for security and efficiency of supply and new connections.

Missing information and incentives for demand-side grid management. From our studies of this market, it appears that this has the potential to pose a barrier in Sweden. Operators are incentivized mainly based on CAPEX (infrastructure investment) rather than OPEX (procuring novel services), such that they prioritize grid expansion to improve grid control rather than capitalizing on flexibility services such as demand reduction or storage.

National issue

Incentive structures for system operators in Sweden are mostly CAPEX-based, limiting their motivation to procure flexibility from the market, which would instead incur operational costs.

Potential solutions

Ei is working to address this situation, with recent legislation on DSO incentives to remove the efficiency requirements for certain operational costs aimed at reducing the effects of capacity shortages. Ei is aiming for a TOTEX incentive structure in the regulation, possibly in place for the next regulation period.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

Market structure does not incentivize novel products (missing perceived value). In the research this barrier was indicated as an issue in Sweden. Without an existing demand and/or mindset for novel services such as DR, new entrants face the barrier of establishing the entire market before they can act in it. This is complicated if the market roles of different actors in the energy system, such as DSOs, are not clear.

National issue

Suppliers feel there is little room within their defined market role to add value by adding new products or services. Compounding this, the role of DSOs in providing services such as aggregation and storage is not clear, raising the risk that these regulated players encroach on the market roles of participants in the deregulated market. In addition, the market for equipment to help customers optimise their energy use, such as load control equipment, is currently immature, making it difficult for providers to fully equip customers for DR.

Potential solutions

Clarification around the role of DSOs would substantially improve this issue, to make it clear to suppliers how they can expect to interact with the DSOs in relation to novel services. An examination of the scope and type of obstacles to novel services would also be welcome.

European markets in which this barrier has also been indicated

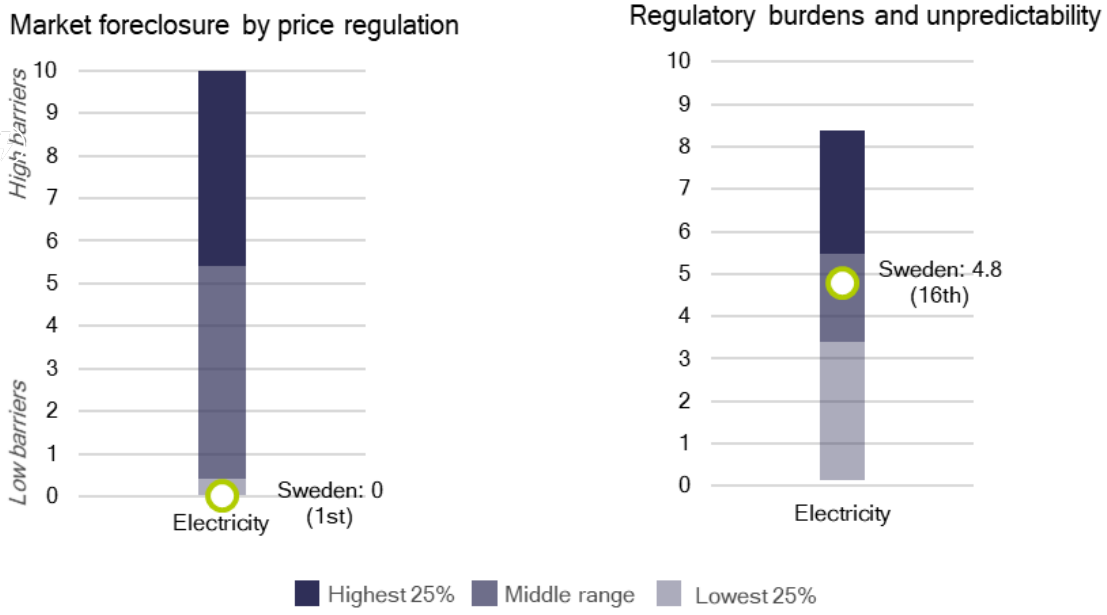
AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

1.5 Sweden's performance in this barrier category

The following figure shows quantitative indicators of how far regulatory disincentivisation acts as a barrier in this market. The values for Sweden are shown against the range across all analyzed countries. These scores contribute to the performance index. The performance indicators of regulatory disincentivisation are the following:

- **Market foreclosure by price regulation:** The index consists of two sub-indicators, the penetration of price regulation (among residual customers), and the mark-up of the regulated offer. A high score is attributed if a high share of customers is supplied at regulated price, and the mark-up is significantly lower than the average mark-up in the competitive markets.
- **Regulatory burdens and unpredictability:** The index consists of two sub-indicators. Regulatory burdens reflect the non-energy share of the energy bill in an average household, which are regulated (taxes, network fees). Regulatory unpredictability was measured via the related question in the supplier survey conducted for this project. A high score is attributed if the share of the non-energy elements is high, and if survey respondents scored the question highly (as an important barrier).

Performance indicators



As Sweden has no price regulation, it scored joint 1st across Europe for market foreclosure by price regulation, and . ranked in the middle of the European range on regulatory burdens and unpredictability (16th).

2) Market inequality

Within market inequality, barriers across Europe have been sub-categorised into two areas encompassing 8 specific barriers[3]:

1. **Unbundling and market power.** In order to facilitate better competition and improve performance of the individual parts of the energy companies, the Energy Directives introduced rules for legal, functional and accounting unbundling between DSOs and supplier. Although legal unbundling has been implemented throughout all EU member states, barriers arising from vertical integration can still be observed in many markets, raising the question if the required level of unbundling is sufficient in order to meet the goal of a fair and competitive retail market. Companies serving less than 100 000 customers are only obliged to implement accounting unbundling.

   In order to avoid confusion among end customers between the separate parts of integrated energy businesses, brand unbundling has been a focus area for NRAs over the last years. Nevertheless, in several EU countries, the difference in the branding of the supplier and the DSO is perceived as

[3] Please note: these definitions are Europe focused, not Sweden specific. Highlighted barriers have been identified as country specific.

insufficient. Strategic and unfair advantages for incumbent suppliers around transparency, pricing and access to information and data occur in most of the European countries studied. Access to production capacities can also be limited for small suppliers if market players with a large generation portfolio can withdraw production capacity from the accessible markets. Balancing and ancillary services markets can also be distorted as they are often still designed to mainly benefit large-scale generation, discriminating against smaller market participants. Below, we describe these barriers related to market power in more detail. Across Europe, the following specific barriers related to "unbundling and market power" were detected by this study. Those highlighted in blue have been raised, indicated or identified as barriers in Sweden:

- Lack of brand unbundling
- Discriminating, strategic behaviour of incumbent, and obstruction by other market players.
- Strategic, unfair advantage of vertically integrated market players and lack of transparency.
- Limited or biased access to production.
- Discrimination against new and small market players in capacity and ancillary services markets.

2. **Equal access to and maturity of wholesale market.** The wholesale markets present one of the most important sources for energy procurement for all market participants. New and small suppliers tend to have weaker bargaining position in bilateral negotiations, which incurs higher sourcing costs, therefore leading to a competitive disadvantage. Access to a well-functioning wholesale market (an energy exchange) therefore enables smaller suppliers to buy energy for competitive prices.
   Barriers related to the wholesale market can arise by discriminatory market platform access and the absence of any viable alternative. Furthermore, a lack of available products and low liquidity can both lead to an increase in risk, disadvantaging small market participants substantially more than large, established suppliers. Across Europe, the following specific barriers related to "equal access to and maturity of wholesale market" were detected by this study. Those highlighted in blue have been raised, indicated or identified as barriers in Sweden:

- Discriminatory market platform access (standards, guarantees, etc.)
- Low liquidity in the wholesale market (gas only)
- High price or volume risk in energy procurement

2.1 Description of market inequality barriers in Sweden: Unbundling and market power

Discriminating, strategic behaviour of incumbent, and obstruction by other market players. In the research this barrier was indicated as an issue in Sweden. This is a rather specific case of obstructive behaviour that applies to a uniquely Swedish process during switching, in which the supplier is given power of attorney to seek necessary

data on the customer's behalf. Both the previous supplier and DSOs can act in an obstructive way, e.g. delaying data sharing.

National issue

In order to switch, the new supplier must provide a large amount of data. This could all in theory be provided by the customers, but most customers do not have the knowledge or time to do so. Instead, they give the new supplier power of attorney to acquire these details from the DSO and old supplier. This creates a large amount of work for the new supplier, with considerably less impact on the previous supplier. In addition, new entrants feel that previous suppliers are deliberately slow to respond to requests for such information, even exploiting loopholes in legislation to avoid sharing the data. This delays switching and hence the new supplier's revenue. The inefficiency in this system is likely due to its having evolved out of market need rather than by design.

Potential solutions

Under current plans, the Datahub coming in 2022 will solve this issue by including all contract details centrally, such that new suppliers will not need to obtain any details through direct contact with DSOs or suppliers. In the meantime, imposing requirements on response times would go some way to alleviating this barrier (if they can be enforced; see section 3.1). If the problem remains after the Datahub launch, a fundamental redesign of and explicitly mandating for the data provision processes, may be required.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

Strategic, unfair advantage of vertically integrated market players and lack of transparency. In the research this barrier was indicated as an issue in Sweden. Supply companies that are integrated or co-owned with DSOs have advantages in e.g. accessing information and customers through the associated DSO. Integrated suppliers thus have the potential to leverage this unfair advantage, e.g. to target customers based on consumption profiles, and further to benefit from cross-subsidisation between the distribution and supply side by e.g. DSOs favouring sister companies when procuring services.

National issue

The structure of the Swedish market, like the other Nordic countries, is characterized by small, local, integrated DSO/supplier companies. This gives potential for the DSO to exploit its position, for example in accessing customer data, although market players reported that this was only a minor problem that mostly arises among smaller DSOs. Further, the nominated supplier (supplier of last resort) is usually the co-owned retailer of the DSO group, which is not necessarily the best solution for customers. Additionally, DSOs are able to encroach on market functions such as storage provision due to unclear roles (see section 1.4).

Potential solutions

Considering how widespread vertical integration is, concerns about exploitative behavior by DSOs were less severe than in other Nordic countries, e.g. Denmark. Nonetheless, regulation to extend unbundling would benefit the Swedish market by facilitating customer choice of supplier and reducing the potential for internal communication, cross-subsidising and favourable behavior in integrated groups. There are plans to introduce a supplier-centric market model, which would effectively hide DSOs from customers, but its implementation is unclear.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

GREAT BRITAIN BEST PRACTICE CASE: Unbundling of DSOs and supply businesses

Great Britain provides an example of well-functioning separation between distribution and supply. Ten of the 14 electric DNOs (distribution network operators) are free standing companies, while 4 are part of groups that include generation and supply businesses. Of the 4 companies that distribute gas, only 1 is part of a group that also owns a gas supply business. The companies that have generation or gas supply affiliates are effectively unbundled. In this study, we found no evidence of incomplete unbundling presenting a problem in Great Britain. DNOs are prohibited from providing end-user services, they are invisible to the customer, and no suppliers in the study had experience of the supplier/DNO relationship being exploited.

Discrimination against new and small market players in capacity and ancillary services markets. In the research this barrier was indicated as an issue in Sweden. The balancing landscape remains designed mainly for large-scale generation, making it difficult for smaller-scale/aggregated generation or demand-side bids to participate as they cannot meet the product requirements.

National issue

Rules around balancing were felt to restrict demand-side involvement. The balancing markets remain focused on large generation, with similar product requirements and prequalification applied to new entrants with very different generation or load assets. This prevents them from participating in the balancing markets in practice, despite demand-side bids being allowed on the markets in principle.

Potential solutions

The TSO should seek to reform requirements for different balancing products to enable demand-side participation. Examples include reducing minimum bid sizes, increasing response times, and allowing step-wise activation, as appropriate for each product. These measures have been effectively implemented in Finland, and attracted a high level of consumption bids into the balancing market.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

FINLAND BEST PRACTICE EXAMPLE: Consumption bids in balancing

Several respondents active in aggregation and demand response expressed satisfaction at how Finland has redesigned balancing products to make them amenable for demand-side bids, complemented by its market-centric approach to DR. This indicates a willingness to let flexibility play a bigger part in the evolving energy system. Indeed, Finland's attitude to DR is positive and flexible, with respondents feeling that Fingrid is easy to work with and open to novelties. Many of the market structures for DR are an example of how to incorporate demand-side flexibility into the energy system. Some products are necessarily constrained by e.g. fast response times or minimum bid size due to their function, which make them difficult for DR providers to fulfill. However, open-minded amendments such as allowing pooling of loads, enabling step-wise activation or reducing minimum bid size where possible have opened up several products to DR. Developments remain ongoing, e.g. imbalance settlement for aggregators is currently under discussion. Progressive changes at the consumer end have also helped open the aggregation market in Finland, for example allowing 3rd party providers to access customers. Market players reported that the other Nordic countries are now developing in the same direction that Finland already has done, in this and other DR- and novelty-related aspects.

2.2 Description of market inequality barriers in Sweden: Equal access to & maturity of wholesale market

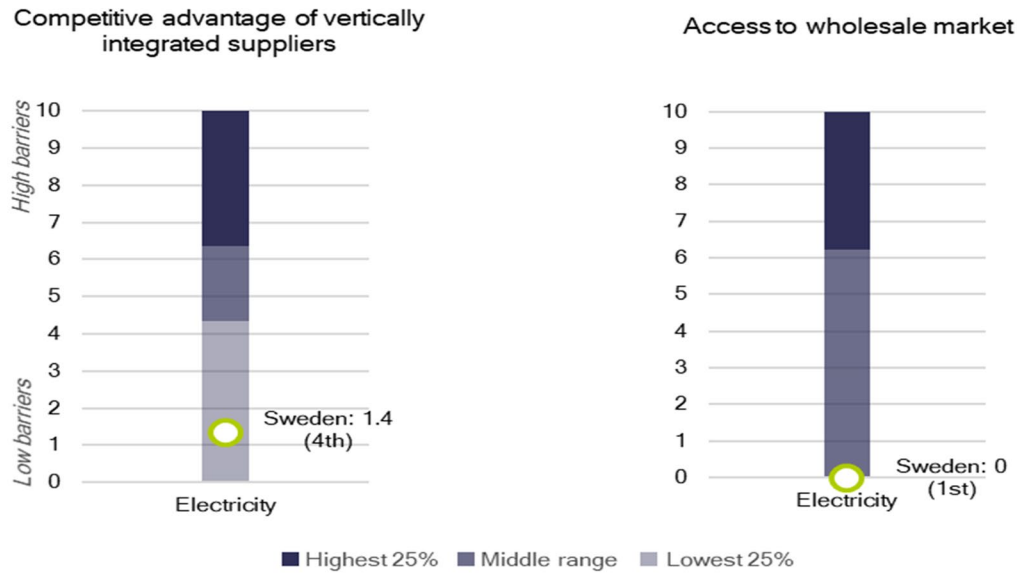
No barriers around wholesale liquidity were identified for electricity in Sweden.

2.3 Sweden's performance in this barrier category

The following figure shows quantitative indicators of how far market inequality acts as a barrier in this market. The values for Sweden are shown against the range across all analyzed countries. These scores contribute to the performance index. The performance indicators of market inequality are the following:

- **Competitive advantages of vertically integrated players.** The index consists of two sub-indicators, the market share of vertically integrated suppliers (on the household competitive market), and the strictness of DSO unbundling. A high score is attributed if the vertically integrated suppliers have a high aggregated market share, and the unbundling regime is not very strict (brand unbundling is not in force, high share of local, integrated companies).
- **Access to wholesale market.** The indicator measures the accessibility of the wholesale market by quantifying the liquidity of wholesale markets. High score is attributed if the traded volume is relatively low compared to the consumption of the country. Traded volume includes volumes that are traded at hub as recorded by brokers (over-the-counter) or exchanges and does not include 'contracted' (long-term contract or other bilateral deals) volumes which are conducted 'off market'.

Performance indicators



Sweden ranked 4th across Europe for competitive of vertically integrated suppliers, and joint 1st for access to wholesale market.

3) Operational and procedural hindrances

Within operational and procedural hindrances, barriers across Europe have been sub-categorised into two areas encompassing 13 specific barriers[4]:

1. **Sign-up & operations compliance.** Sign-up, licensing or registration, along with other administrative requirements or system establishment such as arranging contracts with relevant stakeholders (TSOs, DSOs, BRPs) are among the first steps that a new supplier undergoes to enter and operate in a retail energy market. To deliver natural gas or electricity to final consumers in Europe, an energy supplier usually needs to be registered to a certain institution list, or to proceed with a notification, or follow a process to grant a licence. Entrance processes for suppliers often requires commitments such as a minimum standard of customer service obligations, requirements on service quality, to provide financial guarantees or to have a communication system in place.
   In most responding NRA countries, suppliers need to register and make contracts with certain stakeholders (mainly TSOs and DSOs) to procure the access to the energy grid: transport capacity, balancing. This procedure can be very different from a country to another. Accessing wholesale markets and balancing may also require a license or prior agreement/registration with the market operator. In some markets, business processes to enter and operate in the retail market can be extremely detailed and burdensome. The lack of a functioning national wholesale market may also hinder the entrance of retail companies that are not vertically integrated. Across Europe, the following specific barriers related to "sign-up & operations compliance" were detected by this study. Those highlighted in blue have been raised, indicated or identified as barriers in Sweden:

   - Poor availability of information for market entrants & active participants
   - Heavy administrative process for entry (registration / licensing)
   - **High financial requirements (incl. long working capital cycles) and forced risk during operations**
   - Excessive reporting requirements during operations
   - Excessive information requirements around billing and energy labelling
   - **Highly complex or country-specific systems & processes**
   - Regional differences or differences between DSOs within a country
   - Cumbersome or biased switching process
   - Unduly burdensome environmental obligations
   - **Unduly burdensome or insufficiently regulated market exit**

2. **Data access & processes.** Data access and management refers to the processes by which data are sourced, validated, stored, protected and processed and by which it can be accessed by suppliers or

[4] Please note: these definitions are Europe focused, not Sweden specific. Highlighted barriers have been identified as country specific.

customers. In a well-functioning energy retail market, it is important that the information required to operate in the market is available to newcomers (subject to applicable legislation on data protection). This may include information on, for example, individual consumption or more specific meter details. This data is required in order for suppliers to carry out their market role, such as initiating a switch, or billing a customer. A standardized approach to the provision and exchange of data creates a level playing field among stakeholders and helps to encourage new, challenging market actors to enter the market. In order to avoid data management and access processes acting as a significant barrier to entry, Member States' initiatives to standardize data format and processes, including investments in data hub infrastructure, have the potential to make a positive impact. Across Europe, the following specific barriers related to "data access & processes" were detected by this study. Those highlighted in blue have been raised, indicated or identified as barriers in Sweden:

- Lack of data hub
- Complex, heterogenous IT infrastructure and/or low level of digitalisation
- Missing access or poor quality of operations-critical data

3.1 Description of operational and procedural hindrances barriers in Sweden: Sign-up & operations compliance

High financial requirements (incl. long working capital cycles) and forced risk during operations. In the research this barrier was raised as an issue in Sweden. High financial requirements, in particular securities, present a barrier due to the amount of capital that must be acquired and set aside. This is a challenge especially for small and new retailers. It can, of course be claimed that this barrier is prevalent in all energy markets, but it was prominently perceived in Sweden.

National issue

To access the wholesale market, the required collateral is very high compared to the level of cash flow in the industry at large. This is a challenge particularly for new entrants, who must attract significant investments to cover this before starting operations, while established players can secure against existing assets.

Potential solutions

Collateral requirements could be adjusted by the market operator to account for a company's size and hence ease of meeting them. Newer companies tend to be smaller, with a smaller trading volume and turnover, and hence pose less risk on the wholesale market.

European markets in which this barrier has also been indicated

Highly complex or country-specific systems & processes. In the research this barrier was raised as an issue in Sweden. Systems for forecasting, customer service etc. can be expensive, especially when first established and for smaller suppliers with less expertise in-house. If these systems are similar to those required in other markets, this investment can be capitalised on when expanding to other markets; if they are country-specific, expansion requires the same investment again in the new market.

National issue

Country-specific systems are a particular problem in small markets, such as the Nordics, as it requires large investment for a small customer pool. Cross-border differences in systems and processes often seem unnecessary to market players.
Within the Swedish context, it was reported that top-down control over certain operations processes - although these processes were not specified - feels restrictive, effectively hindering the development and launch of more innovative and potentially customer-friendly solutions.

Potential solutions

Plans exist in cooperation with the other Nordic regulators and governments to increase harmonization across the Nordic energy markets, with the ultimate aim of a full common Nordic retail market. Ei should continue pushing for these developments, which would effectively quadruple the size of the market accessible with the same systems to any entrant in the Nordic countries.

European markets in which this barrier has also been indicated

AT	BE	BG	HR	CY	CZ	DE	DK	EE	FI	FR	EL	HU	IE	IT	LV	LT	LU	NL	NO	PL	PT	RO	SK	SI	ES	SE	UK
■	■	■	■			■	■	■		■	■			■		■	■	■	■	■						■	

Cumbersome or biased switching process. In the research this barrier was raised as an issue in Sweden. Despite established systems, the switching process can be problematic for the new supplier.

National issue

The switching process is smooth and reasonably quick (14 days) provided that customer data is fully accessible. However, the use of “power of attorney” (details in section 2.1) is widespread, which causes extra effort for suppliers and delay for customers. There are no explicit requirements for the speed of response, so new suppliers frequently wait 2-3 months before finally gaining a “power of attorney” customer.

Potential solutions

Setting legal time limits for responses around “power of attorney” customer would reduce the potential for old suppliers to intentionally delay, and hence ease new suppliers’ gaining customers. The Data Hub is also likely to go a long way towards solving this issue (see section 2.1).

European markets in which this barrier has also been indicated

AT	BE	BG	HR	CY	CZ	DE	DK	EE	FI	FR	EL	HU	IE	IT	LV	LT	LU	NL	NO	PL	PT	RO	SK	SI	ES	SE	UK
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

IRELAND BEST PRACTICE CASE: Switching and win-back functions well despite DSO integration

The central messaging centre in Ireland is well designed, requiring timely messaging of switches and with fair access to that information for all players. Switching messages must be sent only after a customer signs a new contract, but within four days. Win-back may only start after this and is restricted to a 10-day window. Hence, despite there not being a centralized data hub that includes data storage as well as messaging, access to information and the opportunities arising from it are considered equal across market players. Other industry processes were felt to be similarly well-developed and fair.

Unduly burdensome or insufficiently regulated market exit. In the research this barrier was raised as an issue in Sweden. The possibility for suppliers to exit the retail market very easily, or to act without sufficient/timely sanctions on improper behaviour, can indirectly encourage irresponsible or unethical behaviour among suppliers. This can discourage new suppliers from entering and reduce customer trust and hence their willingness to engage with the market.

National issue

Monitoring of and sanctions on new entrants has been felt by some suppliers to be insufficient to enforce supplier obligations and hence the market model. This has led to several failures among companies who are poorly prepared for growth or adopt too aggressive pricing policies. Supplier failures decreases customer trust in the market and hence engagement. This reduced trust impacts new entrants hardest, as customers fear being let down again by unfamiliar players in the market.

A perceived insufficiency of data exchange efficiency between DSOs and suppliers is another issue. While Ei can monitor DSOs and force them to deliver accurate data on time, there is concern by some, that for whatever reason the issue remains. Some suppliers feel that they have little recourse if their operations are hindered by DSOs failing to provide data.

Potential solutions

Obtaining a balance between ease of entry and operation on the one hand to encourage new entrants, and ensuring proper behavior on the other to protect customers, is a challenge. Ei already has the power to issue fines, but not to suspend irresponsible or unethical companies from trading. A revocable license, that requires suppliers to meet specified obligations, could be one solution, provided it is not too burdensome to apply for. But pre-license reviewing is also important to prevent the wrong players entering the market in the first place. Potential solutions could be found from Great Britain, which is currently working to address similar challenges and is reviewing the financial strength necessary to get a license.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

3.2 Description of operational and procedural hindrances barriers in Sweden: Data access & processes

Lack of data hub. In the research this barrier was indicated as an issue in Sweden. There is no centralized data hub or platform for switching, which increases the time and effort required by suppliers in these processes. This

tends to favour suppliers vertically integrated with a DSO, such that the parent company benefits from DSOs providing data directly to the supplier side, or large, established suppliers with access to large amounts of customer data, including historical usage data.

National issue

Sweden has no centralized data hub, potentially giving integrated or co-owned retailers (a common market feature, see section 2.1) an advantage in accessing metering and customer data. The current plans for and political decisions around a Datahub are felt to be unclear, hence suppliers are reluctant to invest in systems until they are sure what will be required.

Providers of demand-side services in particular raise timeliness, quality and ease of access to data as a barrier to operations. Meter data is currently provided by network companies in different formats, thus increasing the amount of work for 3rd-party companies to access and act upon it.

Potential solutions

A Datahub is planned for launch in 2022. This should, if it is well designed, alleviate these issues by introducing standards around quality and format of data, as well as making access simpler and equal among market players. By stopping customers requiring interfacing with the DSO, novel players hope that this will also encourage inactive customers (see section 4.1) to participate. However, clarity should be provided around its functioning and timescale in order to enable suppliers to develop necessary systems and potentially novel products in good time.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

DENMARK BEST PRACTICE CASE: Denmark's DataHub

The development of the DataHub is held up by market actors in other countries as a good example of regulatory development that involved and cooperated with market players. A key aspect of the successful development process was that a single organization (the TSO) had a clear system-wide responsibility to implement the changes, enabling streamlining of the process. Market players report the launch of the DataHub as the most important recent innovation in Denmark's energy system.

NORWAY BEST PRACTICE CASE: A well-designed data hub improved market equality in Norway

The Norwegian market is characterized by a large number of small, local, currently vertically integrated supplier-DSOs. Across Europe, this study has found vertical integration to cause issues around data access, where the integrated supplier (usually the incumbent) has an advantage in data access through its affiliation with the DSO, which collects and controls the information. However, such issues were not raised in Norway.

This favourable situation results from the existence since 2019 of a centralized data platform, Elhub, that is functioning near-perfectly according to suppliers to even out the playing field around data access (see section 3.2). Previously, independent suppliers faced delays and obstruction in obtaining customer data from DSOs. The impact on data exchange was so great that one supplier described their dealings with DSOs as "different pre- and post-Elhub worlds". The Elhub moreover allows the regulator to technologically control that actors are behaving appropriately.

Missing access or poor quality of operations-critical data. In the research this barrier was indicated as an issue in Sweden. Poor availability, timeliness or quality of smart meter data decreases its utility to providers of novel service, while also increasing the effort and therefore costs needed to acquire it. This can give certain market participants such as vertically integrated suppliers a major advantage in leveraging this new technology.

National issue

While access to meter data is straightforward, its quality and timeliness is an issue - DSOs vary in the data format and speed at which they provide consumption data. Accurate consumption data is only provided after billing has occurred, so bills are based on historical consumption profiles and corrected later, which can confuse customers. Small DSOs, with less automated processes, and mostly in rural areas, were felt to be particularly inefficient.

Data access is particular problem for DR: historical, hourly meter data is necessary to identify a customer's flexibility potential and design attractive customer offers, but such data is currently difficult for third-party actors to obtain. Provision of the high-resolution and other data needed for more dynamic, novel products is currently slow, potentially because DSOs shy away from the administrative burden of including novel processes, which hinders supply companies from innovating.

Potential solutions

The arrival of the Datahub in 2022 should alleviate these problems. These concerns highlight the importance of including historical data in what will be accessible on equal terms to all market actors. For more novel market players, an ideal situation would be continuous reporting by the DSO with suppliers free to acquire the data whenever they need it.

European markets in which this barrier has also been indicated

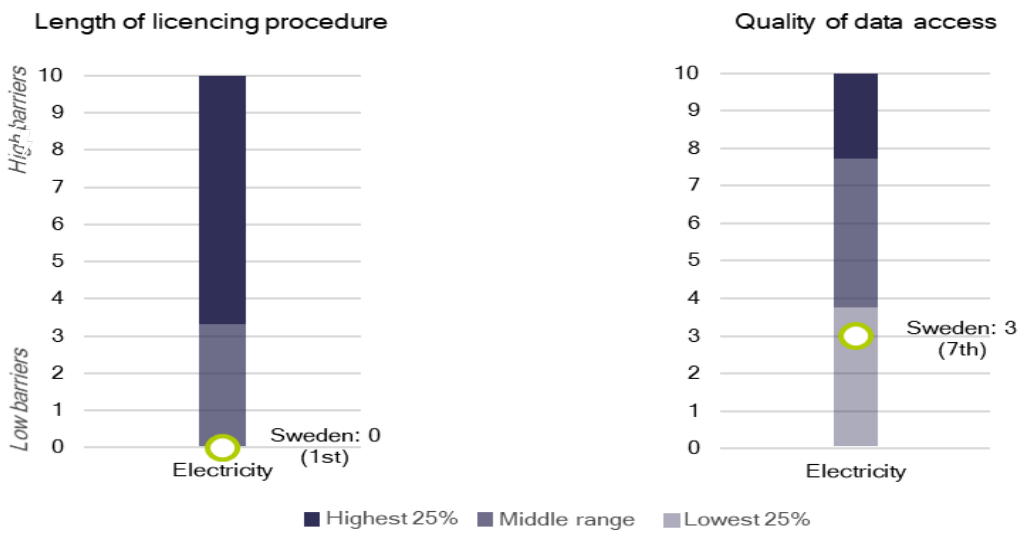
AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

3.3 Sweden's performance in this barrier category

The following figure shows quantitative indicators of how far operational and procedural hindrances act as a barrier in this market. The values for Sweden are shown against the range across all analyzed countries. These scores contribute to the performance index. The performance indicators of operational and procedural hindrances are the following:

- **Length of licensing procedure.** The complexity of the licensing procedure is quantified using the legal deadline of the licensing procedure. A higher score is attributed the longer the regulator's authorization period, while a score of 0 is attributed if there is no licensing obligation in the country,
- **Quality of data access**. Barriers relating to the quality of data access are measured with a checklist indicator, which focuses on the DSO's practices regarding data collection and access provision to suppliers. A high score is attributed if the format of the data provision is not standardised, third party access is not available via website or data hub, and the smart meter rollout is small.

Performance indicators



Sweden was ranked 1st across Europe for length of licensing. Sweden ranked highly (7th across Europe) for data access.

4) Customer inertia

Within operational and procedural hindrances, barriers across Europe have been sub-categorised into one area encompassing 6 specific barriers[5]:

Customer orientation. Whether customers want to or can engage with the market depends on a broad range of market characteristics, including how well authorities inform and support customers and how energy companies are viewed by the customer. For example, if there is no trusted central place to compare offers from different suppliers, customers may struggle to make an informed choice; or if customers perceive all energy companies as irresponsibly profit-driven, or providing a poor service, they may feel there is nothing to be gained from switching. Moreover, across Europe, most energy markets have been liberalized relatively recently (last 20 years, some only a few years ago), so for a considerable portion of customers the potential for them to engage may still feel unfamiliar. Across Europe, the following specific barriers related to "customer orientation" were detected by this study. Those highlighted in blue have been raised, indicated or identified as barriers in Sweden:

[5] Please note: these definitions are Europe focused, not Sweden specific. Highlighted barriers have been identified as country specific.

- Lack of information regarding available offers and switching possibilities
- Low customer awareness or interest makes it difficult to attract customers
- Insufficient price signals for end-users
- Changing supplier is cumbersome or has little pay-off for the customer
- Consumers prefer status quo
- Lack of trust in new or foreign suppliers and in new technology

4.1 Description of customer inertia barriers in Sweden: Customer orientation

Lack of information regarding available offers and switching possibilities. In the research this barrier was raised as an issue in Sweden. Price comparison sites exist, but they should be flexible enough in terms of how to search and rank offers to enable customers to engage with the market on their own terms. Strict price-based results also prevent suppliers from showing how other aspects of their product sets them apart, making it hard to compete effectively. This issue is more significant in markets where more innovative supplier models are available.

National issue

Several comparison sites exist, where customers can access information on available offers from all, most or some suppliers. However, these can only be compared on price. This was felt by some to prevent novel actors from promoting other aspects of their product, which might be an important part of customer choice. This is potentially important as price comparison sites have a significant influence on the market: 40% of customers who switched in 2018 did it through a comparison tool. There is no platform for comparing demand-side offers.

Potential solutions

Developing the information available on these sites would allow representation of more diverse aspects of suppliers' products, including DR, benefiting both customers - encouraging them to engage with the market by allowing them to do so on their own terms - and suppliers - freeing offerings up from competing almost exclusively on price. Ei's comparison website Elpriskollen already shows renewables offers and from May 2020 will compare hourly offers.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

NORWAY BEST PRACTICE CASE: Customer information

Norway has one of Europe's highest switching rates, driven by an informed and interested customer base who have by a wide margin the highest household electricity consumption. DSOs must provide customers with neutral information on how to choose a retailer which is available in the network area, and information about the national price comparison web site. The national price comparison website Strompris.no ranks contracts according to their estimated total cost and is monitored by the regulator to ensure that prices there reflect those on the suppliers' own websites. NVE also publishes a weekly online view of retail market prices. Underlying this, the focus of the market on similar products (open-ended spot-linked contracts) makes it easier for customers to compare offers between suppliers as there are fewer variables to account for. In addition to information on available offers, the authorities actively provide plentiful information on how and why to switch, and the switching process is easy and fast for the customer.

Low customer awareness or interest makes it difficult to attract customers. In the research this barrier was indicated as an issue in Sweden. Customers need to be both informed and motivated in order to be driven to engage with new energy suppliers. This barrier especially prevents uptake of novel services such as DR, as the benefits are difficult to promote to customers who do not already value energy or their role in the market.

National issue

As in several other markets, Swedish customers fall into two groups: those that are active and change contracts frequently, and others with no desire to apply their freedom of choice to their energy bills and hardly ever engage with the market. This inactive group was reported to have low awareness of, or interest in, participating in the market due to its complexity, relatively low electricity prices, and the fact that electricity is generally a low-interest product. Nonetheless, 87% of Swedish customers know that they can choose supplier. There was broad concern that demand response is hindered by a lack of customer awareness or interest in why or how they should engage in demand side flexibility. Moreover, DR is perceived by customers as complex and hence difficult to engage in.

Potential solutions

With regard to interest in DR, an information campaign - as indeed has been proposed by Ei - would greatly advance customer understanding of demand side flexibility functioning and potential, and hence potentially encourage participation.

Increasing interest in electricity more generally is a challenge, as low prices are a desirable outcome for customers, yet low prices tend to mean low savings, which are the main driver of market activity. Nonetheless, inactive customers present a key target group to target with e.g. information campaigns to encourage them to engage with the market. Novel products emerging onto the market may serve to increase interest by expanding customers' perception of - and hence interest in - the energy market beyond simply supply.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES **SE** UK

Insufficient price signals for end-users. In the research this barrier was indicated as an issue in Sweden. With limited price signals for end-users, due to e.g. the energy component of the bill being small, customers have limited power to bring their costs down and therefore to switch supplier or be flexible in their demand.

National issue

The energy component is only about ⅓ of an end-user's cost, with flat network charges composing c. ¼ of the bill. Hence, changing supplier or consumption can only have a limited impact on the bill, especially for low-consumption customers (e.g. those living in district-heated apartments). Nonetheless, the spot price is sufficiently volatile that bills for market-based products do vary considerably.

Low price signals are a particular concern for DR, as it reduces both the stimulation to alter behaviour and the economic benefit of doing so, thus reducing customer interest in DR. Moreover, although over 90% of Swedish electricity meters are enabled for hourly measurement, many lack functionality to provide customers access to hourly consumption.

In addition, settlement is based on simplified, profile-based rules; decoupling imbalance settlements from spot prices in this way can reduce customers' economic incentive for flexibility, and creates an economic risk for DR providers.

Potential solutions

Ei has proposed changes to the taxation arrangements for electricity, which comprises over 1/3 of a customer's total bill, such that the bill as a whole would better reflect real energy prices. Ei has also proposed requiring hourly metering and settlement on a daily basis for customers, along with a 15-minute imbalance settlement period on the markets. It is not yet clear how or when these proposals will be implemented. Nonetheless, higher-resolution smart meters and a Datahub will soon provide the infrastructure to base bills on actual consumption, which would aid the promotion and uptake of DR. Increasing loads as a consequence of heat pumps and EVs will also increase end-users' ability to affect their bill.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

Lack of trust in new or foreign suppliers and in new technology. In the research this barrier was raised as an issue in Sweden. While Sweden is a highly digitalized society that is therefore more adoptive of new technologies than most other European markets, it has been claimed that customers tend to mistrust new technology relating to energy - perhaps because innovation and energy are not something customers are used to - at least until they have been convinced that it is useful and will not disrupt their lifestyle.

National issue

In relation to demand response, there appears to be limited trust among customers that engaging in flexibility services will not impact personal comfort or business processes.

Potential solutions

It has been argued that this could perhaps be alleviated - at least to some extent - through more information, also from authorities who might be regarded as a neutral source by the public. Explanations / demonstrations of how DR can work might give customers confidence in their ability to avoid negative impacts on their quality of life.

European markets in which this barrier has also been indicated

AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

4.2 Sweden's performance in this barrier category

The following figure shows quantitative indicators of how far customer inertia acts as a barrier in this market. The values for Sweden are shown against the range across all analyzed countries. These scores contribute to the performance index. The performance indicators of customer inertia are the following:

- **Comparability of offers.** The index consists of two sub-indicators. The first measures consumers' ability to compare offers, based on a survey commissioned by the DG Justice and Consumers. The second is a checklist indicator which quantifies the availability of comparison websites, based on their number and functionalities. A high score is attributed if the consumers gave low scores for comparability, and there are no comparison websites in the country.
- **Perceived cost of switching.** Difficulties around the switching process are also measured based on DG Justice's survey. The indicator incorporates the experience and opinions both of customers who have switched, and also of those who have not because they faced obstacles or thought it might be too difficult. A high score is attributed if a high share of consumers reported a bad experience of or poor opinion on the switching process, among all customers who considered switching.

Performance indicators

Sweden was ranked 13th across Europe for comparability of offers and the perceived difficulties of switching were ranked highly for electricity (6th across Europe).

5) Other

Other aspects of the market not directly related to its functions, as addressed above, may also impact suppliers' ease to enter and operate in the market. These relate to characteristics of the market that are not necessarily a barrier per se, but their impact on the energy retail environment could be minimized to benefit market function.

5.1 Description of other barriers in Sweden: Other

Small market or margins. A small population and/or low consumption hinders profitability, or market conditions mean low margins. Market size as a barrier could be ameliorated by better harmonization of markets.

National issue

As with the other Nordic countries, Sweden's market is relatively small, limiting opportunities for suppliers. This is compounded by relatively low electricity prices - though consumption is high - which decreases customer lifetime value to suppliers.

Potential solutions

Closer harmonization of Nordic retail markets would help suppliers to operate over the entire region (see also section 3.1). This would increase economies of scale, bringing improved prospects for businesses and thereby possibly attracting more new entrant players. However, Sweden is c. twice as large a market as the other Nordic countries, so national benefits to harmonization may be lower than for the other Nordics.

European markets in which this barrier has also been indicated

AT	BE	BG	HR	CY	CZ	DE	DK	EE	FI	FR	EL	HU	IE	IT	LV	LT	LU	NL	NO	PL	PT	RO	SK	SI	ES	SE	UK
■	■	■	■	■			■	■	■				■		■	■	■		■			■	■	■		■	

FINDINGS & RECOMMENDATIONS

As seen throughout this project, barriers to entry and operation can constrain the development and functioning of energy markets. Examples of such barriers identified in this project vary widely across EU countries, including issues as wide-ranging as the use of financial guarantees for access to wholesale markets, the presence of price regulation in the market, and burdensome licensing regimes, where the requirements are disproportionate to their protective function.

After an initially poorly coordinated start to the liberalized market, the Swedish retail electricity market is now effective and competitive with 129 suppliers in 2019 serving 4.7 million households. The limited gas market is not considered in this study. Three supply companies have a share of about 46% of the household market, with the rest consisting mainly of municipal suppliers, many of which only supply locally. However, the switching rate is modest. This points to the existence of barriers that hinder new entrants from establishing and operating effectively.

Many barriers concerned the energy system's approach to innovative products and services. Issues that held suppliers back included a lack of incentives to undertake novel pilot projects, lack of data for innovative product development, and new business models not fitting current regulations/obligations. On the balancing markets, new and small players were not felt encouraged to participate. Some steps have been taken to develop product requirements and prequalification processes for new players, moving away from the current state that was designed for large-scale generation. However, to harness the potential of market players to provide flexibility, these aspects must evolve faster, perhaps taking neighbouring Finland as an example of system changes favourable to aggregators and demand-side actors.

Suppliers were also concerned about uncertainty of future regulatory developments, such as the implementation of the supplier centric model. This was linked with a perceived reluctance of the regulator, Ei, to involve market actors in the development of market changes, which has resulted in some suppliers regarding recent changes as unnecessarily complicated or not fulfilling their intended function. Both situations could be improved through increased communication between Ei and stakeholders, including around timelines. This would give market players more clarity around upcoming developments, facilitating business planning for the future regulatory landscape.

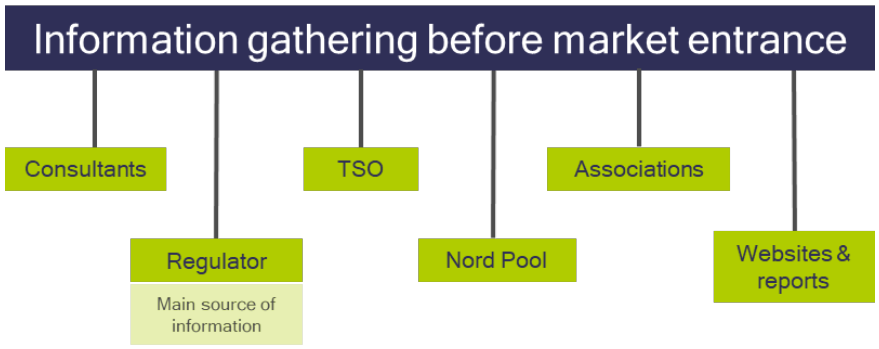
The Swedish market is characterized by many small, local DSOs, often integrated with suppliers. There was some concern that, as is widespread across Europe, incomplete unbundling gave these local incumbents an advantage particularly in customer data access, but most DSOs were felt to behave comparatively well. Bigger issues arising from this market structure were the ability of DSOs to encroach on provision of market services, and the effort required to deal with multiple DSOs with different systems, data formats and standards for data quality and timeliness. A data hub is due to launch in 2022, which will address many of the these issues, provided it is well designed. To mitigate the market power of DSOs, Norway could be taken as an example, which will soon require

complete unbundling of DSOs, to remove economic incentives for data sharing, and prevent them from undertaking any activity other than in networks, hence clarifying their role in the energy system. If DSOs must procure services such as storage and demand-side management, provided they are correctly incentivized to do so, it opens up market opportunities for suppliers and ESCOs to develop such flexibility services and products.

APPENDIX 1: PROCESSES

This section describes market processes in energy retail in Sweden. This provides context for the market barriers described above by giving a high-level overview of the most critical aspects involved in establishing and operating as a supplier in the national market. The stages of market entry and operation are described in sequence, each with an illustration ("process map") showing that stage's various processes together with comments/details on market specifics.

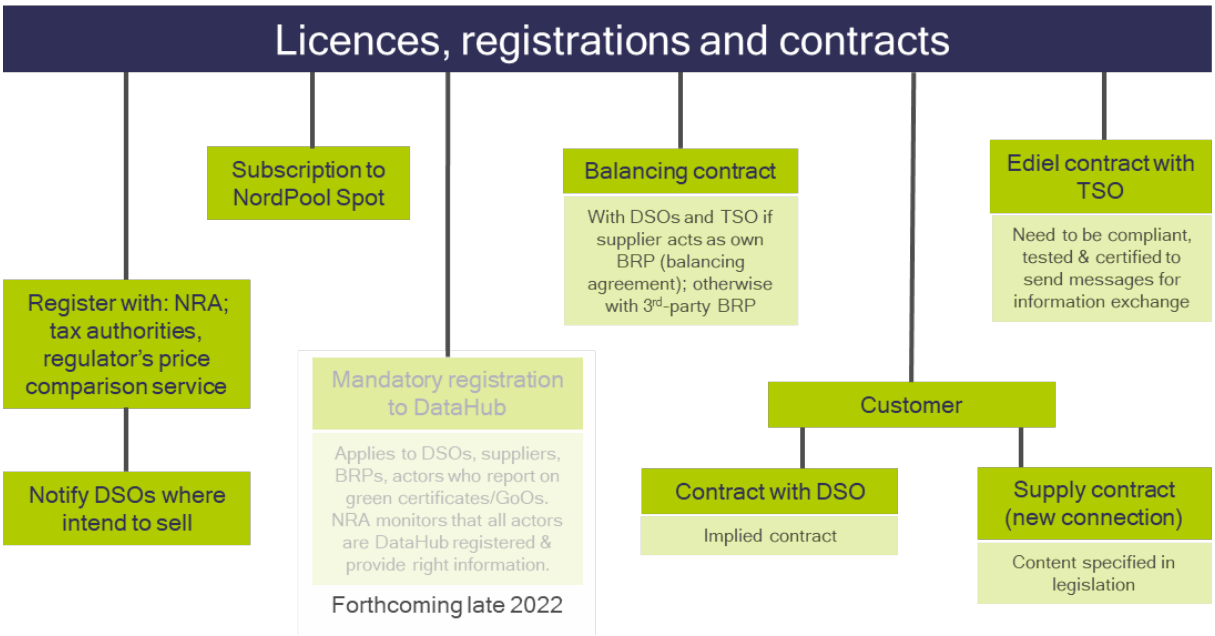
1) Information gathering before market entry



Further comments

The regulator is the main source of information, much of which is available in English.

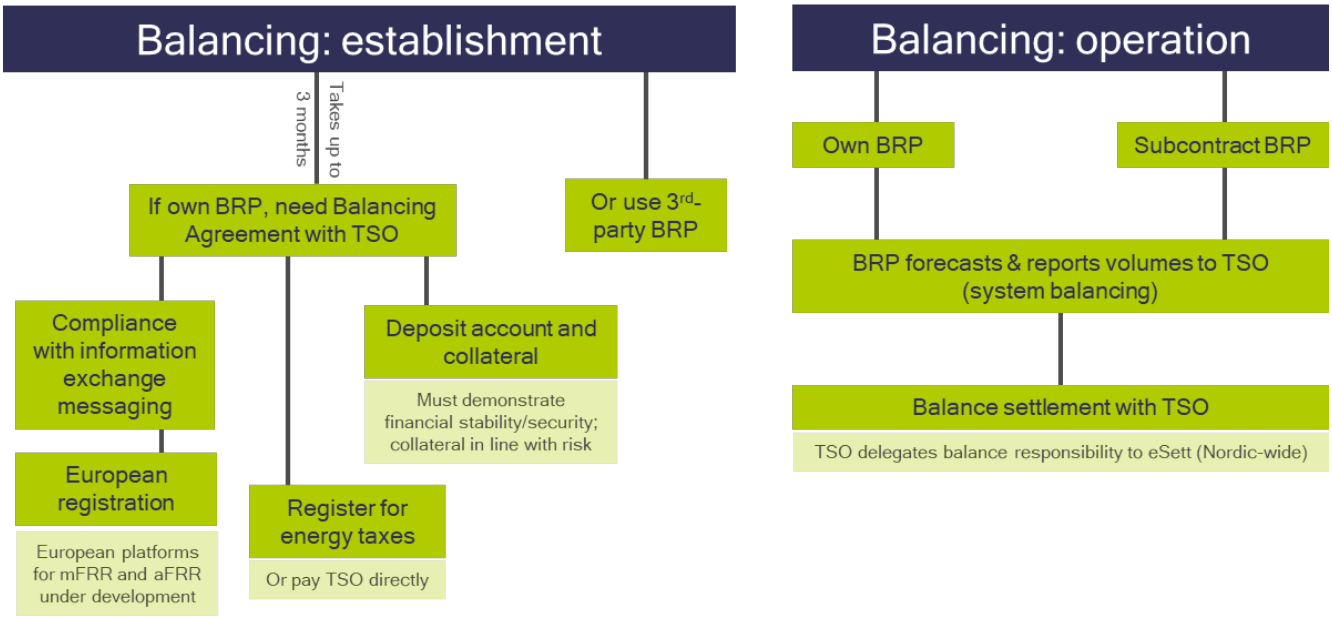
2) Licences, registrations and contracts



Further comments

The DataHub, planned for launch in 2022, will be operated by the TSO and financed by fees. Full details have not yet been not legislated.

3) Balancing



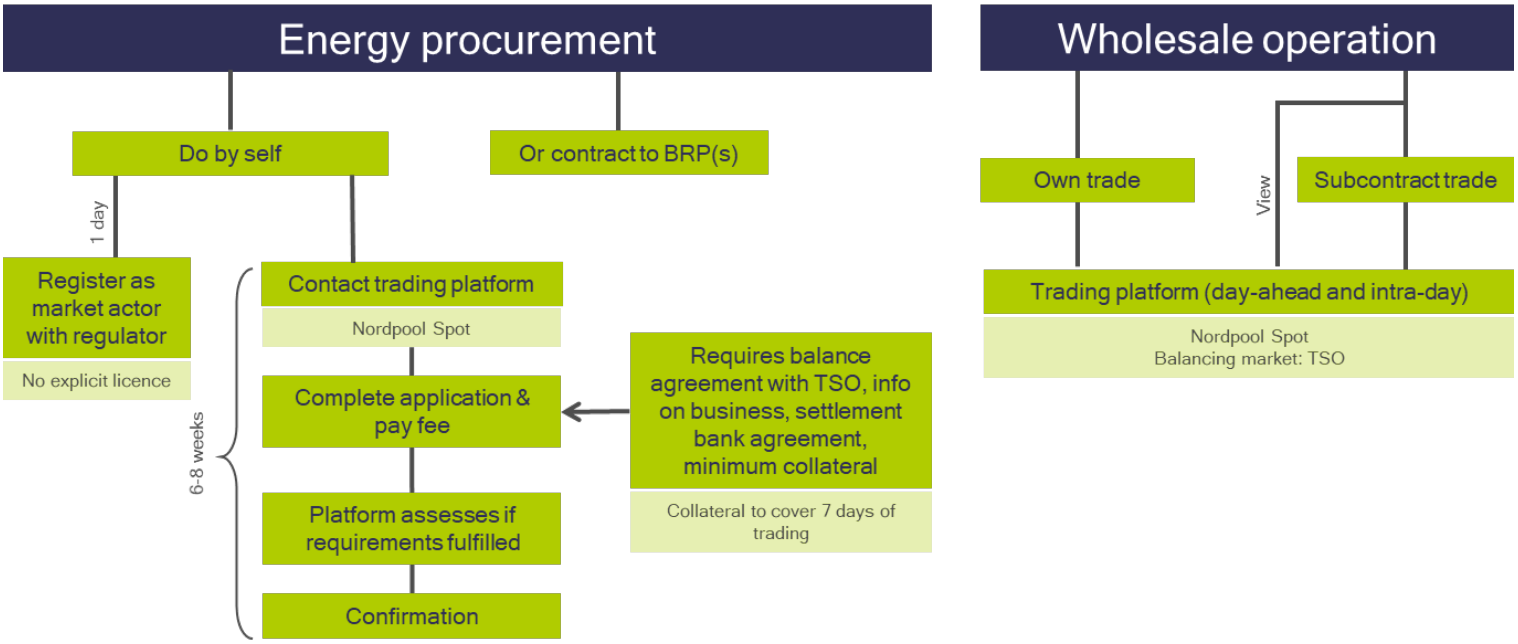
Further comments

By law, every input & outtake point requires a balance responsible party (BRP). Balancing service providers are now obsolete in Sweden.

Balance regulation is handled jointly across the Nordic region, with national TSOs retaining responsibility for working around cross-border transmission bottlenecks. Balances for individual customers are settled in Sweden using simplified settlement rules based on monthly average prices weighted by the area's consumption profile

- Terms & conditions for BRPs currently under discussion between the regulator and TSO. The new rules will cover aggregation & demand side, which should compete on equal terms with traditional flexibility
- The manual and automated frequency restoration reserves (mFRR & aFRR) are since 2017 included in the development of a Europe-wide platform for frequency reserves (MARI & PICASSO, respectively)
- In the implementation of the Electricity Directive, aggregators should be responsible for imbalance costs. As 3rd-party aggregators are not yet active in the markets this is a moot point for the time being, but discussions are ongoing.

4) Wholesale

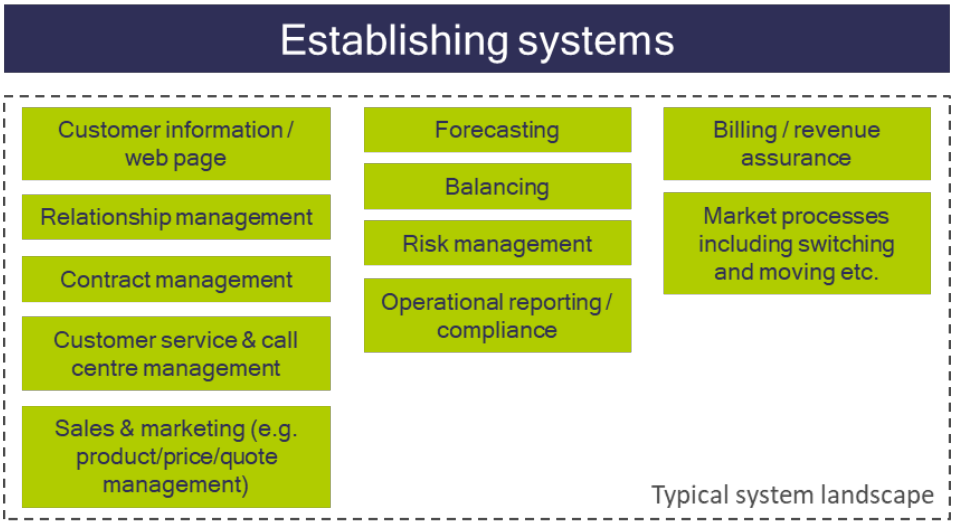


Further comments

The regulator estimates total costs for registering and monitoring to be around EUR 2000. Nord Pool estimates annual fees to total EUR 34 250 (exchange fee EUR 13 500 euro, average clearing fee EUR 18750)

- A Nordic end-customer electricity market is currently in development, based on a supplier-centric model, facilitating suppliers' being active in multiple countries and thus promoting competition
- It is possible to have one registration for access to all NordPool Spot markets, but for this to be possible the participant must have at least one legal representative.

5) System landscape

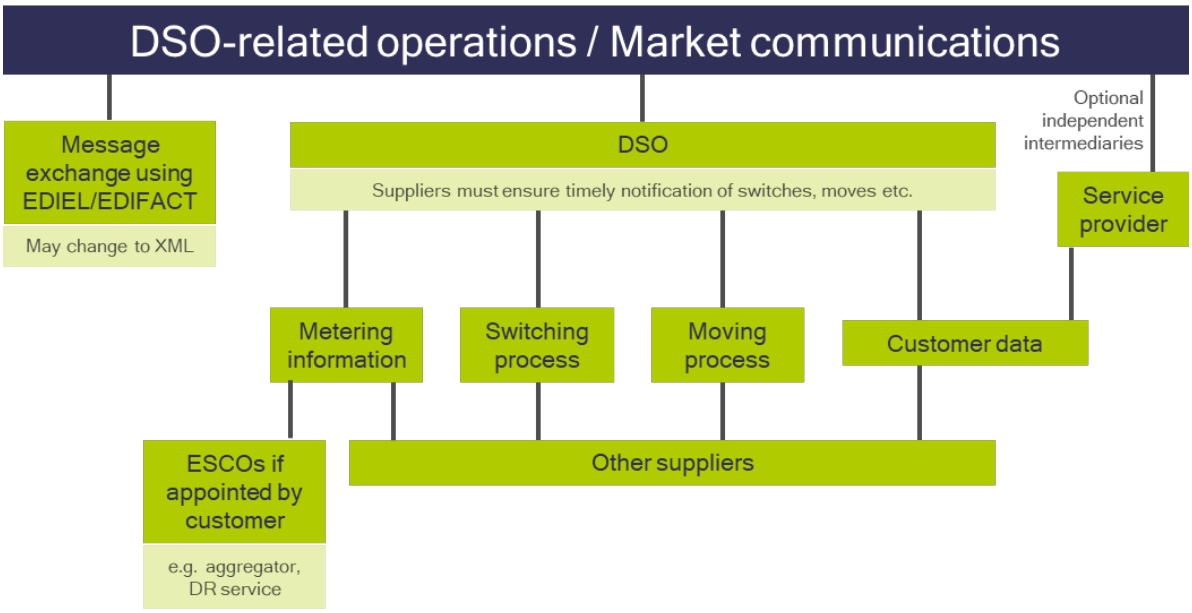


Further comments

System requirements and market processes are generally not considered problematic. However, respondents noted that many systems/processes are country-specific, restricting their development and use to the Swedish market.

- As of 2018, it is no longer the suppliers but the utilities that are liable for energy tax on electricity.

6) DSO-related operations & market communications

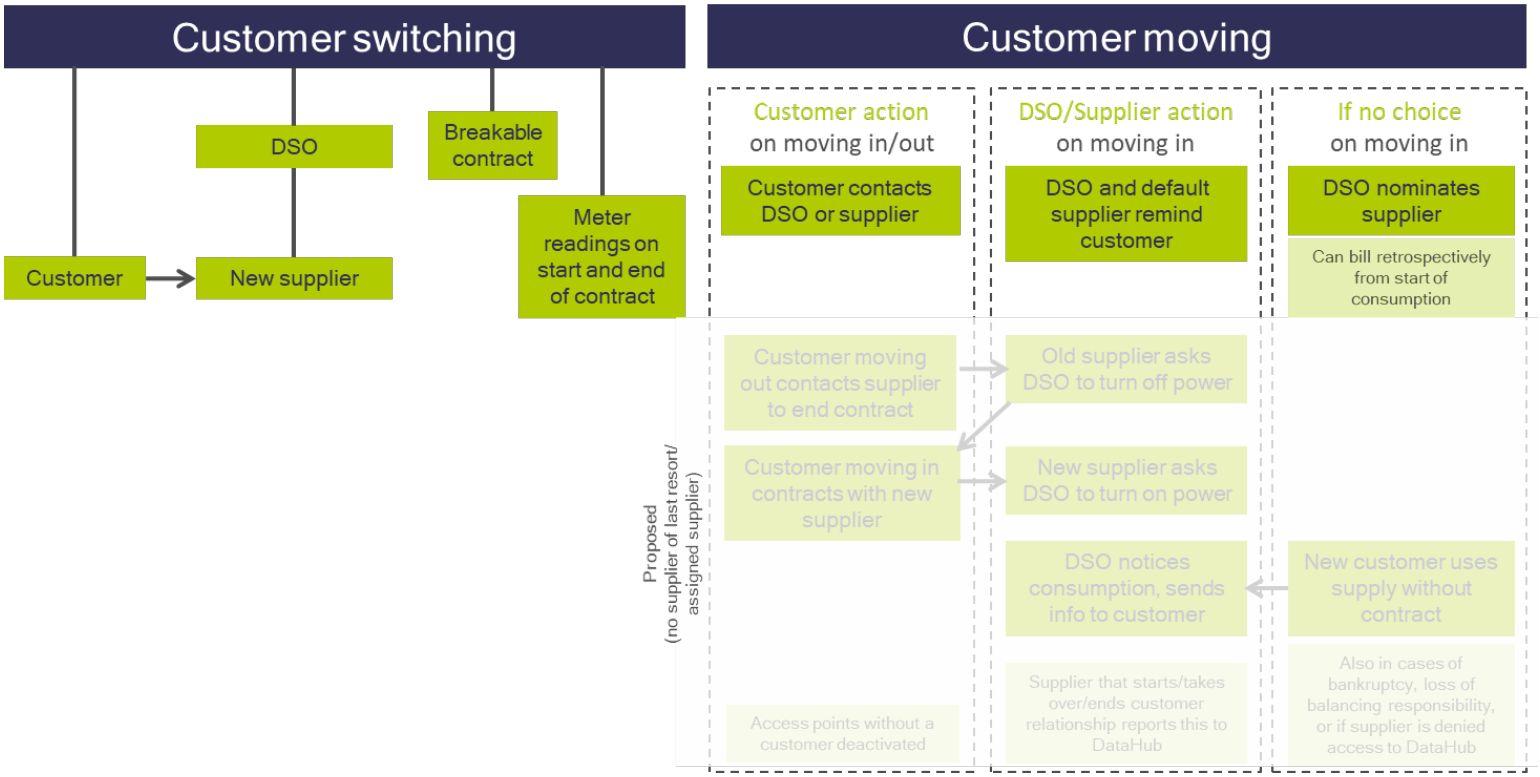


Further comments

Market communication still goes through the DSOs, but the forthcoming DataHub (in development, projected launch date 2022) will centralize data storage and message exchange, giving all actors equal access to the same information (customer data, metering values etc.). In tandem, proposals exist to move to a supplier-centric model in which customers will only need to have contact with their supplier, not the network operators.

- The supplier-centric model should simplify market engagement for customers, who will only have one contact point with market (their supplier). The supplier will jointly invoice distribution and consumption of electricity.
- It is hoped that improved access and exchange of information through the DataHub will enable new types of services related to energy efficiency by increased competition and transparency on the electricity market
- The DSO is responsible for meters. Customer or DSO takes reading min. monthly (electricity)
- In 2017, one company (Alltid) attempted to streamline customer experience by combining the energy and network costs in one customer invoice, while introducing a “fixed price” model where price was fixed each month rather than by kWh. However, the company folded after 2 years of operations.

7) Customer switching & moving

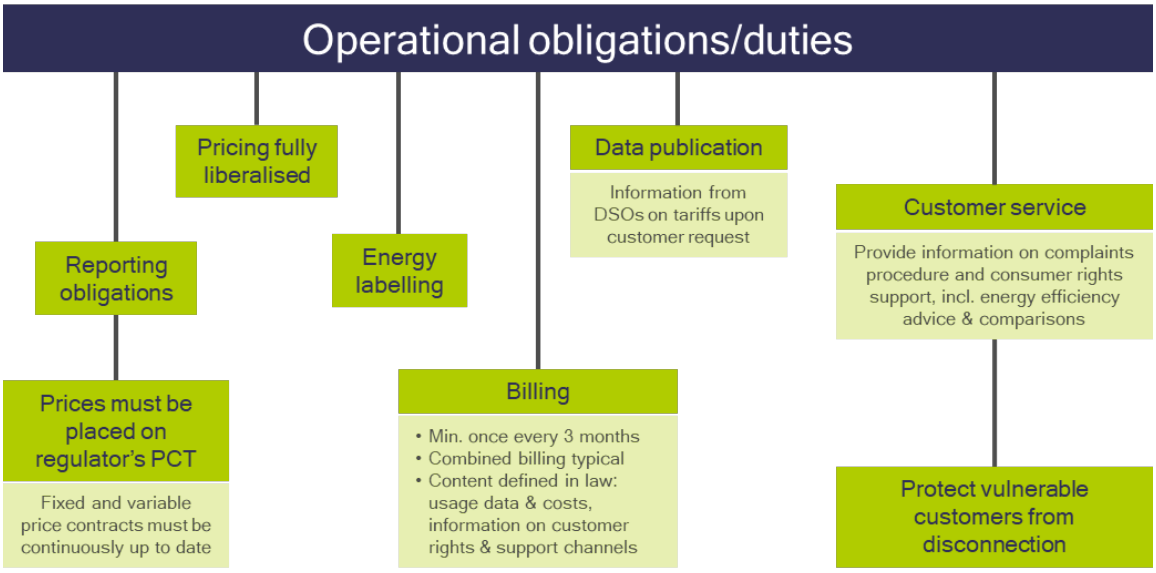


Further comments

These processes will likely change with the introduction of the DataHub, which will centralize messaging and data storage. In addition, the regulator has proposed to government a supplier-centric market model, where the customer would only face the supplier during moving and switching, not the DSO. The implementation time scale of the supplier-centric model is unclear. To increase the strength of retail price signals for consumers and hence incentivise both end-user participation in the market and DR across suppliers and consumers, the regulator has proposed changes to the taxation arrangement for electricity, where over 1/3 of a customer's total energy bill consists of taxes (including electricity certificates). It is unclear which of these recommendations will be adopted and, if so, when. Nonetheless, customers who have switched have saved on the order of tens (apartment customers with district heating) to hundreds (electrically heated detached house) of euros per year.

- Contracts not signed person-to-person have a 14-day cooling off period
- Nominated supplier is effectively a supplier of last resort mechanism. The nominated/assigned contract must be on reasonable terms, and supplier must inform customer every quarter about options for other suppliers/contracts
- Suppliers (but not if nominated supplier) can request the DSO to disconnect customers for persistent breach of contract.
- DataHubs across the Nordic region lay the groundwork for harmonizing these processes across Nordic region, as part of developing a collective end-user market

8) Operational obligations/duties

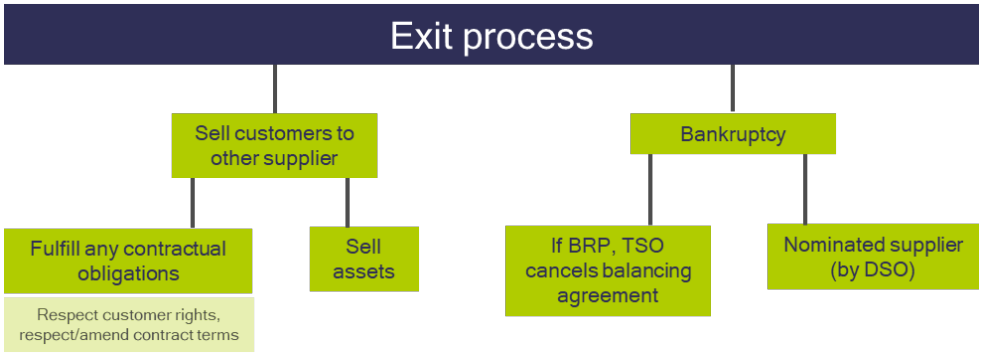


Further comments

Legislation prescribes many operations aspects, e.g. how to set up pricing models, when and how to communicate with customers, billing requirements etc.

- The main means for a supplier to reach new customers is to be in the top three on comparison websites. This makes for a transparent market in terms of customer flux
- Consumption & distribution are commonly billed together; billing can be done by a third party. The DataHub will include invoice information, enabling all suppliers to bill jointly
- Notification of changes to contract are defined in law. Changes to terms require notification at least 2 months in advance; expiry of a fixed-term contract requires notification 60-90 days in advance, including new terms if the customer takes no action
- Customer service potential will improve with the DataHub. Centrally available metering identification will mean more ability for all actors to find and solve problems, avoid error corrections etc.
- Due to functional unbundling, groups encompassing companies that engage in electricity trading as well as network operations must present to the regulator and report on following a monitoring plan, to ensure no cross-subsidization of activities

9) Market exit



Further comments

The voluntary exit process is similar to other industries. In case of supplier bankruptcy, Sweden has a “nominated supplier” model, in which the DSO effectively nominates a supplier of last resort for customers in question. Nominated suppliers are also used in cases where a recently moved in customer has not made a choice of supplier, but that mechanism is due to change in the next few years.

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