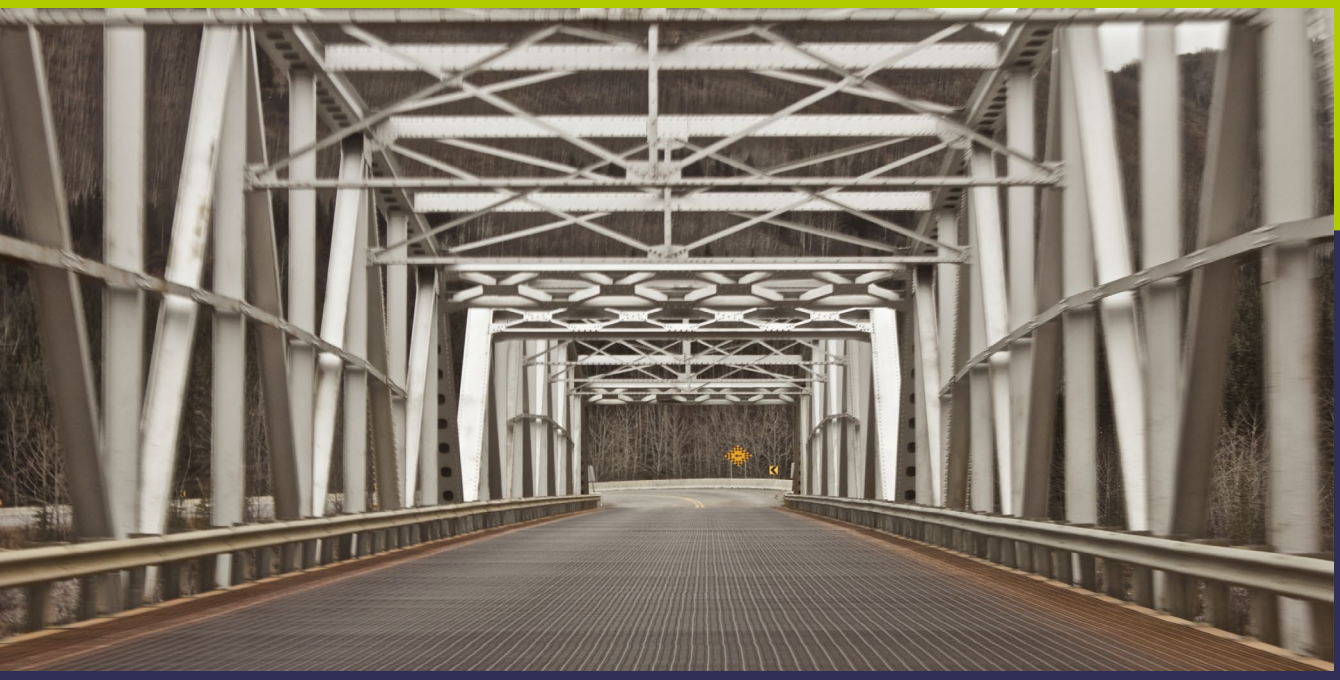
European Commission

EUROPEAN BARRIERS IN RETAIL ENERGY MARKETS



DENMARK
Country Handbook

Prepared by vaasaETT REKK MRC CONSULTANTS AND TRANSACTION ADVISERS A member of the MRC Group of Companies THE ADVISORY HOUSE LISTEN-ADVISE-SUCCEED

Energy

EUROPEAN BARRIERS IN RETAIL ENERGY MARKETS PROJECT: Denmark Country Handbook

VaasaETT
REKK
MRC
The Advisory House

Contact:
Philip Lewis, VaasaETT, philip.lewis@vaasaett.com
Balazs Felsmann, REKK, balazs.felsmann@rekk.hu
Chema Zabala, MRC, jmlopez@mrc-consultants.com
Florian Hirschbichler, The Advisory House, florian.hirschbichler@advisoryhouse.com

Manuscript completed in July 2020

Luxembourg: Publications Office of the European Union, 2021

PDF ISBN 978-92-76-30252-0 | doi:10.2833/78538 | MJ-02-21-183-EN-N

How to cite this report: Lewis, P., & Granroth-Wilding, H. (2021). European Barriers in Retail Energy Markets Project: Denmark Country Handbook. Luxembourg: Publications Office of the European Union. ISBN 978-92-76-30252-0, doi:10.2833/78538.

TABLE OF CONTENTS

This document has been prepared for the European Commission however it reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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.

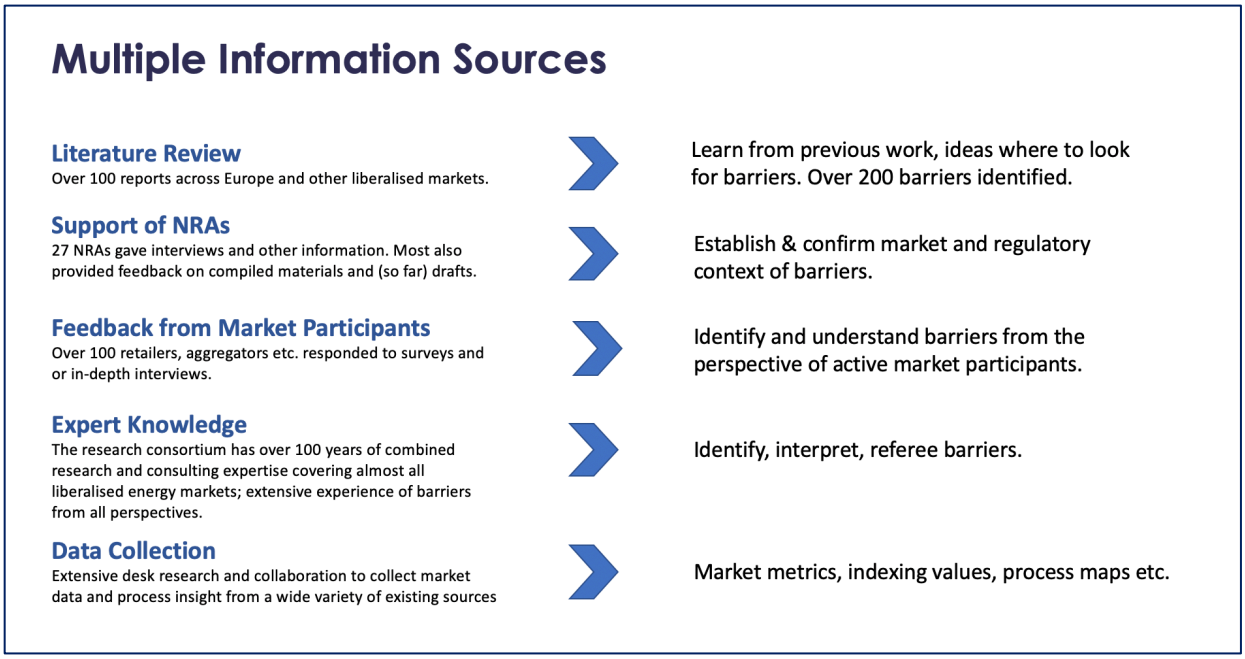
The project focuses on retail (supply), including also demand aggregation services, other additional offerings and new model retail, especially relating to the household segment customers (in some markets households and smaller SMEs may be difficult to distinguish). The project additionally concentrates 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



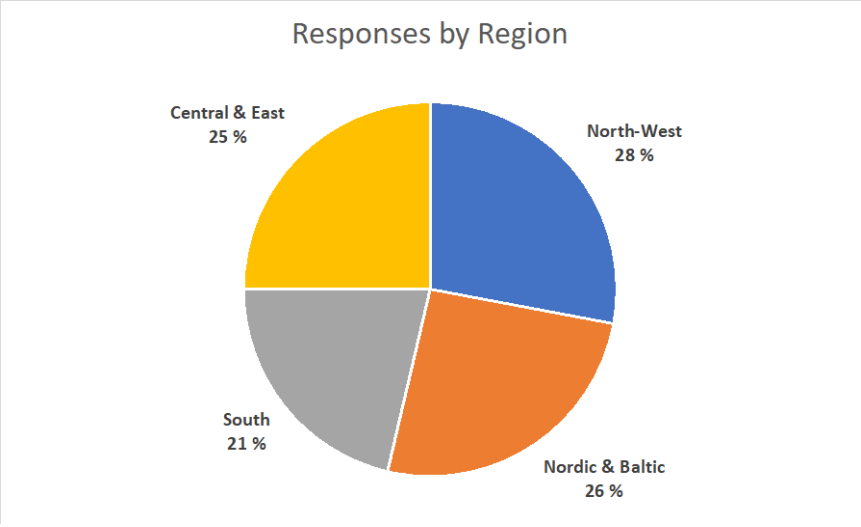
Surveys & Interviews

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

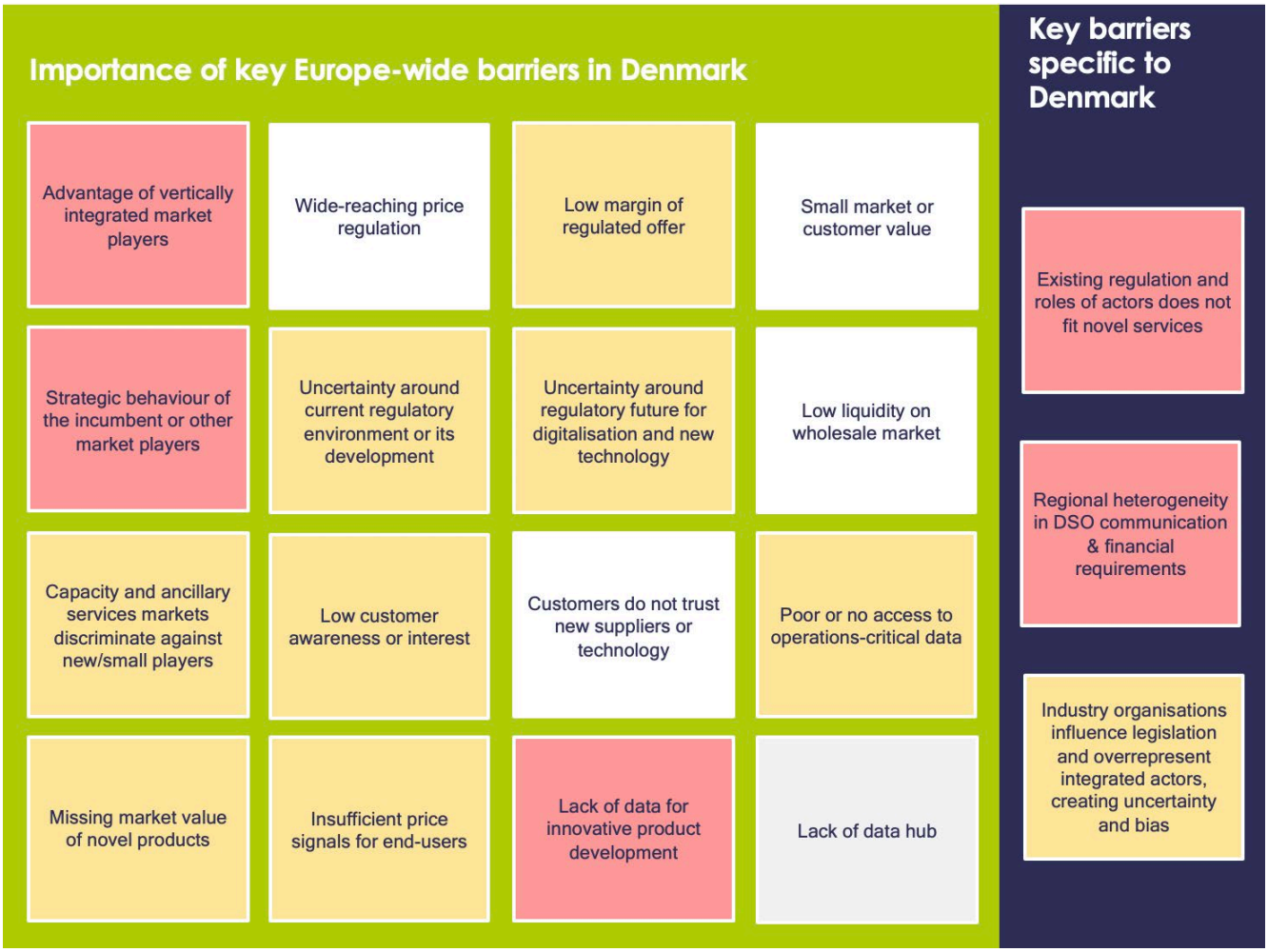
The purpose of the 'European Retail Energy Market Barriers Index' is to enable a degree of comparability between the barriers' context in each of the markets. It is based on metrics that can be collected for all markets, metrics for which available data currently exists. As such it provides a simple, 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 Danish market

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



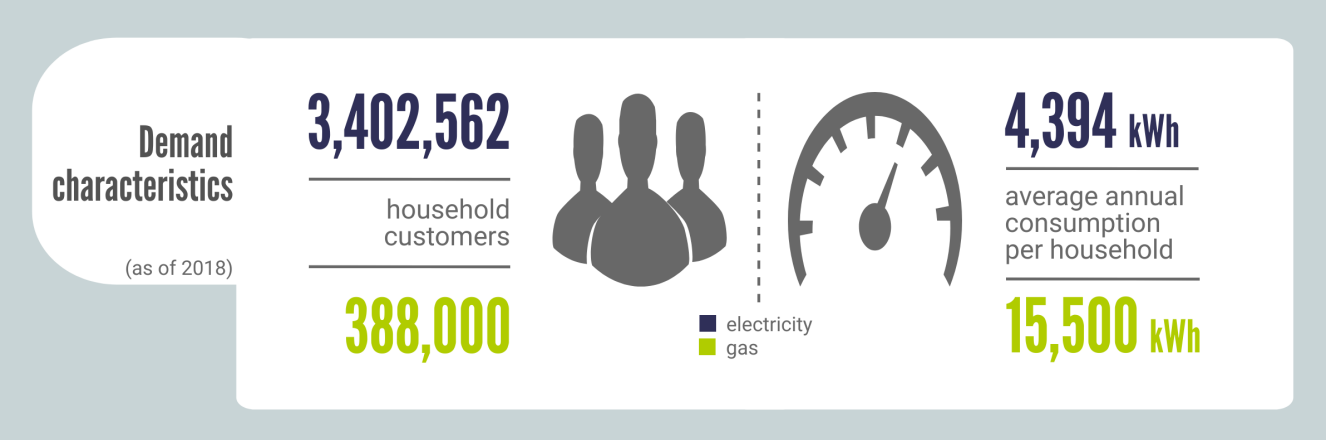
Key recommendations

Like the other Nordic markets, the Danish market is characterised by a large number of small, local suppliers, vertically integrated with DSOs. In Denmark, these tend to be owned by large holding groups, creating a market structure that has led to substantial issues arising from incomplete unbundling. Denmark was a European leader in launching a fully functional Data Hub already in 2016, coupled with a supplier-centric model that has eased customer engagement with the market, yet barriers around data access persist.

- **Incomplete unbundling.** Vertically integrated companies have been found to exploit their incumbent and/or DSO position in various ways to favour the competitive supply side, at the expense of independent suppliers' market opportunities. In keeping with the regulator's own reviews, it appears that requiring full ownership unbundling to remove any financial incentives for such behaviour is the only lasting solution to this issue.
- **Scattered DSO structure.** The many small, local DSOs require separate communications and bank guarantees, raising barriers in terms of both effort and finance to actors wishing to operate across larger geographical regions. Harmonizing processes and collateral requirements would facilitate operations for independent suppliers.
- **Lack of data for innovative products.** Although current and historical consumption is available through the DataHub, sufficient granularity and timeliness of consumption and other data important to e.g. demand aggregation and associated infrastructure (smart meters) are not considered easily accessible; processes for data access are arguably not sufficiently defined. This maintains a data advantage for vertically integrated suppliers who can access data through their associated DSOs. Moreover, meter data is not the only information relevant to developing novel products or services. Other consumer profile and contextual information is also important. Given the speed at which the Danish market is developing for novel services, DUR could consider requiring readings of data other than consumption volume: frequency readings, for example, would indicate time of use of more energy intensive appliances, allowing new actors to better shape flexibility services.

MARKET OVERVIEW

Denmark was the last Nordic market to liberalise, behind Norway, Finland and Sweden. Denmark is generally regarded as a developed, efficient and mature electricity and gas market, with for instance a highly effective and liquid wholesale electricity market (part of the Nordic wholesale market). It was also the first Nordic, arguably the first in Europe, to have a data hub. Despite having less than three and a half million household electricity customers and less than 400,000 gas customers, it can also be seen as a reasonably substantially sized market due to higher consumption.



However, despite its highly digitalised customer base, its proximity to the relatively similar neighbouring Nordic markets of Sweden, Norway and Denmark, and a somewhat liberal, yet responsive and evolutionary approach to regulation, the Danish Electricity market stands as the least active of the Nordic markets, by some margin. That is not to say that a significant number of customers have not changed supplier. Approximately one third of electricity customers have done so. However, few independent competitors have entered the market, and none appear to have truly succeeded. Competition is - to all intents and purposes - a national affair, largely a case of customer-swapping among former incumbents.

Background

The Nordic wholesale electricity market

Denmark is part of the Nordic market along with Norway, Finland, and Sweden. The installed capacity in the market at the end of 2017 was 105GW and total annual consumption in 2017 was 387 TWh. As in Sweden and Norway, the Danish TSO and the largest generator are owned by the government[1]. 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

[1] The Danish TSO Energinet is an independent public enterprise owned by the Danish Ministry of Climate, Energy and Utilities.

managed congestion between price-areas. Finland joined the Nordic market in 1998 and Denmark in 1999-2000. The Baltic countries joined the Nordic market in 2013 and in 2014 the Nordic market coupled to Europe. 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, an organization for cooperation between Nordic Energy regulators, has long been working towards a common Nordic retail market. Datahubs – the centralization of key data relating to the retail market – are part of the proposals for a common market and by 2022 will be implemented in all four countries. The supplier-centric model is at least partly in place in that in switching suppliers one only has to contact the new supplier and not the DSO nor the old supplier. Rules around combined billing vary between the markets, however. In Denmark, there is a supplier-centric model and mandatory combined/single billing for electricity, but for gas there is currently no supplier-centric model and combined/single billing is voluntary.

The Danish electricity and gas markets

In Jutland prior to 1998 there were about 70 small municipal utilities and consumer cooperatives which in groups owned seven power stations, which in turn owned the TSO. Jutland is connected to the Nordic system. In Zealand Copenhagen Energy was an integrated undertaking; there was a major generator (SK Power) owned by three distributors and a municipality. Copenhagen Energy and SK Power in turn owned the TSO. Zealand is connected to the continental network through Germany. Since 2010 the two halves of Denmark have been connected by a DC link, the Great Belt Connection.

The electricity market in Denmark has been gradually liberalised since 1998, when it was opened to electricity customers with a consumption >100 GWh p.a. concluding on 1 January 2003 with all customers. Jutland joined NordPool in 1999 and Zealand joined in 2000. Along with liberalisation the structure of the electricity supply industry has been radically reorganized. In 1998-99 the two TSOs were separated from generation; in 2005 they were merged along with the gas TSO into one company, Energinet, and ownership was transferred to the government.

The 1999 reforms also introduced corporate unbundling which banned a company from having licenses for production and distribution and trading electricity. The generators in Jutland merged into Elsam A/S, which was owned 2/3 by Dong, then the Danish state-owned gas company, and 1/3 by Vattenfall, which is owned by the Swedish government. On 1 January 2000 SK Power and the other major generators in Zealand were merged into Energi E2 A/S, owned about 1/3 by Elsam and 2/3 by Dong. However, following subsequent reorganisations, the generation industry is completely different (see below).

The gas market in Denmark was liberalized in 2004. Denmark has been producing gas from the North Sea since 1972, and now has a large natural gas production[2] plus significant production of biogas, an extensive gas grid and two gas storage facilities at Stenlille in Zealand and Lille Torup in Northern Jutland. The gas transmission network, owned and operated by Energinet, links the gas production locations in the North Sea, and the two interconnectors with the neighbouring countries with connection points Ellund (towards Germany) and Dragør (towards Sweden). Sweden has no indigenous natural gas production and depends entirely on gas supplies from Denmark to cover its consumption. In 2018, Denmark exported 1.46bcm (of which 52% went to Sweden) and imported 0.37 bcm from Norway by pipeline from the Norwegian Trym field and Germany. The Baltic Pipe Project is in progress to link the Norwegian North Sea offshore system to Denmark and further on to Poland through an offshore Poland-Denmark interconnection.

Danish Liberalisation timetable

Denmark was the last of the Nordic electricity markets to liberalise. For electricity, Denmark commenced liberalisation in 2000 for the largest consumers, but it was not until 2003 that households and other small consumers became eligible. For gas it was 2000 and 2004 respectively. Specifically:

Electricity

- 01.04.2000: > 10GWh/year
- 01.01.2001: > 1GWh/year
- 01.01.2003: All other customers.

Gas

- 01.07.2000: > 35m Nm3/year
- 01.07.2002: > 25m Nm3/year
- 01.08.2003: >12m Nm3/year
- 01.01.2004: All other customers

Market structure

There are 42 electricity DSOs. Their revenues are regulated through price caps set every five years. All DSOs are unbundled according to the provisions of the 3rd Energy Package. DSOs serving 100.000 or more connected customers have to fulfill legal, functional, informational, and accounting unbundling, while smaller DSOs are exempted from legal and functional requirements for unbundling. Branding must clearly distinguish the DSO from its sister supply company. DSOs must report annually on their compliance with unbundling regulations. Vertical integration between generation and supply is permitted. There are three gas DSOs, all owned by Energinet and unbundled, which are being merged into one.

[2] Gas production is, however, decreasing and because of this and the refurbishment of Tyra gas field until 2022, DK will actually be a gas importer instead of exporter for that period.

Denmark moved to a “supplier-centric” electricity market model in 2016, in which suppliers are the main point of contact for customers with the electricity industry, including joint billing for supply and distribution.

Generation and interconnections

There has been an ongoing evolution of the generation market. Now there is about 2100MW of local district heating capacity owned by municipalities and 3900MW of central district heating which is owned by Ørsted (formerly Dong; it is now owned 51% by the government and the remainder by many companies including some retailers/DSOs), Hofor, Fjernvarme Fyn and Aalborg Forsyning. The latter three companies bought Vattenfall’s plants. There is 6GW of wind with Ørsted and Vattenfall as major players along with Eurowind and European Energy, and many smaller developers. There is 1GW of PV and several GW are planned without subsidy. In addition, there are four aggregators who dispatch the local district heating schemes and renewables.

There have been major issues – causing major concern - at the Denmark – Germany interconnection. While the situation is improving and further interconnectors are under development with Germany through offshore windfarms (operational end 2019), similar capacity restrictions seem to have appeared at interconnection with Sweden. In September 2019, an interconnector between Denmark and the Netherlands was commissioned primarily to export wind energy from Denmark to the Netherlands, and also to connect an offshore windfarm in the future. Further interconnection is also planned with Great Britain (operational in 2023).

The gas system

Denmark produces its own natural gas and also biogas, which in 2019 accounted for 9% of Denmark’s gas consumption. In 2018 Denmark produced 47TWh of gas and consumed 28TWh. In April 2019, the Swedish gas market merged with the Danish system to create a cross-border balancing zone, and Energinet is now responsible for balancing the Swedish part of this integrated system. The gas market is divided into two classes of customer – 47 industrial customers and power stations, and 400,000 private customers, public enterprises, district heating systems and private businesses. Residential gas consumption is small because district heating is widespread

The gas system is well connected to the northwest European gas market. While it is historically a net exporter, this was changed in late 2019, when its main gas platform was closed for extensive renovation until 2022, and gas needs will be met mainly by imports from Germany. The Baltic Pipe Project, due to be commissioned in 2022, will bring Norwegian gas to Denmark and onwards to Sweden and Poland, and also open Polish sources of gas for the Danish market.

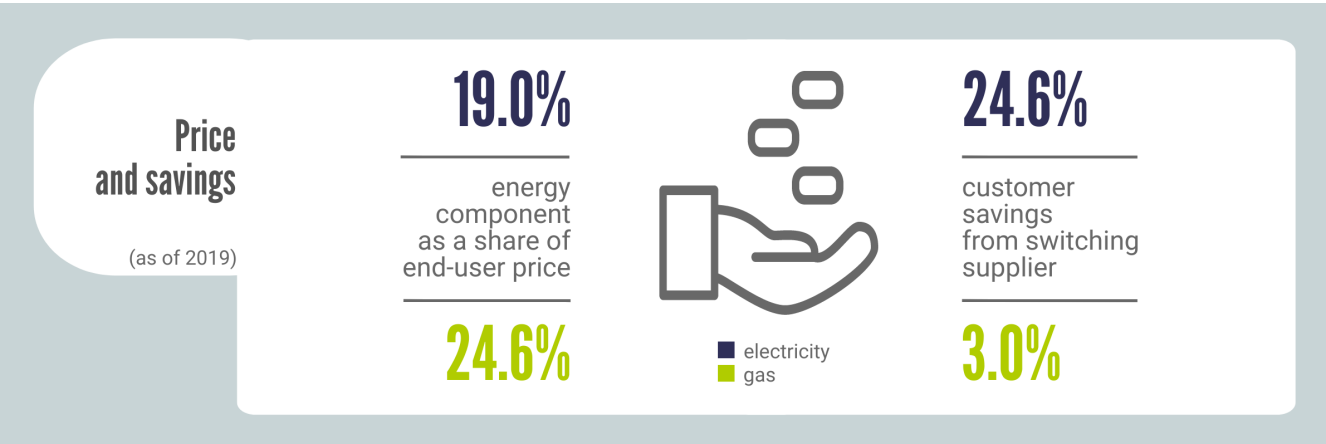
Status of competition

There are 39 electricity suppliers, of whom 28 are associated directly with DSOs; 17 are owned by consortia of DSOs; and 11 are independently owned. In the capital city, as of 2019, household customers could choose between 33 electricity and 10 gas suppliers. The regulator’s price comparison site Elpris.dk, furthermore lists some

200 different products offered to residential customers[3] of which the most common products are variable tariffs that can be altered every month.

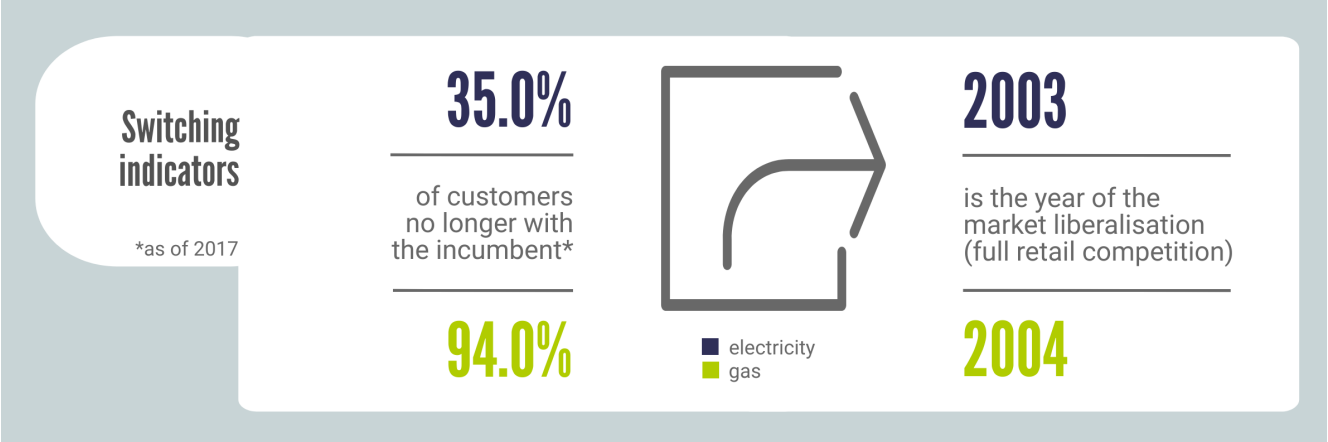
In 2019, only 19% of the price household customers paid for electricity was energy costs (25% in the case of gas). The rest comprised network costs, taxes, public service obligations and VAT. Specifically, as a consequence of high taxes the price of electricity in Denmark is substantially the highest of the Nordic countries.

The most recent annual survey by DUR found in 2018 that average potential savings for household customers were between 12 and 66 €/year for those living in an apartment (consumption 1.800 kWh/year), 20 to 105 €/year for those living in a house without electric heating (consumption 4.500 kWh/year), and 32 to 246 €/year for those in houses with electric heating (consumption 15,000 kWh/year).



[3] Additionally, the website guides users through the rules of the electricity market - such as how to change supplier, change of address and the consumer's contractual rights and obligations.

The switching rate is low at only 5.1% in 2018. In 2018, 62% of the volume sold in Denmark was sold on so-called "passive products", for customers who had not actively chosen a contract. An electricity customer survey by NordREG in 2018, with c. 1500 respondents in each of the four Nordic countries[4] found that 17% of Danish respondents had not actively searched for better deals within the last 3 years, 35% had not switched supplier for at least 3 years, and 38% had never actively switched. Customers who move to a new house and do not actively choose a new supplier will continue to be supplied by the previous supplier on the tariff of the previous householder.



Over half of gas consumption in Denmark is for heating either in houses or in district heating plants. There are 14 suppliers that supply natural gas products to the approximately 408,000 gas customers in Denmark (2018). Customers can choose between three types of gas products, i.e. universal service obligation products, the so-called basic products and market-based products. Two of the 14 suppliers are licensed default suppliers who are obliged to supply gas to customers who have not actively chosen a supplier. The Danish Energy Agency grants the default supplier licenses on the basis of a tender process, and the licenses are granted for a 3-year period with the possibility of an extension. The Danish Utility Regulator monitors that the price of universal service obligation products does not exceed the sum of the wholesale gas price, the cost of transmitting the gas and an additional charge for the default supplier's mark-up. The additional charge is determined in the tender process for obtaining the default supplier license. Most gas customers in Denmark are on a market-based product (approximately 94% in 2017).

Regulatory and political orientation

Denmark's retail energy market is characterized by a liberal and responsive regulatory attitude whereby the role of the regulator is to facilitate rather than drive or control competition. It is a regulation-light orientation (e.g. no license is required to establish as a supplier), customer centric (e.g. combined billing is mandatory – for electricity though not for gas - unlike other Nordic markets) market where efficiency of the market is the priority and

[4] http://www.nordicenergyregulators.org/wp-content/uploads/2018/11/Nordic-Customer-Survey-2018.pdf

unnecessary interference is avoided. There has, over the years also been a strong push for pan-Nordic harmonization and opportunities as well as consumer centricity (as exemplified by its successful development of its data hub), although the Nordic harmonization efforts, at least, appear to have faltered somewhat in recent years and fallen short of original visions.

On a national level, politics (and the public) does not appear to have been overtly interested in retail energy competition. Combined with powerful regional political support for the protection of municipal utilities, the status quo of the retail energy market has not been significantly challenged.

Perhaps most concerning was the planned sale of the national incumbent utility which – apparently due to fears of international acquisition – was politically cancelled at the last minute, in favour ultimately of a national acquisition – preventing still further any chance of significant international entry into the Danish retail energy sector.

The Danish Utility Regulator (DUR) was established on 1 July 2018 as an independent Authority under the Ministry for Climate, Energy and Utilities and replaced the former Danish Energy Regulatory Authority (DERA).

Other market characteristics

Denmark's energy consumption has been broadly falling for over a decade, as have emissions, while the economy and population have continued to grow. By 2050 at the latest, Denmark aims to be carbon neutral. Although wind accounted for 47% of Denmark's electricity consumption in 2018, and renewables continue to expand at the expense of coal and gas, coal is still the second-largest electricity source at 22% of production, with biomass at 13% and gas at 10%. Denmark is reliant on hydro from Norway and Sweden to offset the intermittency of wind.

Context for aggregation/demand response

Energinet is keen to open markets to promote demand-side management, which would be particularly valuable to the Danish electricity system, which is dominated by intermittent wind and reliant on imports, with associated price risks, to balance that intermittency. All customers are expected to have a smart meter by the end of 2020; hourly settlement has been available for smart-metered small customers since 2017. Hence, infrastructure for more demand response participation is almost fully in place. Denmark is also a leader in data handling, and data accessibility is a key prerequisite for effective demand response products. Energinet launched an initial version of a "DataHub" in 2013 and developed it to handle all communication between suppliers and DSOs in 2016. The aim was to "stimulate competition, encourage innovation and to motivate the demand-side of the market to play an active role in Denmark's green transition."

Although the market for demand-side services is not yet well developed, Energinet has in recent years conducted pilots such as controlling EV charging and heating. The smart-meter roll-out is intended to pave the way for hourly settlement for all end-users which provides wholesale price signals to end-users in a timely way. This will hopefully activate customers to participate more in the market by controlling their own consumption and accessing new

third-party services such as aggregation. This requires market participants to offer relevant services or products to allow the customers to adjust their consumption. In addition, Denmark's broad use of district heating (> 55% of net heating energy demand) could provide opportunities for innovative companies to couple the heating and electricity sectors.

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

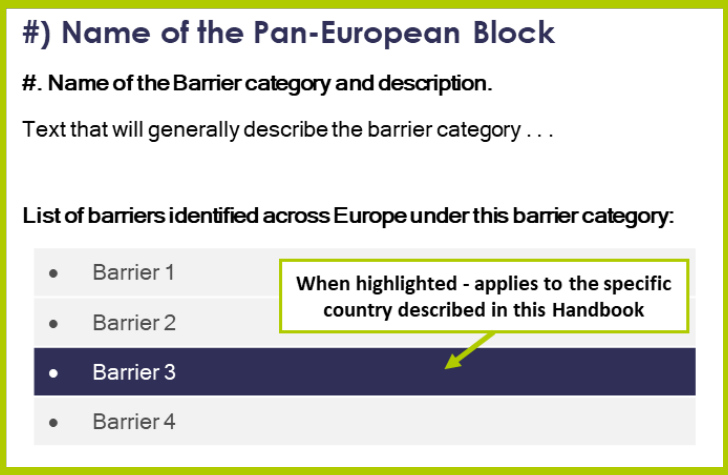
Description of the four-over-arching pan-European barrier blocks:

1. **Regulatory disincentivisation:** barriers arising as a consequence of the general regulatory framework of the natural gas and 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 natural gas and 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 behavior 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 Danish case as reported in the following chapters of this handbook.

HOW TO READ AND INTERPRET THE FOLLOWING SECTIONS

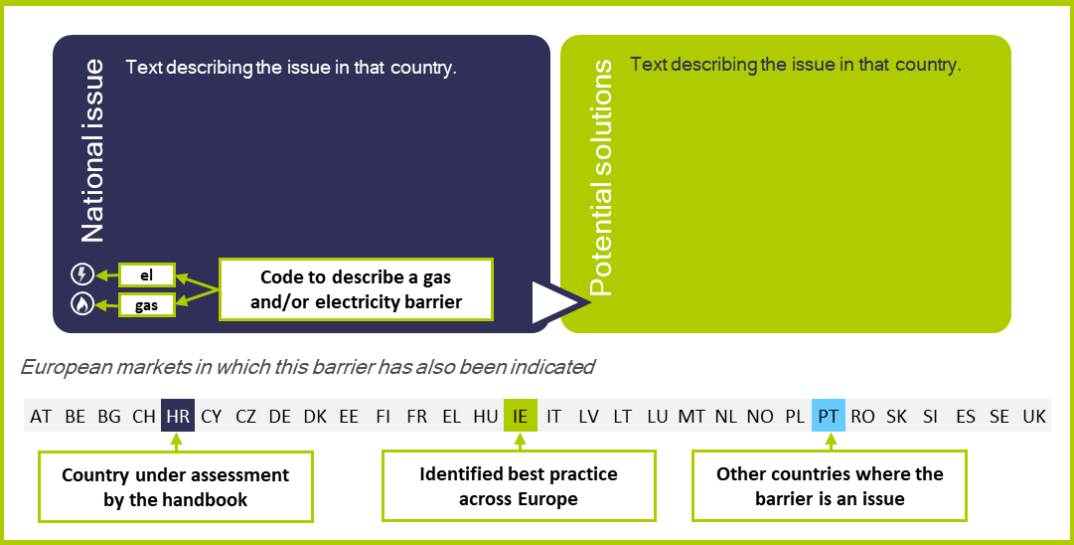
Each of the following four chapters explores one of the four pan-European blocks of barriers and report how each sub-category barrier apply to Denmark. When a barrier applies to Denmark, it will be highlighted in the table following a general description of the barrier itself as shown in the example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



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

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
- suggesting potential solutions to the problem as depicted in the figure below.



At the end of each chapter, Denmark'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[5]:

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[6], 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 Denmark:

   - 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 Denmark:

   - 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

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

- 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 Denmark:

- 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 Denmark: Price regulation

Low margin of regulated offer (margin squeeze). In the research this barrier was raised as an issue in Denmark. Prices for inactive gas customers remain, arguably, in effect regulated, which hinders full competition in the market as the regulated price is relatively low.

National issue

The gas market is transitioning away from price regulation, but the remaining regulation still arguably imposes a margin squeeze on competitive suppliers: Supply obligation licenses for gas customers who have not actively chosen a supplier - tending to favour DSO-associated suppliers - were due to no longer be granted after 2019, but this has been postponed and a price-monitored "basic product" will remain.

Potential solutions

Price regulation in electricity was completely removed in 2017, when the obligation to supply and supplier of last resort schemes (designated suppliers, usually integrated with the DSO, supplying energy at regulated prices to inactive customers) was stopped. These developments were strongly welcomed by market players. While encouraging timely application of similar measures in the gas market, the gas market remains incompletely price deregulated.

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

SPANISH BEST PRACTICE CASE: Low margin of regulated offer.
Before 2014, the price regulation regime (PVPC) raised many complaints from electricity companies, claiming that the price was set below cost or may have too limited margin to cover the risk of activity.
Hence, a new Royal Decree was issued (RD 216/2014), establishing a new methodology for calculating the PVPC, including the energy cost, the applicable access tariffs and a commercial margin.
The main difference is that the energy cost is now calculated on an ex-post basis, using the average price resulting in the spot electricity market during the period covered by the bill. In the case of consumers with an operative smart meter installed (as of now, more than 98%), since 1 October 2015, a real consumption tariff following the spot price, is applied. The real time price is published by the electricity TSO through ESIOS platform.
Having a pass-through of the energy cost from the electricity spot market is considered as a best practice within the price regulation category. This prevents the energy component of the regulated tariff to be set below cost. However, the customers exposure to the volatility of the spot market may trigger further Government interventions.
Discussions still exist about the value of the commercial margin, which still is seen as too low by reference suppliers and limits the ability to compete of new and small companies. Also, having a price regulation in place that applies to the 95% of the retail market is perceived as hindering competition among suppliers. Suppliers wish a phase-out of price regulation regime, with a clear plan defined by the relevant institutions.

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

No barriers around burdens on suppliers or burden-sharing were identified in Denmark.

1.3 Description of regulatory disincentivisation barriers in Denmark: Regulatory unpredictability

Suppliers face uncertainty because of a newly liberalized regulatory environment or uncertain future development of the regulatory framework. In the research this barrier was indicated as an issue in Denmark. Suppliers experience uncertainty because of unpredictability around what the future regulatory framework will look like and hence what business opportunities will be possible.

National issue

Uncertainty in the regulatory framework was raised as a barrier especially in the context of unbundling regulations (see section 2.1 below), which are currently under discussion.
Broadly, Denmark's market environment was considered rather unstable, in part at least due to the perceived impact of politics and incumbency. Where new models are emerging, certainty over the basics underpinning a level playing field are considered critical.

Potential solutions

To some extent, it is inevitable that a developing, progressive market will contain elements of uncertainty. Nonetheless, effective and regular communication with market players can foster trust that developments are beneficial, even handed and will be implemented according to a known schedule. DUR may benefit from assessing whether it is creating unnecessary uncertainty.

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
■		■	■	■		■	■	■	■	■	■			■	■	■						■	■		■		

Uncertainty caused by industry actors influencing legislation, e.g. incumbent or associations shape legislation. In the research this barrier was indicated as an issue in Denmark. While cooperation between authorities and market actors is essential for functioning and lasting market developments, industry bodies or certain actors may be given too much power to shape legislation for their own benefit to the detriment of other actors, customers or market competitiveness.

National issue

Lobbying organisations exert a strong political influence on the regulatory framework. In particular, the DSOs - regulated monopoly players - are not independent of their integrated supply companies in lobbying (see section 2.1). Incumbent interests tend to advocate the status quo at the expense of new approaches (e.g. to demand aggregation).

Potential solutions

Lobbying should be subject to strict transparency rules.

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
■		■	■				■	■	■	■							■							■			

Uncertainty regarding future regulatory developments, especially in the field of digitalisation and new technology. In the research this barrier was raised as an issue in Denmark. New technological advances require appropriate regulatory frameworks in order to be introduced without excessive business risk for suppliers. Regulatory uncertainty regarding the future of demand response aggregation or other novel services can hinder investment/innovation in these areas.

National issue

Newer players in Denmark consider that the market rules need modification to prepare it for aggregation. The current market environment is not felt to be ready for a regime that includes aggregators (see "Missing perceived value" below).

Potential solutions

Pilot projects to identify the scope and technical/regulatory limitations around demand response could inform what measures need to be taken. Lessons could be learnt from Finland, where market players appreciate the regulatory approach towards new technology, which tends to shape regulation (post pilots) around new entrants' activities once established. This does not negate the need for predictive regulation (to anticipate and prevent issues), however.

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 Denmark: Access to innovation

Lack of data for innovative product development. In the research this barrier was identified as an issue in Denmark. Smart meters open up opportunities for novel demand-side and aggregation services that rely on almost real-time consumption data to be able to match grid requirements and balancing product bids. Aggregators must be able to access customers and their data in sufficient granularity and timeliness - independently of suppliers, who in effect constitute a competitor for the DR provider/aggregator.

National issue

Although current and historical consumption is available through the DataHub, sufficient granularity and timeliness of consumption and other data important to e.g. demand aggregation and associated infrastructure (smart meters) are not considered easily accessible; processes for data access are arguably not sufficiently defined. This maintains a data advantage for vertically integrated suppliers (see section 2.1) who can access data through their associated DSOs. Moreover, meter data is not be the only information relevant to developing novel products or services. Other consumer profile and contextual information is also important.

Potential solutions

As in other European countries, the DataHub design could allow equal access for all market participants to historical customer data. Given the speed at which the Danish market is developing for novel services, DUR could consider requiring readings of data other than consumption volume: frequency readings, for example, would indicate time of use of heavier appliances, allowing new actors to better shape flexibility services.

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 indicated as an issue in Denmark. Regulatory frameworks need to provide an environment for both piloting and further developing new business models without risking grid stability or business operations. Regulatory requirements/obligations designed for traditional suppliers may not be appropriate or sufficiently permissive for innovative players. For example, unclear current regulations around demand response aggregation, such as missing role definitions, makes it challenging for companies offering novel services to enter and grow.

National issue

Market players felt that specific regulation for companies with new business models is lacking. For example, the roles of different market participants in demand aggregation and other novel businesses were unclear. Consequently, market players are unsure of what they are able to offer and how they should interact with other parties. An additional problem for demand response is that independent aggregators require the agreement of the supplier, a potential competitor, to access customers. One market player reported Denmark as falling between Norway (easier) and Sweden (harder) in terms of how easy it is to enter as a DR provider.

Some respondents also felt hindered by the lack of competition on ownership and operation of meters. The DSO has a monopoly on metering, with potential to abuse that position in terms of data provision (see section 2.1). Hence, suppliers are for example not able to provide heat pumps or other accessory services fitted with their own meter.

Potential solutions

As in several other European countries, clarification of roles around e.g. what novel services DSOs are allowed to provide would be valuable for market players. Access to customers for aggregation should be solved by implementation of the Electricity Directive.

Enabling other novel businesses requires engaging with the players offering those services to understand what market/regulatory developments are required. For example, meter ownership could be linked to service provision so that the supplier of a device or an independent meter operator owns the meter. This would allow businesses to provide e.g. heat pumps as a service. Note, however, that non-centralized ownership of meters is considered inefficient in Great Britain, the only market where it exists, so this idea should be treated with caution.

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. In the research this barrier was raised as an issue in Denmark. Flexible tariff structures can be a main driver of demand flexibility as they allow the design of Time-Of-Use tariff zones, encouraging customers to consume less when electricity is more expensive. This is true for grid as well as wholesale electricity. Rigid or flat structures, defined by regulation, hinder new and innovative demand.

National issue

Grid tariff structures were considered to unfairly allocate costs by not adequately reflecting network congestion. This creates a substantial barrier for demand response as the network part of the bill cannot reflect the value of flexibility, especially as network fees make up as much of the of the bill as energy (see Market Overview above).

Potential solutions

A potential solution is locational marginal pricing, but that would involve altering a basic feature of the Nordic market. In other markets in the Nordic-Baltic region, trials to allow more dynamic grid pricing are underway (Sweden) or have already been successful in driving a change in customer behavior (Latvia).

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. In the research this barrier was raised as an issue in Denmark. Grid operators could reduce outlay on network expansion by instead procuring demand reduction or storage to aid grid control. The income cap is neutral between OPEX and CAPEX for electricity DSOs, but it has nevertheless been claimed that operators are subject to a support scheme built around CAPEX (infrastructure investment) rather than OPEX (procuring novel services) and hence incentivized to build rather than utilize flexibility services. DUR will, in 2020, analyse if there is a potential bias in the current model for benchmarking costs. The analysis will cover each of the services included in the benchmarking model.

National issue

DSOs in Denmark are arguably still supported through CAPEX-based incentives, preventing them from investing in OPEX-heavy services, such as storage, to promote flexibility in favour of grid expansion.

Potential solutions

In association with the above, and also linked to clarifying the roles of DSOs in the flexibility market, a broader vision for DSOs' function in the future energy system would encourage a rethink around how best to promote grid stability. In Sweden, rules are in place to allow some CAPEX-based incentives to be switched to OPEX.

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 structures do not incentivize novel products (missing perceived value). In the research this barrier was indicated as an issue in Denmark. 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. A low level of perceived value can due to a technology lag and/or customer being unaware or not incentivized to use novel products such as flexibility services.

National issue

The market for demand response in Denmark was not considered attractive. Low price variability (see section 4.1) seriously limits the value of flexibility; consequently, there is as yet little market value in demand response. Hence, assets related to DR were considered to have limited economic potential, which discourages market participants from investing in them. This is linked with issues of data availability (see above): a lack of DR-relevant data also means that DSOs, TSOs and other actors underestimate the value of novel services, including flexibility, to the energy system.

Potential solutions

A more attractive market is likely to evolve by itself once the above barriers to innovative companies are addressed to open up these novel markets.

European markets in which this barrier has also been indicated

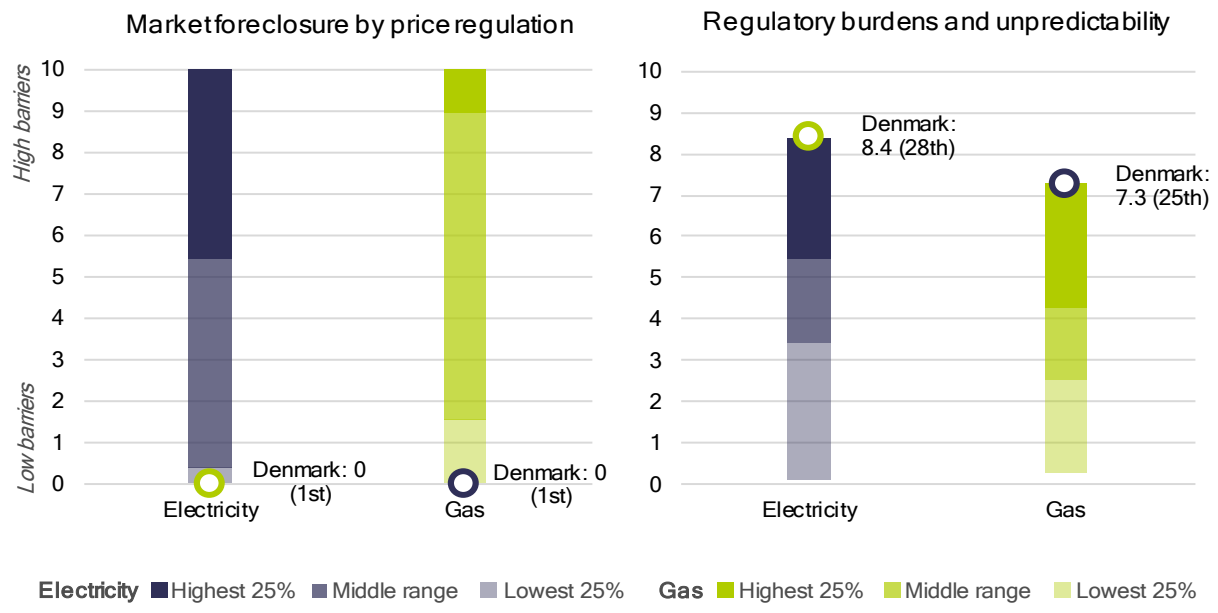
AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

1.5 Denmark'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 Denmark 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



With no direct (official) price regulation, Denmark ranked joint 1st for this indicator. However, regulatory unpredictability was ranked poorly (28th across Europe in electricity, 25th in gas).

2) Market inequality

Within market inequality, barriers across Europe have been sub-categorised into two areas encompassing 8 specific barriers[7]:

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 insufficient. Strategic and unfair advantages for incumbent suppliers around transparency, pricing and

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

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. 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 Denmark:

- 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 occurs 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 Denmark:

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

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

Discriminating, strategic behaviour of incumbent, and obstruction by other market players. In the research this barrier was identified as an issue in Denmark. The incumbent/existing suppliers are able to use tactics in customer access, pricing etc. that are not available to new entrants. Market players with a large market share may act in an obstructive way, especially around data exchange. This can especially disadvantage small suppliers with only a

limited customer base to draw data from. If regulated DSOs are involved in other areas of activity such as customer care or flexibility services, it can narrow deregulated suppliers' potential to expand into these areas.

National issue

Along with vertical integration (see following barrier), this was raised as the most fundamental and largest barrier for independent suppliers in both gas and electricity. As in the other Nordic countries, most suppliers are local incumbents integrated with the local DSO, and these suppliers were reported to have "extreme dominance" in their grid areas (c. 90% of customers). In Denmark, these integrated utilities are in turn owned by a handful of large holding groups. This encourages DSOs to operate in ways that benefit the commercial supply side, distorting the market at the expense of novel and independent suppliers. Certain suppliers were reported to engage in strategic behavior unavailable to new entrants, or to obstruct market processes by e.g. late replies, creating a highly important barrier in both electricity and gas, also for novel players such as demand aggregators.

Further, conflicts of interest between integrated electricity grid operators and suppliers were considered to be a major risk for aggregation services from independent suppliers, which should be welcomed by the DSO to improve grid control but compete against the integrated company's supply side. Vertically integrated electricity DSOs were reported to show biased treatment of novel energy resources and players, constituting a major barrier for demand aggregators.

Potential solutions

This barrier stems partly from the historic market structure, which will change gradually as new players move in. It is also closely linked with problems around vertical integration; see below. Refinements of requirements and procedures around market communication and data would go some way to reducing the incumbent advantage (see also section 3.1). This issue is also a major barrier in other Nordic countries, but in Denmark it is arguably added to by the higher-level of co-ownership of the local incumbents by large holding groups (see "Unbundling in Denmark box below). Stricter limits on company structure and mergers, based on competition considerations, may thus be warranted among utilities.

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

Unbundling in Denmark

Denmark provides a valuable case study in how insufficient unbundling requirements can distort a market. Similar issues exist in many countries, notably Finland and Norway, which also share Denmark's broad electricity market structure of small regional DSOs integrated with a local incumbent supplier. In Denmark, this is compounded by the vertically integrated undertakings being owned largely by a small number of large holding groups. Independent market players in Denmark have in recent years highlighted several examples of the various ways in which incomplete unbundling skews the playing field in favour of integrated suppliers, and recent reviews by the regulator have reached similar conc. Integration between the DSO (a regulated monopoly) and supplier (a commercial enterprise) encourages the supplier to pass costs to the DSO while subsidizing the supply side from DSO income. This hinders competition with independent (non-integrated) suppliers who simply do not have the same possibilities for financing and information access as integrated companies. Integration can also skew decision-making within the integrated companies such that they act in the interest of the ownership group's profit rather than a well-functioning energy system. The examples below illustrate cases where insufficient unbundling between grid operators and suppliers has led to competition-hindering behavior.

Inside trading

One of Denmark's largest energy concerns, SEAS-NVE, was recently forced to renege on a contract it had made up with its sister supply for delivery of energy savings services. The contract tender only received one bid, from the sister supply company, at prices c. DKK 50 million above similar contracts in other grid areas. These circumstances indicate an intentional abuse of position, bypassing standard market processes to favour the holding group.

DSOs as empty companies

An independent investigation found that many vertically integrated DSOs employ only a handful of people, unlikely to be sufficient to manage all the DSO's tasks if it were operating as an independent entity. At the same time, c. two thirds of vertically integrated company's income was found to come from the understaffed DSO side, and only one third from the commercial supply side. This indicates skewing of structure and accounting to benefit the holding group.

Practical consequences

Independent market players have experienced that DSOs favour their sister company suppliers also in practical ways on the ground. For example, when customers are to be switched off for non-payment, the DSO is reported to prioritise the customers of its integrated supplier, causing independent suppliers to lose more money than the integrated company by continuing to supply a customer that will not pay while they wait for the later disconnection.

1. https://forsyningstilsynet.dk/aktuelt/publikationer/elmarkedet/undersoegelse-af-konkurrencesituationen-paa-elmarkedet-med-fokus-paa-de-koncernforbundne-virksomheders-aktiviteter
https://forsyningstilsynet.dk/aktuelt/publikationer/elmarkedet/undersoegelse-af-personsammenfald-i-netvirksomheder-elhandelsvirksomheder-og-virksomheder-der-direkte-eller-indirekte-ejer-elhandelsvirksomheder

Strategic, unfair advantage of vertically integrated market players and lack of transparency. In the research this barrier was identified as an issue in Denmark. Most DSOs in Denmark are small and hence exempt from most unbundling requirements. In addition to the advantage of an established customer base (see above), these vertically integrated companies have advantages over new entrants in terms of information, e.g. allowing them to target customers based on consumption profiles, and in terms of access to financing through e.g. DSOs preferentially favouring co-owned companies when procuring services, even though it is illegal in Denmark for DSOs to favour sister companies.

National issue

In association with the above barrier, this was raised as a fundamental barrier on the Danish market. Indeed, cross-subsidisation between the grid and supply side was considered the biggest barrier in the electricity market overall. At its root, the issue arises due to insufficient unbundling, which - despite legislation that prohibits DSOs from showing preferential treatment towards their associated suppliers - allows and even incentivizes companies to cross-subsidise and favour their affiliated companies in operations and procurement, and DSOs to favour their sister supplier's customers in customer service issues. Independent suppliers feel that unbundling prevents DSOs from making rational decisions for the grid system, instead prioritizing economic benefit for the holding group. DSOs are not required to submit public tenders for services, enabling them more easily to procure services such as energy efficiency from the integrated supplier, moreover at prices that may not reflect market conditions (see "Unbundling in Denmark" box above). This has consequences for market functioning not only in in energy supply but also areas such as in, e.g. EV charging, street lighting, fiberoptic cabling where vertically integrated groups are active.

Vertically integrated suppliers also have a data advantage over new entrants, especially with regards to data for innovative products (see section 1.4),

Potential solutions

Legislation to prevent DSOs favouring sister companies already exists, but based on the surveyed supplier experiences has not been sufficient to prevent anti-competitive behavior. Other steps already taken to reduce opportunities for DSOs to favour sister companies include removing the responsibility for procuring energy efficiency services (under the "Energy Savings Agreement") from DSOs as of 2020.

DUR has just completed a survey of unbundling. Based on this, regulatory change may be hastened to level the playing field for independent actors. However, given the recurrence of this problem in many European markets, it appears that the only effective solution would be to require complete unbundling of DSOs from supply companies. At a minimum, transparency requirements should be tightened to e.g. require public tenders by DSOs and to, allow public scrutiny of how their public subsidies are spent.

DSOs could be excluded from any other activity than provision of network services as will come into force in Norway. If not, the potential for these regulated players to participate in competitive markets must be carefully considered when designing structures for DSO incentives and subsidies.

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 identified as an issue in Denmark. The balancing arrangements remain largely focused on large-

scale generation. This can exclude smaller-scale/aggregated generation or demand-side bids as product requirements are insufficiently accommodating to these newer actors.

National issue

Market players felt that demand-side access to the markets is restricted to favour large-scale generation, for example through access conditions and product definitions that are prohibitive for consumption bids to the point of explicit exclusion. Hence, independent demand aggregators face an unequal competitive environment, also due to specific restrictions such as limits on pooling resources in single bids.

Potential solutions

Some measures to facilitate smaller players' entering the markets have already been taken, e.g. lowered bid sizes and less stringent metering requirements, and the TSO is piloting how to aggregators could be accommodated on the balancing capacity markets without balancing responsibility. Implementing the aggregator role as prescribed in the Clean Energy Package is ongoing. Such efforts should be continued and even accelerated to keep pace with the potential contributions of newer players on balancing markets.

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 Denmark: Equal access to & maturity of wholesale market

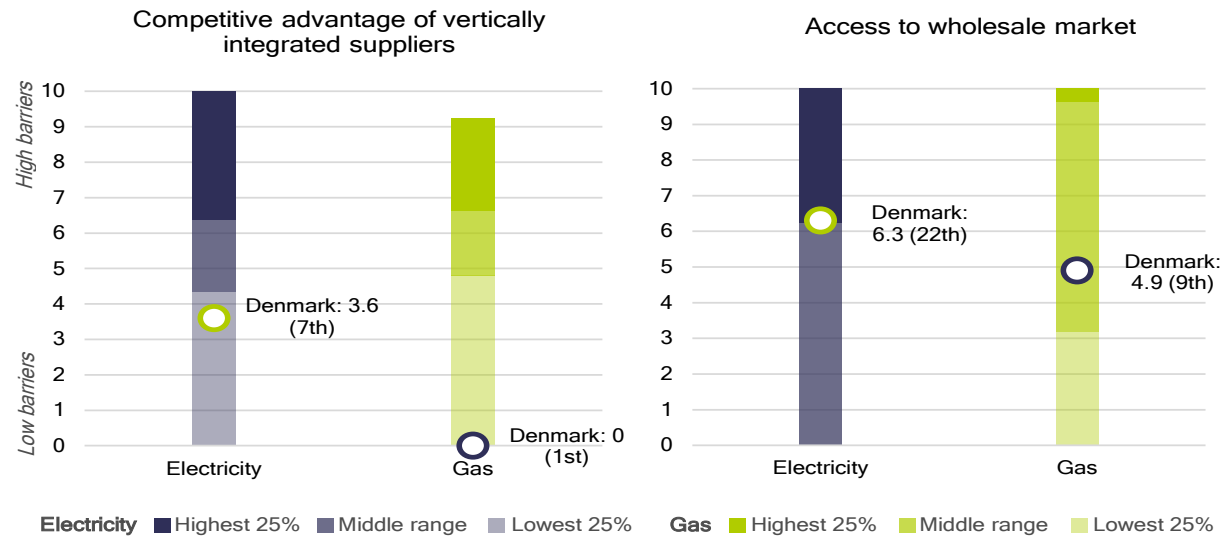
No considerable barriers around wholesale were identified in the Danish markets.

2.3 Denmark'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 Denmark are shown against the range across all analysed 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 residential 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. A high score is attributed if the traded volume is relatively low compared to the consumption of the country (churn rate). Traded volume includes volumes that are traded at hub as recorded by brokers (OTC) or exchanges and does not include 'contracted' (LTC or other bilateral deals) volumes which are conducted 'off market'.

Performance indicators



Denmark was ranked well for competitive advantage of vertically integrated suppliers (7th for electricity and 1st for gas). For access to wholesale, it was ranked quite low for electricity but moderately for gas (22nd and 9th respectively).

3) Operational and procedural hindrances

Within operational and procedural hindrances, barriers across Europe have been sub-categorised into two areas encompassing 13 specific barriers[8]:

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 Denmark:

   - 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

[8] Please note: these definitions are Europe focused, not specific to Denmark. 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 Denmark:

- 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 Denmark: Sign-up & operations compliance

Poor availability of information for market entrants & active participants. This was not a barrier in Denmark; rather, information availability in Denmark was described as one of the best in Europe. In other markets, detailed information about legislation, licensing requirements and procedures during operations etc. are not readily available, or only in the local language. This makes it difficult for potential new entrants to (1) understand the market and judge its suitability for their business; (2) efficiently go through the entry process to establish on the market; (3) operate effectively and efficiently.

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

AUSTRIAN BEST PRACTICE CASE: Availability of information for market entrants & active participants.
The Austrian NRA, E-Control offers a comprehensive "starter kit" with all the necessary information for new market entrants in German and English language. Furthermore, statistical data, covering switching rates, price levels, smart metering rollout progress and others is frequently being published. Therefore, a barrier is not only non-existing, but even more, the situation in Austria can be regarded as a best practice.

Heavy administrative process for entry (registration / licensing). In the research this barrier was identified as an issue in Denmark. The processes required to enter a market constitute a significant administrative burden. Complicated and time-consuming processes and requirements mean that new entrants must invest considerable time and money before they can begin to generate revenue.

National issue

All electricity and gas suppliers have to register with Energinet in order to be a market participant in Denmark. The procedure is standardized for both electricity and gas and Energinet's webpage contains guidance (both in Danish and English) on how to e.g. become a supplier Nevertheless, complex and time-consuming licensing procedures were raised as a substantial barrier for both electricity and gas, particularly for novel services. There appears to be no standard operating procedure for novel companies entering the market, and processes are not transparent (although. Bureaucracy at the TSO and DSOs arguably constrain innovation and development in the electricity market.

Potential solutions

The authorities should communicate with market actors to identify the precise causes of novel companies feeling overlooked in the entry process. A clearer regulatory environment for new energy businesses and technologies (see section 1.4) would equip authorities to deal more effectively with these actors.

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
				CY			DK				EL		IE	IT				NL				RO						

High financial requirements (incl. long working capital cycles) and forced risk during operations. In the research this barrier was indicated as an issue in Denmark. DSOs require financial guarantees from suppliers, who collect network fees as part of the supplier-centric model. This means a large amount of capital must be set aside, which is a challenge especially for small and new retailers.

National issue

Each of the c. 40 local DSOs requires a separate bank guarantee of a different size when a supplier begins operation. This requires both capital and communication, both of which can be a challenge particularly for smaller suppliers with less credit potential. Any conflicts with suppliers must be settled in court as the regulator has no power to intervene in such disputes. This barrier is linked with the dominant market position of the incumbent (see section 2.1).

Potential solutions

The issue of bank guarantees could be alleviated by harmonizing and even centralizing these requirements across the country. The issue of settling disputes arises from a special case in the relevant regulation; amending this would solve the problem and alleviate the resulting market distortion.

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
	BE					DE	DK			FR			IE					NL		PL					SI	ES	SE	

Highly complex or country-specific systems & processes. In the research this barrier was raised as an issue in Denmark. The systems arrangements (forecasting, customer service etc.) can require significant costs, especially when first being established. Costs and outsourcing potential can fall disproportionately on 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 a repeat investment in the new market.

National issue

Market processes were considered so complex as to create an important barrier in electricity but not gas. Further, issues around scaling up these systems and processes was considered a hindrance.

Potential solutions

As above, communication between authorities and market actors would help to identify which aspects of processes are problematic and how, perhaps taking good examples from the gas market. This issue is linked with the scattered structure of the market, particularly heterogeneous DSO requirements (see above and below) and would hence also benefit from national harmonization of requirements. Harmonisation of systems should feature in the continued development of a common Nordic retail market, which the authorities should carry on promoting.

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

Regional differences or differences between DSOs within a country. In the research this barrier was indicated as an issue in Denmark. Different regions within the country and different DSOs' grid areas have different processes and requirements. This requires more effort from the supplier to be active across many regions, compared to if there were national standardisation.

National issue

Denmark's electricity market structure of small, local supplier/DSOs makes it heterogeneous yet with high market concentration on a regional scale. DSO requirements differ, complicating processes for suppliers working across grid areas. For example, separate bank guarantees must be agreed and set up for each DSO.
Another regional difference of importance to demand-side services is that Denmark's electricity system is effectively split in two, with the east connecting to the Nordic-Baltic system and the west to continental Europe. Different balancing mechanisms and markets apply in each half, hence providers must develop two versions of their products in order to compatibly act across the whole country.

Potential solutions

The two national grids are being harmonized in preparation for a joint central European market, and as part of this process the TSO is investigating barriers on the balancing markets. However, the timescale for these developments is not clear. In gas, grid operation has recently been harmonized to give a single grid operator, which was welcomed by market actors, albeit with some frustration around the slow speed of the merger.

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 Denmark: Data access & processes

Lack of data hub. While Denmark's development and use of the DataHub serves as an example of best practice in centralized data access, quality issues with the DataHub were also indicated as a barrier in Denmark in the research. The DataHub provides a centralized platform for data storage, system messaging and switching, but its full potential functionality has not yet been realized.

National issue

Despite the success of the DataHub, some issues arguably remain that prevent it fulfilling its potential as a neutral and complete data system. Data are not as clean as it should be, and some is difficult to access. For example, hourly metered household electricity data exists but there are no requirements for the meter operator, i.e. DSO, to guarantee its quality. Consequently, it is subject to corrections, which are expensive for suppliers and confusing for customers. Also, DSOs often fail to provide data in a timely manner.

Potential solutions

These concerns could be easily addressed by stricter regulation around data quality and timeliness standards, designed to ensure that all actors can benefit equally. Continuous development of the DataHub should consider likely future data requirements to ensure it remains fit for purpose.

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.

European markets in which this barrier has 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: 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".

Notwithstanding the above, it is important to note that detailed requirements, rights and obligations of the relevant market participants in terms of the DataHub (including DSOs), are set in regulations issued by Energinet within the framework of the Danish Electricity Supply Act. Pursuant to Energinet's regulation D1 on settlement metering, DSOs are e.g. obliged to send metered data per metering point to the Datahub and check the correctness of metered data in the Datahub.

Missing access or poor quality of operations-critical data. In the research this barrier was indicated as an issue in Denmark, particularly for the demand side. Non-available, delayed or low quality of operations-critical data (including smart meter and historical data) increases the need for manual processing and therefore costs. Without timely, high-quality data, new services are difficult to develop and target to customers.
Issues around operations-critical data in Denmark are addressed above in sections 1.4, 2.1 and 3.2.

European markets in which this barrier has also been indicated

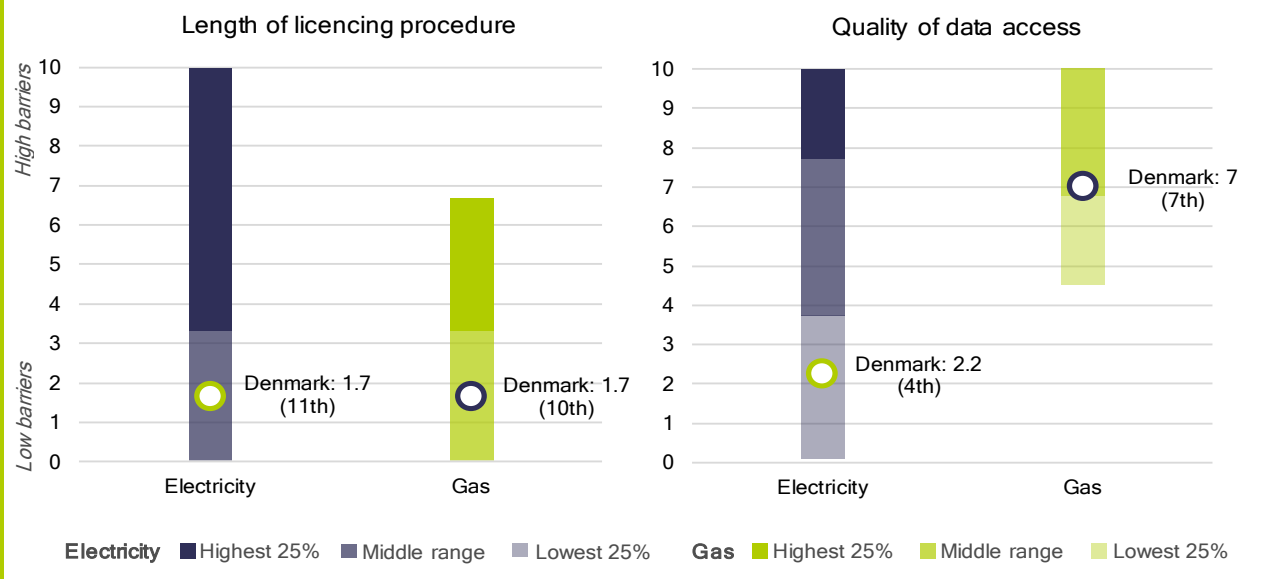
AT	BE	BG	HR	CY	CZ	DE	DK	EE	FI	FR	EL	HU	IE	IT	LV	LT	LU	NL	NO	PL	PT	RO	SK	SI	ES	SE	UK

3.3 Denmark'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 Denmark are shown against the range across all analysed 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



In terms of Length of licencing procedure, Denmark was ranked 11th for electricity and 10th for gas. Reflecting the successful data hub, Denmark was ranked 4th across Europe for data access for electricity (7th for gas).

4) Customer inertia

Within operational and procedural hindrances, barriers across Europe have been sub-categorised into one area encompassing six specific barriers[9]:

1. **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 Denmark:

    - Lack of information regarding available offers and switching possibilities

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

- 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 Denmark: Customer orientation

Low customer awareness or interest makes it difficult to attract customers. In the research this barrier was indicated as an issue in Denmark. If customers are not well informed about their opportunities to participate in the market or are not motivated to use them, e.g. because energy is not a core lifestyle priority, they are not driven to seek out or engage with new energy suppliers or services. This barrier 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

Market players felt that customers are generally not engaged with the electricity and gas markets. In particular, a lack of real-time information for customers on their energy usage was considered a substantial barrier to demand response and aggregation. Customers are not able to see their behavior directly affecting their usage and hence bills. Without this awareness, it is difficult to encourage interest in DR and other offerings as well as interest in switching suppliers to obtain such offerings.

Potential solutions

Broad issues with customer awareness and interest could be solved by increasing information requirements on incumbent / default suppliers, for example to require them to regularly inform their customers of their rights to switch and potential gains of doing so. Recent market changes that allow suppliers to bundle energy with other products, e.g. green transition or internet, free suppliers up to attract customers on more varied and differentiated grounds and are valued by suppliers.
The problem of lacking customer-side data should be at least partially solved in 2020, when virtually all customers will have smart meters.

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 identified as an issue in Denmark. Many factors can mean that market price signals do not reach end users, e.g. small energy component of bill, low energy prices, simplified/estimated settlement, etc. With limited price signals, there is little incentive for customers to engage with the market as they have limited power to bring their costs down, or to see an impact of their behaviour on their bills.

National issue

Taxes on electricity make up a significant proportion of the end-user bill, and the energy component of the bill is small. Although much of the rest of the bill is calculated in relation to energy consumption, and hence reflects usage, suppliers still considered this an important barrier for demand response.

Potential solutions

The more the bill reflects actual energy consumption, the more the effect of reducing consumption is reflected in what customers pay (but see section 1.4 on fixed grid tariffs blunting price signals). Minimizing or avoiding fixed bill components is one way of achieving this.

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 Denmark. Lack of trust in new suppliers can be caused simply by customer unfamiliarity with the new supplier's quality of service, often underpinned by a misunderstanding of how far the supplier's responsibility stretches, such that new suppliers have to invest heavily in building a new relationship. Customers may therefore also mistrust new technology from suppliers (although Danish customers are relatively highly digitalised), at least until they have been convinced that it is useful and will not disrupt their lifestyle.

National issue

Independent suppliers raised customer mistrust of new electricity and gas suppliers, and of new technology for e.g. demand aggregation, as a substantial issue.

Potential solutions

This is partly the responsibility of new entrant retailers and of suppliers of new technology to resolve, by gaining a reputation for reliability. However, this is difficult when local incumbents retain trust relationships with their customers, denying new actors the chance to demonstrate their quality. Government-led information campaigns explaining e.g. that changing supplier would not affect security of supply, or the personal and grid benefits of DR, could help ease customers' concerns.

European markets in which this barrier has also been indicated

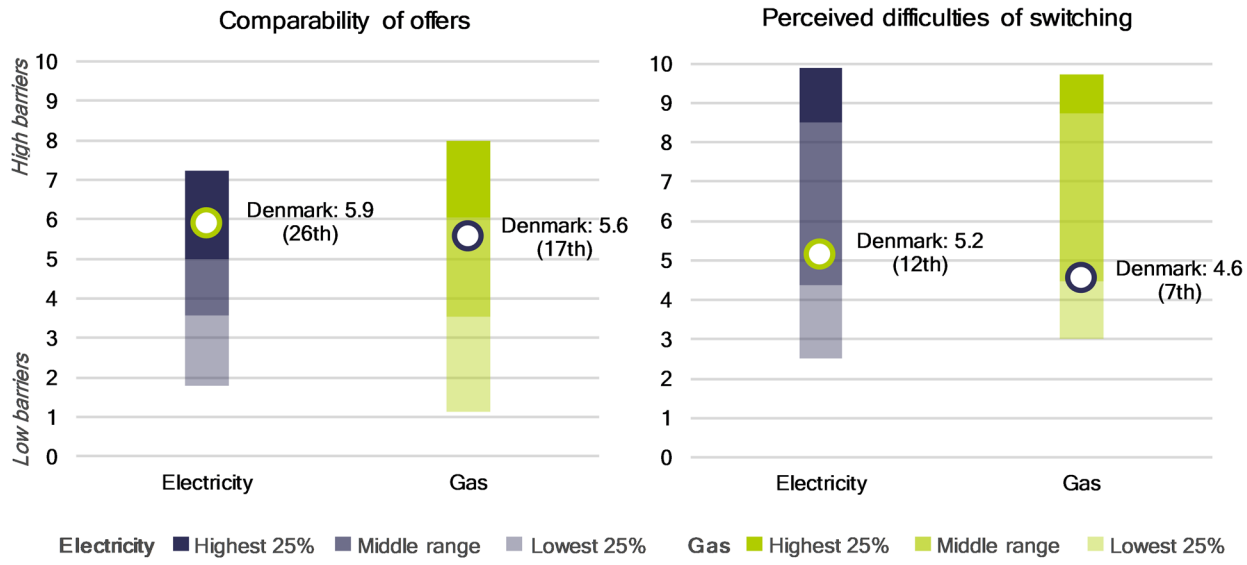
AT BE BG HR CY CZ DE DK EE FI FR EL HU IE IT LV LT LU NL NO PL PT RO SK SI ES SE UK

4.2 Denmark'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 Denmark 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



Denmark was ranked low in terms of comparability of electricity offers (26th across Europe), with the situation better in gas (17th). In terms of perceived difficulties of switching, Denmark was ranked in the middle of the European range for both electricity (12th) and gas (7th).

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 Denmark: Other

Small market or customer value. From our studies of this market, it appears that this would pose a barrier in Denmark. A small population and/or low consumption hinders profitability. Market size as a barrier could be ameliorated by better harmonization of markets.

National issue

Denmark is a small market for both electricity and gas due to its small population. End-user energy prices are low, giving suppliers small margins, increasing risk in combination with the limited customer numbers; it is a feature of the market is that independent retailers have found it difficult to make money. It is not clear whether low prices are due to efficient competition or cross-subsidisation of co-owned retailers (see section 2.1).

Potential solutions

Further harmonization of a Nordic-wide retail market would benefit market players, by enabling them to use their processes and products from one country across the whole region, effectively creating a four times bigger market. DUR could influence this by pressing the government and other Nordic regulators to pursue the unified market proposals.

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 methodology used to determine regulated prices, and burdensome licensing regimes, where the requirements are disproportionate to their protective function. In Denmark, the electricity supply to 3.4 million households is characterized by high prices (though a low share of the energy component within the overall energy bill) due mostly to high taxes, by far the lowest average consumption among the Nordic countries due to widespread use of district heating schemes, and the lowest level of switching among the Nordics. Denmark was a leader in Europe in terms of introducing a centralized platform for consumer data, with a fully functional DataHub operating since 2016.

Most suppliers are local incumbents integrated with the local DSO, many of which are in company groups under a holding company. Denmark provides a case study in how inefficient unbundling can distort a market. Various investigations have found evidence of manipulation of costs between the DSO and the suppliers to benefit the holding company, and cross subsidization was regarded by project participants as the biggest barrier in the electricity market. There has also been favouritism in DSOs awarding contacts for services to affiliates, along with obstructive tactics such as late replies to queries from independent suppliers. Moreover, despite the data hub the incumbent/existing suppliers can arguably be obstructive regarding data provision regarding historical data, which is essential to developing new services and targeting customers. The regulator is increasingly aware of the multiple issues arising from incomplete unbundling and holding group ownership, including undertaking its own reviews of the situation, and is likely to take some action in the foreseeable future. Vertical integration of supply and network activities presents a barrier in many European markets, with different potential solutions. The Danish case could benefit from a similar approach to Norway, where all suppliers will soon be required to unbundle from DSOs, and DSOs are prohibited from engaging in any commercial activities. In addition to unbundling issues, the scattered nature of small, local DSOs leads to other barriers: suppliers must invest substantial effort to communicate with DSOs over a larger geographical area, and as each one requires a separate bank guarantees it raises financial barriers too. Harmonizing processes and collateral requirements, in particular between DSOs in the same holding group, would improve market functioning.

Some suppliers expressed concern about various regulatory uncertainties, notably the future development of the regulatory framework and the potential influence incumbents have. In other markets, the impact of such uncertainty on the market atmosphere has been somewhat relieved by DUR increasing communication with market players and, if possible, speeding up (or at least sticking to planned schedules for) any process of change. The Danish market was felt to not yet be mature for novel products and services to enter, including barriers such lack of relevant data, unsuitability of existing regulation/obligations, lack of flexible grid tariffs that signal peak demand and troughs, and a lack of customer interest in demand response. Balancing was also an area where more novel players felt that more progress should be made to include e.g. smaller generators and aggregated loads, as the Finnish TSO already has done, to even the playing field for such actors as the balancing arrangements remain focused on large-scale generation.

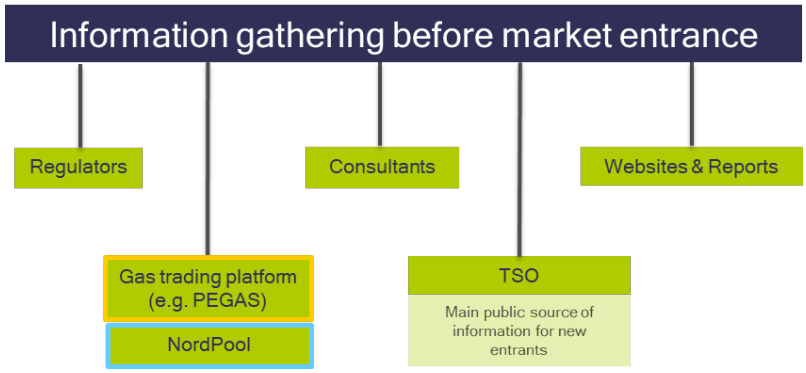
Project participants considered that there were price signals were insufficiently flexible for end users, which probably reflects at least in part the effect of the very high tax on electricity on reducing the proportion of reduction possible from customer initiatives. There was thus a feeling among market players that customers are subsequently not engaged with the market, which is reflected to no small extent in Denmark's relatively low switching rates. While this low switching may to some extent additionally reflect customer satisfaction as a result of a well-functioning market and the appeal of local (often co-operative) suppliers, it may also reflect inertia related to the market advantage of local, integrated incumbents.

Actors on the gas market did not experience as many barriers as in electricity. The power of lobbying and discriminatory strategic behaviour of the incumbent were similarly regarded as a major barrier, while some gas suppliers also considered low margins on regulated prices (only to 6% of customers, and soon to be removed) to hinder free competition.

APPENDIX 1: PROCESSES

This section describes market processes in energy retail in Denmark. 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. Boxes outlined in blue apply only to electricity and in orange only to gas; boxes with no outline apply to both markets.

1) Information gathering before market entry

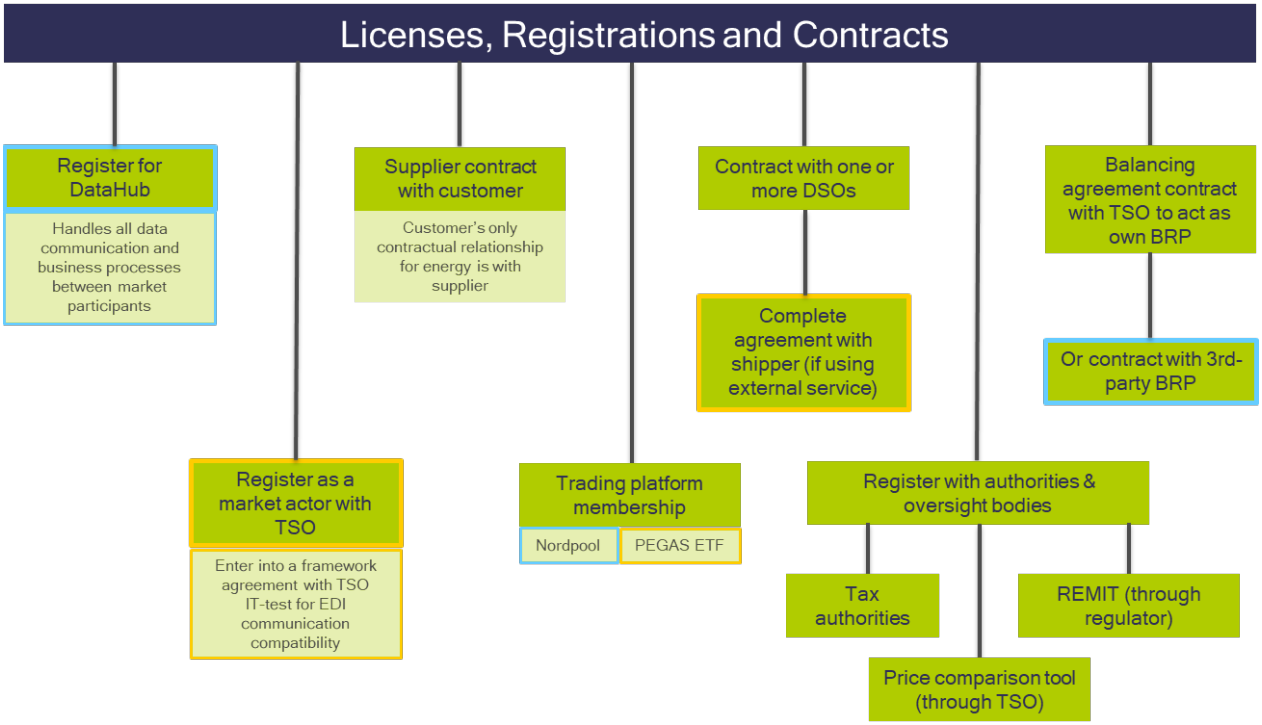


Further comments

The TSO, Energinet, is the main source of information, mainly through its website.

- DUR has little contact with pre-entry actors, almost only through PCT & Remit
- Contracting consultants is not necessary in principle as all necessary information regarding market entrance is publicly available

2) Licences, registrations and contracts

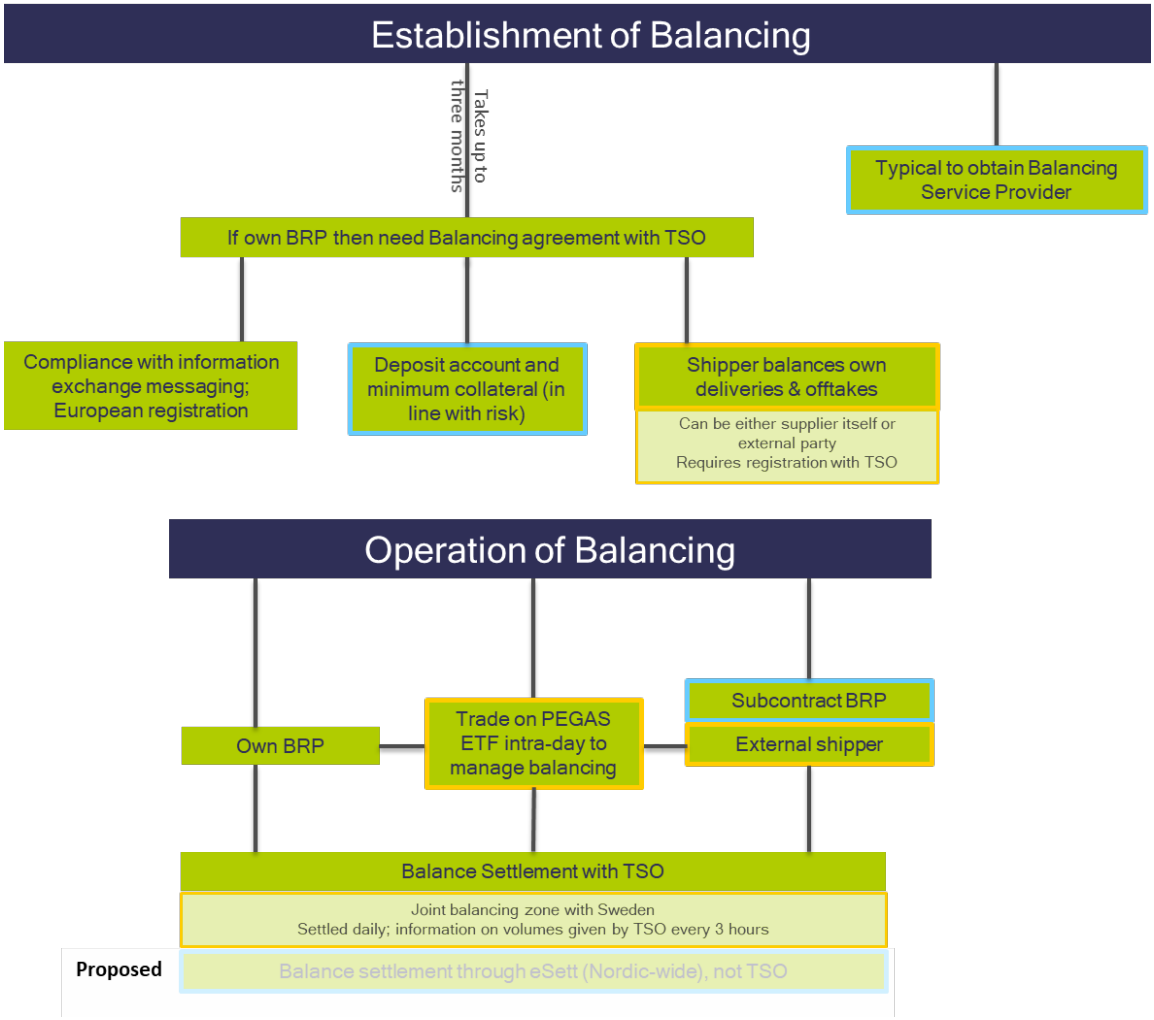


Further comments

Entering as a gas supplier requires no permits or registrations.

- **Supplier-centric model**: the supplier is the customer's main contact point, responsible for communication & billing. The customer does not typically have any direct contact with DSOs and other parties.
- **DataHub:** handles data communication and business processes between market participants in a uniform and standardized way. Operated by the TSO. All market participants, including suppliers, must be DataHub registered.

3) Balancing

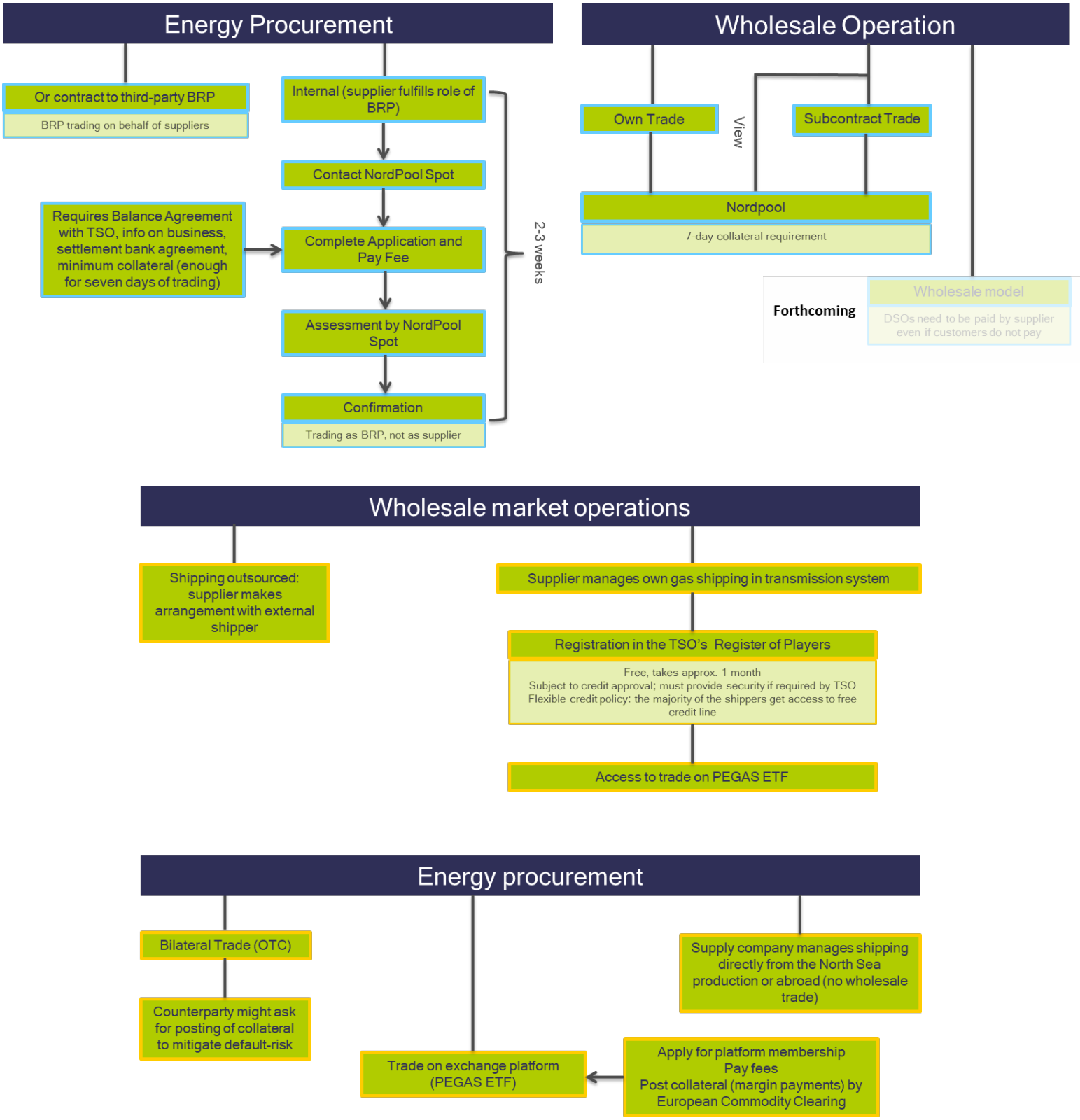


Further comments

In May 2019 Energinet announced its plan to join the Nordic-wide balance settlement and bought 25% of eSett, the settlement company. Denmark will join the Nordic settlement in late 2020, pending regulatory approval of the new market processes.

- **Gas:** flexible and market-based end-of-day-balancing, with no intra-day restrictions; cash out by end of day. Third parties have the right to access storage in a transparent, non-discriminatory and objective way.

4) Wholesale

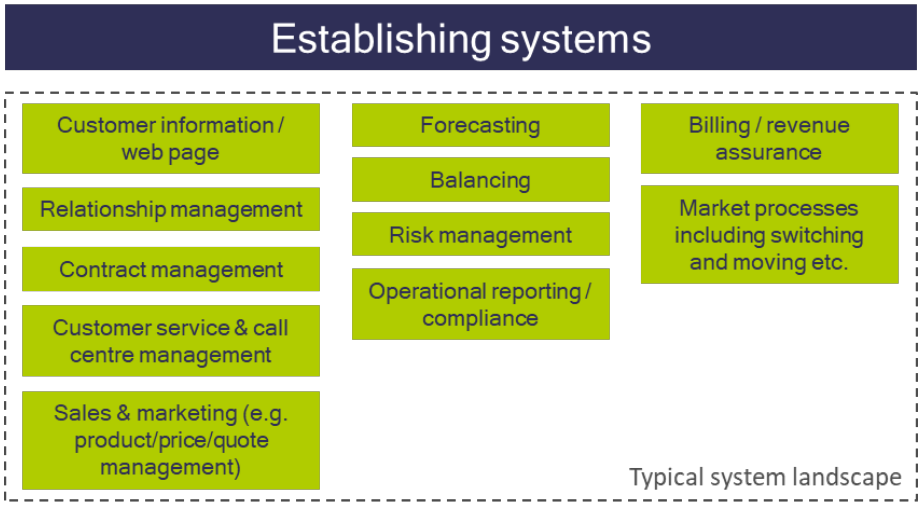


Further comments

- Suppliers cannot make a bilateral agreement with producers without the involvement of the BRP.
- It is possible to have one registration for access to all Nord Pool Spot markets, but for this to be possible the participant must have at least one legal representative.

- In gas, the role of the shipper is to manage gas trade and transportation of gas to distribution area on the supplier's behalf

5) System landscape



Further comments

From the 1st of December 2017 hourly settlement became available for customers with an annual consumption up to 100,000 kWh (previously only available to non-household customers with an annual consumption of > 100,000 kWh) and with smart meters installed.

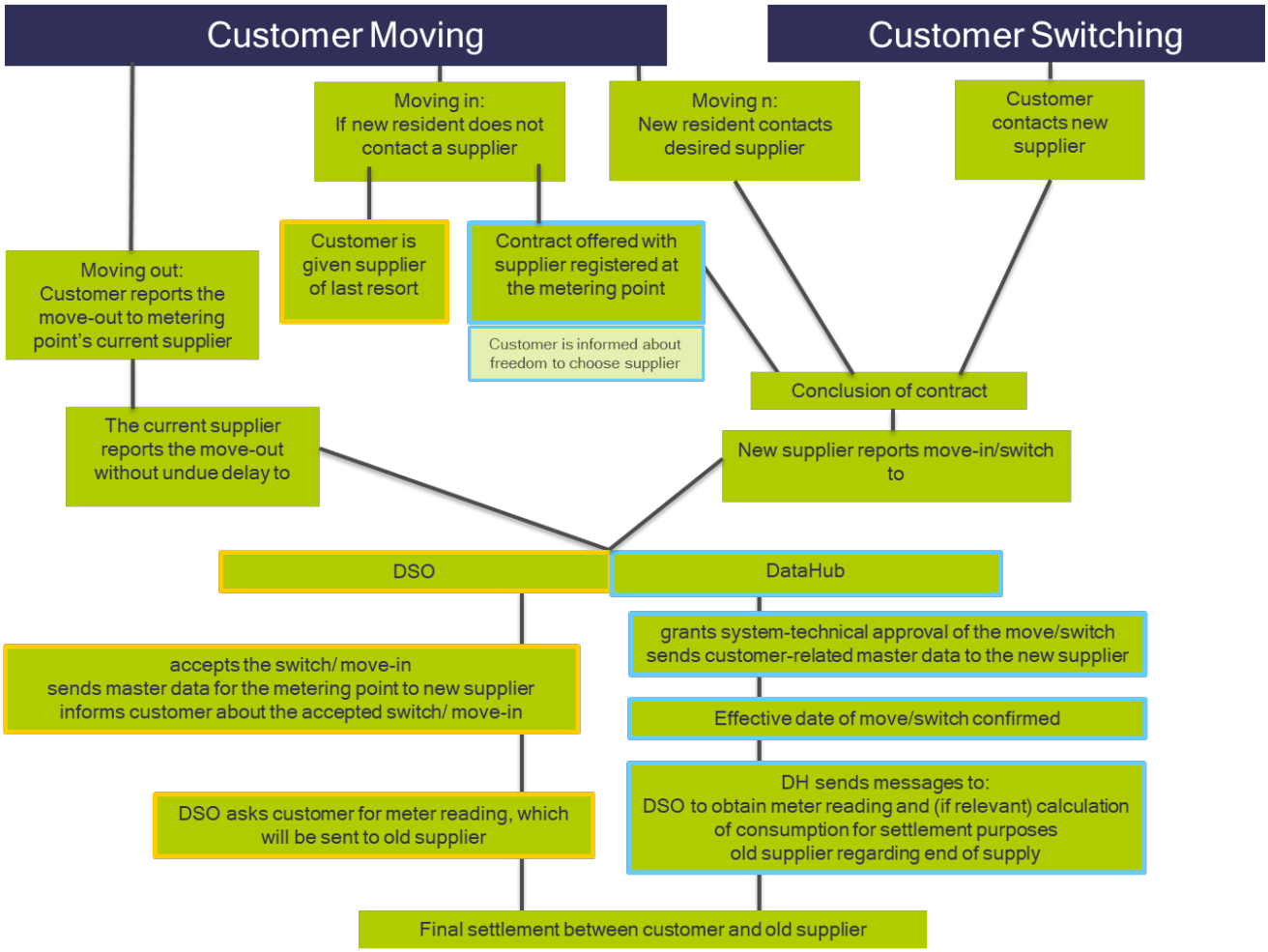
6) DSO-related operations & market communications

Further comments

By law, any communication between suppliers and DSOs concerning a particular metering point must be done via the DataHub, not directly with each other (except in limited circumstances),

- Third-party access to the DataHub has been standardized, such that any third party can access metering and master data pending the approval of the consumer. The consumer then retains control over who accesses the data, how much data can be accessed and for how long.
- The gas market has no central hub for data exchange, but it occurs on non-discriminating terms with all suppliers having access to relevant data. There are no plans to roll out smart meters for gas.
- Electricity customers have easy online access to their own data on the DataHub. Gas customers typically have similar facilities provided through the supplier's website.

7) Customer switching & moving

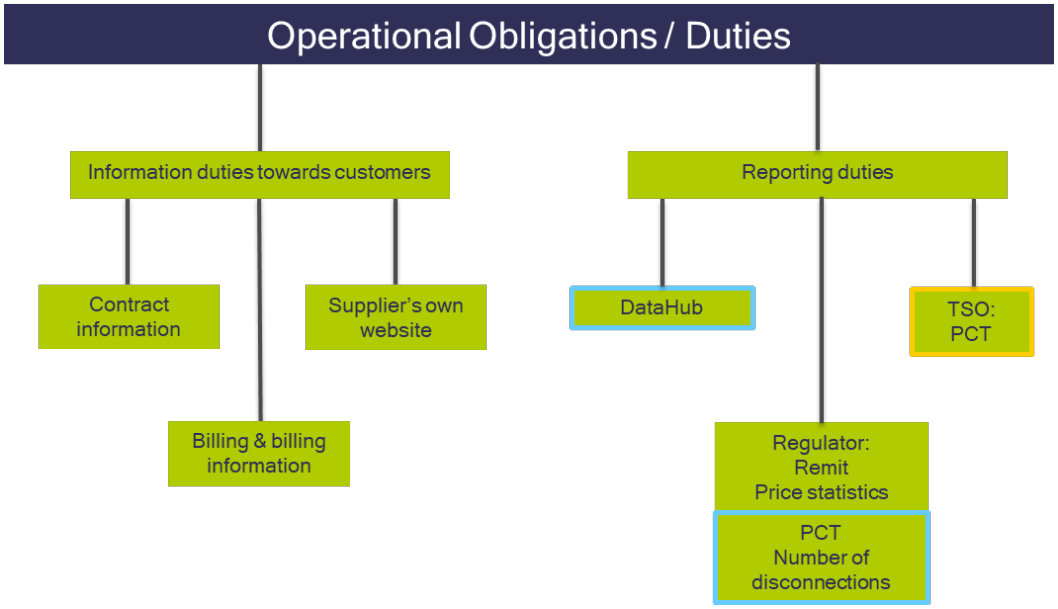


Further comments

Following the implementation of the supplier-centric model in electricity on 1 April 2016, the licensed default supplier mechanism is no longer in force and the universal service obligation has been substituted by a supply obligation. However, the license of the last default suppliers did not expire until the 16 May 2017. Since then all customers have been on market based products.

In gas, universal service obligation products still exist and are provided by licensed default suppliers. The current default supplier licenses will expire by the end of March 2020; after this, inactive customers currently on a universal service obligation product from a licensed default supplier will receive a so-called basic product, if they do not choose a different supplier/product.

8) Operational obligations/duties



Further comments

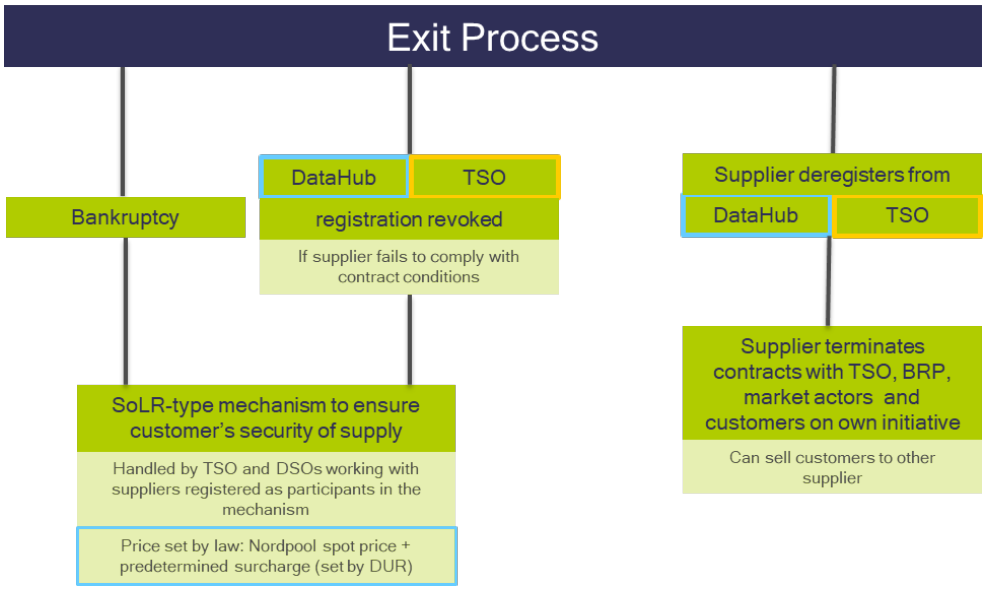
In electricity, price-regulated products (for customers who had not actively chosen a supplier) were abolished in 2017, but such products remain in gas (supply obligation products; 6% of customers), currently supplied by two companies licensed as default suppliers. Their prices are set through tenders of supply obligation licenses and pricing is supervised by DUR. Regulated prices will be gradually phased out of the gas market, and a "basic product" was introduced in 2016 to act as a transition product, with prices and conditions overseen by DUR. Supply obligation customers will be automatically transferred to the basic product when the current supply obligation license period ends (by the end of March 2020).

- Prices of all electricity and gas products offered to household customers (annual consumption < 100,000 kWh) must be placed on the price comparison tool: Elpris.dk for electricity (run by the regulator), Gasprisguiden.dk for gas (run by the TSO).
- There is no supervision of unregulated prices by the regulator.
- Since 2016, all electricity suppliers have a supply obligation, to ensure security of supply for customers: any supplier must supply to any household customer in its network areas of operation that requests it, i.e. pays for it.
- Suppliers are free to bundle electricity with other products e.g. gas or unrelated products
- Combined billing for supply and distribution is compulsory. For electricity the supplier also collects taxes and levies.
- The terms of the supply contract must be fair, transparent, easily understandable and provided to the consumer before conclusion of the contract. Minimum requirements for information to be included in supply contracts are: identity and contact information of the supplier; arrangements for payment, delivery & performance; duration of the contract, or conditions for terminating the contract; where to find information about prices and fees; information on whether the consumer can move the contract to different address, and

relevant terms; deadline for final settlement; information about where compensation etc. can be claimed for non-contractual performance, e.g. inaccurate/delayed billing; information on how to complain.

- Bills were simplified in 2016 to increase consumer awareness by focusing on the most important information and thus facilitating market participation. Minimum requirements include: total payment due and consumption (kWh) in the billing period; type of price (fixed or variable); subscription fees to supplier and DSO; total price in øre/kWh covering electricity costs, grid- and system services, PSO, taxes incl. VAT, provided in the billing period. Consumers have the right to request and receive a specified bill free of charge.
- Customer complaints are handled by the Energy Supplies Complaint Board, also for district heating.

9) Market exit



Further comments

In case of bankruptcy or DataHub registration revocation, the mechanism is a variation on a supply of last resort mechanism and ensures the continued supply of electricity to affected consumers. The TSO (Energinet) assigns the affected customers to suppliers participating in mechanism; customers can terminate this contract with one month's notice to new supplier. The DSO informs the customer of the change of supplier and encourages them to choose a new supplier.

- Suppliers participate in the mechanism by informing the TSO (notification every December for the following year) that they are willing to supply electricity to customers of a failed supplier.
- Participating suppliers cannot reject assigned customers, and the customers will be automatically bound by a supply contract

Getting in touch with the EU

In person

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email

Europe Direct is a service that answers your questions about the European Union. You can contact this service:
- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696, or
- by email via: https://europa.eu/european-union/contact_en

Finding information about the EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications

You can download or order free and priced EU publications from: https://op.europa.eu/en/publications. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1952 in all the official language versions, go to EUR-Lex at: http://eur-lex.europa.eu

Open data from the EU

The EU Open Data Portal (http://data.europa.eu/euodp/en) provides access to datasets from the EU. Data can be downloaded and reused for free, for both commercial and non-commercial purposes.

MJ-02-21-183-EN-N

Publications Office
of the European Union

ISBN 978-92-76-30252-0