



# 2023 *Market Monitor*

**For Demand Side Flexibility**

Published March 2024

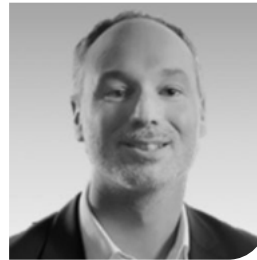


*This report provides an overview of the accessibility and participation of demand side flexibility across 30 European markets. The report covers ancillary services, distribution system flexibility, residential flexibility, capacity markets and wholesale spot markets.*



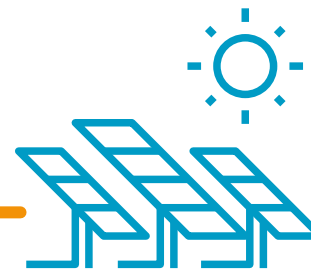
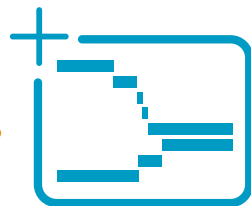
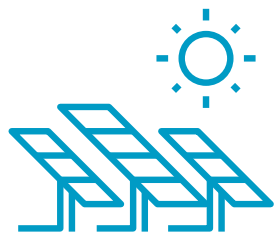
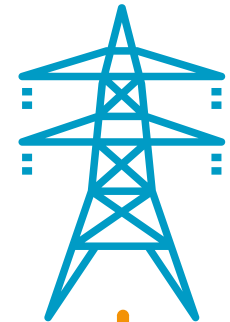
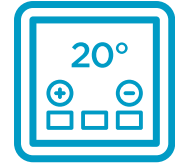
**Lucinda Murley**

Flexibility Research Manager  
+44 (0)20 7432 0625  
lucinda.murley@lcp.com



**Jon Ferris**

Head of Flexibility & Storage  
+44 (0)20 7432 0625  
jon.ferris@lcp.com



# Contents

## EXECUTIVE SUMMARY

Purpose, scope and definition	6
The 2023 European Market Monitor Map for DSF	7
Country score summary	8
Summary score guide	9

## 2023 MARKET MONITOR MAPS


Methodology	12
Accessibility of DSF in ancillary services	16
Accessibility of DSF in distribution system flexibility	17
Accessibility of residential assets in implicit and explicit flexibility	18
TSO spend on markets accessible to DSF	19
Participation of DSF in capacity markets	20
Wholesale spot market accessibility and volatility	21
Future development	22
Capacity market requirements	23

## GLOSSARY 24





# *Executive summary*

- + Purpose, scope and definition
  - + 2023 European Market Monitor  
Map for Demand Side Flexibility
  - + Country ranking and score
- 



# 2023 Market Monitor for Demand Side Flexibility



*Michael Villa*  
Executive  
Director  
smartEn

*Throughout the EU, stakeholders consistently report that access to markets for Decentralised Energy Resources (DERs) is being thwarted by a myriad of multiple regulatory barriers, preventing them from valorising consumers' flexibility.*

*Despite the introduction of new EU rules in 2023 and the forthcoming Network Code on Demand Response, which aim to establish harmonised European approaches to activate flexibility from all consumers, the 2023 edition of the EU Market Monitor for DSF reflects a stagnant situation. While more and more DERs are being deployed, their flexible use is still lagging in many European countries.*

*This is not due to low market interest, but by barriers on the "rules of the game".*

*Best performers identified in this market monitor can demonstrate how to effectively leverage the distributed flexibility, from households and electric vehicles to small businesses and large energy-intensive industries.*



*Jon Ferris*  
Head of  
Flexibility  
and Storage  
Research  
LCP Delta

*While market prices reverted to a level closer to normal in 2023, the lingering impact of the energy crisis caused by Russia's invasion of Ukraine provided ongoing impetus for countries to implement the Clean Energy Package.*

*However, the aspirations set out in the 2019 legislation have neither kept pace with the growing capacity of renewable generation, nor the emergence of the flexibility inherent in low carbon consumer technologies.*

*The 2023 Electricity Market Design requires further integration of flexibility in the energy system, and its implementation by member states cannot take as long as the Clean Energy Package.*

# Demand Side Flexibility Market Monitor

## Purpose, scope and definition

### What the Market Monitor is, and how to use it:

This report provides a high-level summary of 30 European markets and their demand side flexibility market activity. Using this report, you can benchmark markets against each other and track their progress on enabling demand side flexibility (DSF).

The findings are based on our primary and secondary research across each market with findings challenged by internal and external experts.

This report reflects the independent view of the authors.

### Scope of Market Monitor:

- Regulatory progress to enable DSF
- Development of DSO and residential flexibility
- TSO spend on ancillary services accessible to DSF
- Development and accessibility of Capacity Market
- Spend and accessibility of wholesale markets
- Future development of DSF

This report focuses on market-based flexibility and regulations, with a primary focus on ancillary services.

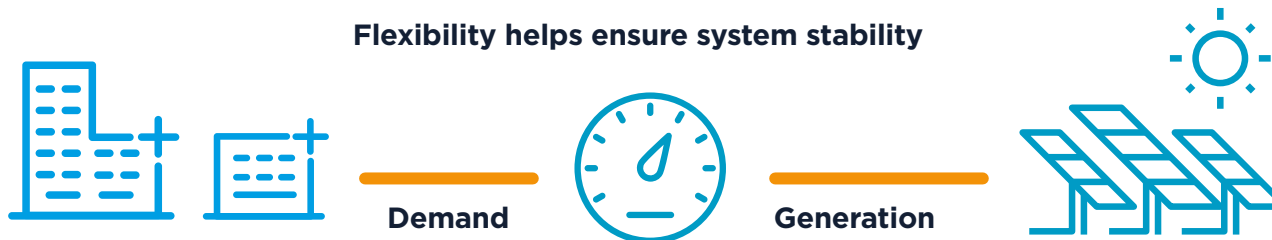
### What is flexibility?

Flexibility is the ability of electrical generators and consumers to alter their output or consumption on demand. It can be provided by assets ranging from large front of meter generation to residential appliances.

### What is Demand Side Flexibility?

DSF is the deviation from the planned consumption, generation and/or use of storage in response to price signals or instruction, from residential, commercial or industrial customer sites, individually as well as through aggregation.

### Flexibility helps ensure system stability



# 2023 Market Monitor for Demand Side Flexibility

## Assessment for the market monitor:

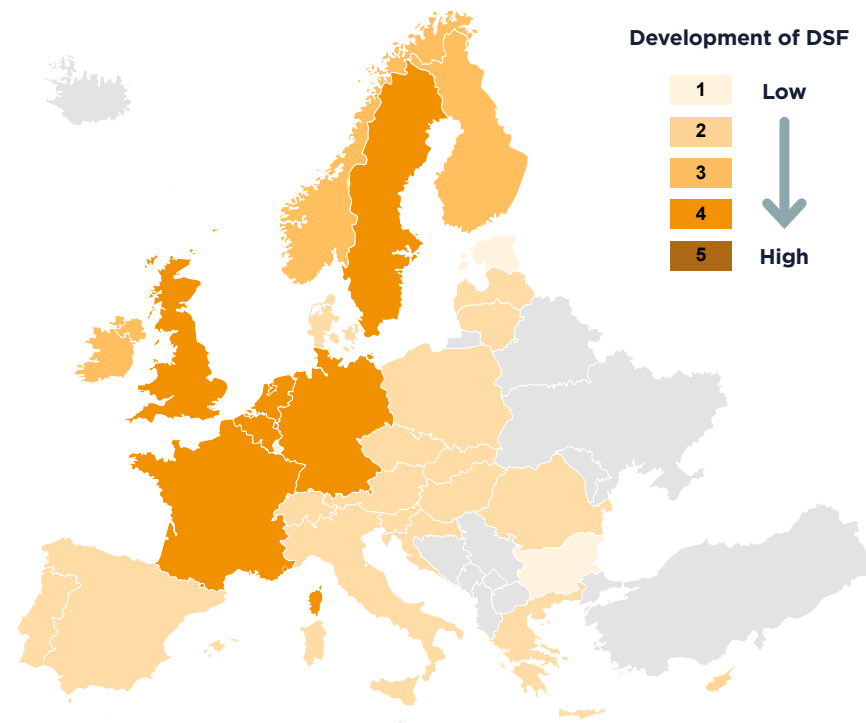
- Accessibility of DSF into ancillary services
- TSO spend on markets accessible to DSF
- Development of DSO and residential flexibility
- Accessibility of capacity markets
- Spend and accessibility of wholesale markets
- Future development of DSF

**This report provides a high-level summary of the current state of demand side flexibility and highlights both the progress made during 2023, and the emerging opportunities.**

Overall, there were positive developments towards opening ancillary services to DSF, especially in Eastern Europe. However, the opening of markets does not directly translate to significant DSF activity, especially for independent flexibility service providers.

Over the past 12 months there has been less positive progress in DSF participation than anticipated, with more still to be done.

- TSO spend on ancillary services fell ~33% in 2023, reflecting lower wholesale prices.
- Joining pan-European flexibility markets is a key driver enabling legal accessibility of DSF.
- However, activity is limited by additional technical and commercial barriers.
- DSF participation is increasing in the few commercial DSO markets, but most countries are still limited to trials and pilot projects.
- Independent access to wholesale markets for distributed flexibility is only starting to develop beyond industrial assets.



# Summary score guide

Our research evaluated the developments of European demand side flexibility:

## How to interpret the rankings :



### Early Markets

'Low' scoring countries typically are markets which are not established or are yet to open fully to DSF and have limited activity.

- These markets have few, if any, value streams open commercially to DSF.
- These markets often have limited need for DSF due to low renewable targets, bilateral contracts with generators, or lack a transmission system (as is the case with Malta).
- With time these markets will develop the need for DSF, however commercial interest will remain limited over the next 3 years.



### Emerging Markets

Countries scoring 'medium' are generally active markets undergoing development to open more fully to DSF.

- Some value streams are open to DSF but there are often significant barriers in high minimum bid sizes, challenging metering requirements or regulatory constraints.
- Despite the (current) lack of accessibility to DSF these countries present an opportunity in the next 2-3 years.
- These countries are aiming to join the coordinated EU markets for ancillary service (MARI, PICASSO, TERRE) this year.



### Maturing Markets

Countries scoring 'high' are more developed markets for DSF. This does not necessarily mean there are no barriers to participation.

- Maturing markets have most (if not all) markets open to DSF, although barriers to entry are still present.
- Local flexibility is developing, with some example of commercial offerings (e.g. the Netherlands) at distribution level.
- Even at their current stage of development, some markets have the potential to grow further due to increasing renewable targets (e.g. France, Germany and Great Britain).



# Country summary 1/2

Ranked in order of regulatory progress (then TSO spend and alphabetically)

Country	Accessibility of DSF in ancillary services	TSO spend on markets accessible to DSF	DSO accessibility	Residential accessibility	Capacity market accessibility	Wholesale accessibility and volatility	Future development of DSF
France	████████	████████	████████	████████	████████	████████	████████
Great Britain	████████	████████	████████	████████	████████	████████	████████
Germany	████████	████████	████████	████████	████████	████████	████████
Netherlands	████████	████████	████████	████████	████████	████████	████████
Sweden	████████	████████	████████	████████	████████	████████	████████
Belgium	████████	████████	████████	████████	████████	████████	████████
Finland	████████	████████	████████	████████	████████	████████	████████
Ireland	████████	████████	████████	████████	████████	████████	████████
Denmark	████████	████████	████████	████████	████████	████████	████████
Switzerland	████████	████████	████████	████████	████████	████████	████████
Czech Republic	████████	████████	████████	████████	████████	████████	████████
Romania	████████	████████	████████	████████	████████	████████	████████
Norway	████████	████████	████████	████████	████████	████████	████████
Slovakia	████████	████████	████████	████████	████████	████████	████████
Austria	████████	████████	████████	████████	████████	████████	████████

## Country summary 2/2

Country	Accessibility of DSF in ancillary services				TSO spend on markets accessible to DSF				DSO accessibility				Residential accessibility				Capacity market accessibility				Wholesale accessibility and volatility				Future development of DSF				
Cyprus	■	■	■		■									■												■	■		
Slovenia	■	■	■		■				■	■	■			■			■	■								■	■		
Italy	■	■			■	■	■	■	■				■	■			■	■								■	■	■	
Spain	■	■			■	■	■	■	■					■												■	■	■	
Lithuania	■	■			■	■	■	■	■					■												■	■		
Hungary	■	■			■	■	■	■	■					■												■	■	■	
Croatia	■	■			■	■	■							■												■	■		
Greece	■	■			■	■	■		■					■												■	■	■	■
Portugal	■	■			■	■	■		■	■	■			■												■	■	■	
Poland	■	■			■	■			■					■			■	■	■	■						■	■	■	■
Bulgaria	■	■			■									■												■	■		
Estonia	■	■			■				■					■												■	■		
Latvia	■	■			■				■	■	■			■												■	■		
Malta	■				■									■												■			
Luxembourg	■				■									■												■			



# Introduction

- + Methodology
- + Scoring System

# Methodology

## The market monitor is based on extensive primary and secondary research

### Demand Side Flexibility Market Monitor

Our approach was as follows:

- **Interviewed over 100 industry contacts** with knowledge of demand side flexibility across all markets, including TSOs, DSOs, energy suppliers, aggregators, independent specialists, technology companies and industry associations.
- **Used LCP Delta's FlexTrack platform** to calculate TSO spend. The platform collects and standardises individual value stream prices and volumes from European TSOs and Entso-e.
- **Calculated** the annual capacity or energy volume, average price and total market value for each value stream with available data.
- **Assessed and scored** each country against seven categories.
- **Aggregated scores** to produce an overall country ranking.
- **Proofed and ensured consistency** across the scores, valuations and rankings with **internal and external challenge** on the results.

**This report is based on LCP Delta's qualitative primary and secondary research and quantitative data analysis across 30 countries and more detailed research into twenty of those countries.**

### Detailed Country Reporting

Alongside the Market Monitor maps, LCP Delta carried out more detailed research in order to produce detailed country reports.

We focused on twenty countries to give a range of examples of markets actively developing demand side flexibility. Countries with country profiles are:

- Austria
- Belgium
- Czech Republic
- Denmark
- Finland
- France
- Germany
- Great Britain
- Hungary
- Ireland
- Italy
- Netherlands
- Norway
- Poland
- Romania
- Slovakia
- Slovenia
- Spain
- Sweden
- Switzerland

# Scoring system 1/2

Category	Feature:	Scoring system:	Description:
<b>Accessibility of DSF in ancillary services</b>	<ul style="list-style-type: none"> <li>Can DSF participate?</li> <li>Is aggregation allowed?</li> <li>Is storage allowed?</li> <li>Is the Min. bid size <math>\leq 1</math> MW?</li> <li>Is a BRP agreement required?</li> <li>Is there an a-symmetrical product design?</li> <li>Is there daily procurement?</li> <li>Which capacity markets are accessible to DSF?</li> </ul>	<b>1 - 5 based on the availability and accessibility of DSF into ancillary services and capacity markets.</b>	Countries scoring highly indicate that not only are markets open to DSF, but that aggregation is allowed and an agreement with a balancing responsible party (BRP) is not required. If the score is low then DSF is either not permitted or only with high barriers to entry.
<b>Accessibility of DSF in distribution system flexibility</b>	<ul style="list-style-type: none"> <li>Whether there are commercial DSO flexibility markets.</li> <li>How many DSO flexibility trials are happening in the country?</li> </ul>	<b>1 - 5 based on the presence, scale and commercial offering of DSO level platforms that enable flexibility.</b>	High scoring countries have both accessible, commercial DSO offerings and high volumes of produced flexibility.
<b>Accessibility of residential assets in implicit and explicit flexibility</b>	<ul style="list-style-type: none"> <li>Participation of residential assets in ancillary and DSO markets.</li> <li>Presence of wholesale reflective dynamic tariffs for residential customers.</li> </ul>	<p><b>1 - 5 based on presence of service providers trading residential assets into ancillary services and/or DSO markets.</b></p> <p><b>Present of wholesale backed dynamic tariffs is also considered.</b></p>	A high score indicates multiple commercial offerings of flexibility into ancillary service and DSO markets. Trials and regulatory sandboxes are given merit.
<b>TSO spend on markets accessible to DSF</b>	<ul style="list-style-type: none"> <li>Ancillary services (FCR, aFRR, mFRR, RR or local equivalent).</li> <li>Spend on DSF in capacity market (if present).</li> </ul>	<p><b>1- 5 based on the volume and prices of ancillary services and capacity markets procured by TSOs.</b></p> <p><b>1 = &lt; €50M</b>  <b>2 = €50M - €99M</b>  <b>3 = €100M - €349M</b>  <b>4 = €350M - €600M</b>  <b>5 = &gt; €600M</b></p>	<p>This score highlights the countries that have the highest spending on the ancillary services and capacity markets that are legally accessible to DSF. If the value stream is not accessible, it is not included in this value.</p> <p>A high spend indicated a large addressable market. It does not indicate DSF participation.</p>

## Scoring system 2/2

Category	Feature:	Scoring system:	Description:
<b>Accessibility and spend of DSF in capacity markets</b>	<ul style="list-style-type: none"> <li>Can DSF participate?</li> <li>Can storage participate?</li> <li>Is independent aggregation allowed?</li> <li>Min. bid size <math>\geq</math> 1MW</li> <li>Clearing mechanism</li> <li>Volume of DSF (if applicable)</li> <li>Spend on participating DSF (if applicable)</li> </ul>	<b>1- 5 based on accessibility and spend on DSF in capacity markets</b>	To achieve any score a country has to have an active capacity market. Those countries with high scores had accessible capacity markets. The highest scores were awarded to those with the largest % of awarded DSF and high corresponding spend on DSF.
<b>Wholesale spot market accessibility and volatility</b>	<ul style="list-style-type: none"> <li>Volatility on day-ahead market in €/MWh</li> </ul>	<b>1 - 5 based on the average daily spread and DSF accessibility</b>	Direct access to wholesale markets for distributed, flexible assets is still limited, even for industrial consumers. As progress towards access for independent flexibility service providers develops, we expect scores to increase.
<b>Future development of demand side flexibility</b>	<ul style="list-style-type: none"> <li>Participation in FCR co-operation, PICASSO, MARI and TERRE.</li> <li>Installed base of flexible residential assets.</li> <li>Targets for growth of renewable generation.</li> </ul>	<b>1 - 5 based on a planned development of DSF and future potential.</b>	High scores highlight the countries that have the most potential to increase monetisation of DSF in the future, reflecting those with large flexibility markets with plans to open to DSF in the next 1-2 years. Where markets are already open, high renewable targets in relation to current renewable generation capacity will increase the need for flexibility.



*The 2023 European  
Market Monitor  
for Demand Side  
Flexibility*

# Accessibility of DSF in ancillary services

## We looked at:

- Are TSO ancillary services commercially operational?

## If yes:

- Can DSF participate?
- Is aggregation allowed?
- Is storage allowed?
- Is the Min. bid size  $\leq 1$  MW?
- Is a BRP agreement required?
- Is there an a-symmetrical product design?
- Is there daily procurement?
- What are the clearing mechanisms?
- Which capacity markets are accessible?

## Interpreting the results

To transpose the EU Clean Energy Package and meet the 2024 deadline to access to the pan-European flexibility markets, there has been a noticeable increase in the opening and accessibility of ancillary services to demand side flexibility, most notably in central and Eastern Europe.

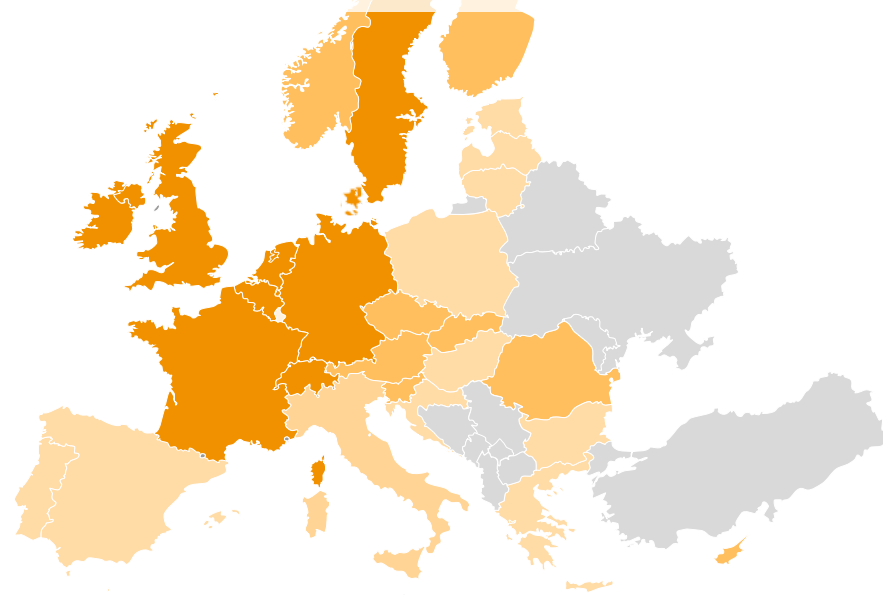
Additional market coupling across the Nordic countries has seen some standardisation, with more expected in 2024.

However, there are still limitations on accessibility for independent aggregators, and this presents a significant barrier for DSF, especially from new entrants.

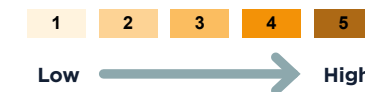
### Spotlight: Italy

Participation in Italy slowed in 2023. Where DSF can legally access ancillary services via the UVAM pilot project, only 24 MW was awarded in 2023 (compared to 269 MW in the previous annual auction in 2022).

Accessibility to ancillary services is generally good for those markets participating in the common EU platforms (and GB). Greater access for independent aggregators is still lacking across most markets.



### DSF accessibility





# Accessibility of DSF in distribution system flexibility

## We looked at:

- Existence of DSO flexibility markets.
- Stage of market development.
- Volume of DSF participating.

## Interpreting the results

The majority of Europe is engaging in developing DSO flexibility – although primarily through pan-European innovation projects, trials and pilots. Incentives for DSO flexibility need to be enduring, and preferential, over physical grid reinforcement.

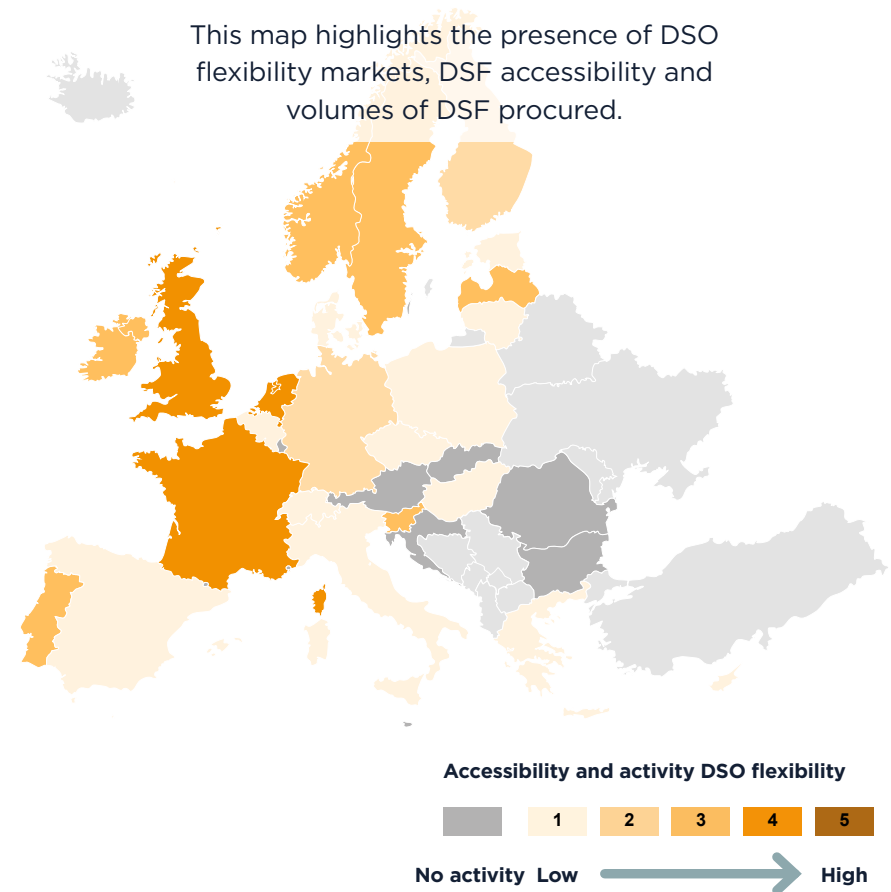
GB and France lead the development of DSO flexibility with enduring commercial offerings. The Netherlands and Slovenia also have commercial procurement, while the Nordics, in particular Sweden, are expanding trials.

To increase DSF participation, smart meter rollout, greater TSO/DSO co-ordination and transparent value stacking opportunities need to be developed.

### Spotlight: Sweden

A rapid increase in demand has imposed constraints on specific regions within Sweden’s distribution network. While they build out their networks, the DSOs are using these flexibility trials to mitigate demand constraints in the interim.

This map highlights the presence of DSO flexibility markets, DSF accessibility and volumes of DSF procured.



# Accessibility of residential assets in implicit and explicit flexibility

## We looked at:

- Participation of residential assets in ancillary and DSO markets.
- Presence of hourly wholesale reflective dynamic tariffs for residential customers.

## Interpreting the results

GB is leading the development of residential flexibility with service providers using a range of assets in ancillary and DSO services and wholesale market trials. Sweden has seen considerable increase in residential participation in FCR in 2023.

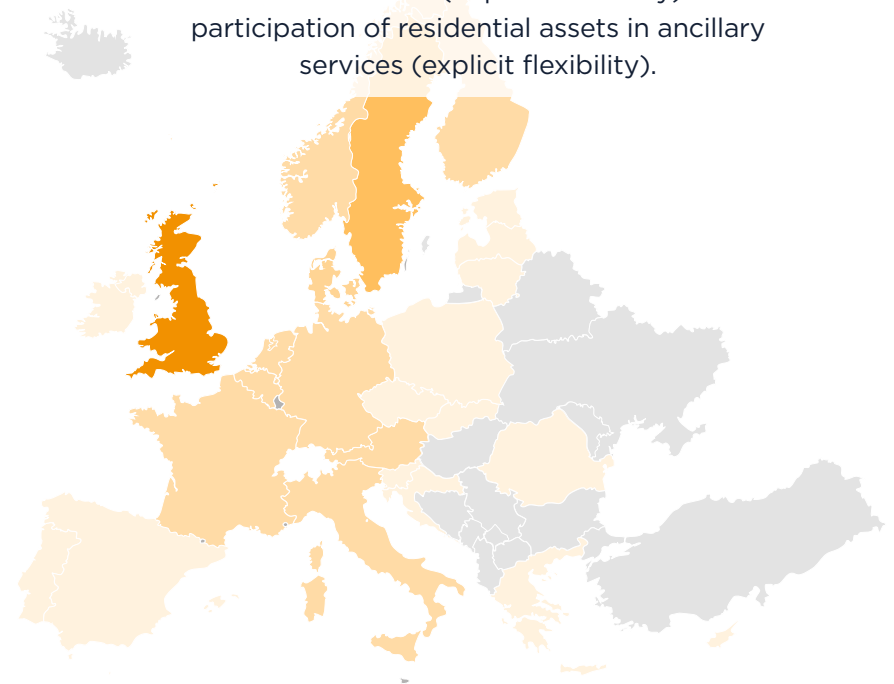
The majority of countries have at least one retailer offering a dynamic tariff with hourly prices reflective of the wholesale market. Where these tariffs are available, uptake varies considerably. The Nordics and Denmark lead the availability of dynamic tariffs.

This map does not include energy retailers using data from residential assets to better forecast and purchase electricity on wholesale markets.

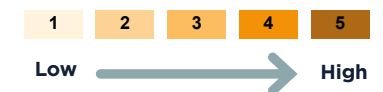
## Spotlight: Great Britain - Demand Flexibility Service (DFS)

The DFS, which remunerates domestic and non-domestic customers for demand turndown, was launched for winter 2022/23. It saved 3,300-MWh across 22 events in total. Relunched for winter 2023/24, volumes procured increased from 5.8 GW to 8.7 GW.

This map considers the availability of dynamic residential tariffs (implicit flexibility) and participation of residential assets in ancillary services (explicit flexibility).



Accessibility of residential flexibility



# TSO spend on markets accessible to DSF

## We looked at:

- TSO spend in ancillary services where **aggregation of DSF is legally allowed** to participate
- Spend on DSF procured in capacity markets

## Interpreting the results

In all countries, TSO spend on ancillary services open to DSF decreased, largely due to a drop in wholesale prices.

Belgium, France, Netherlands, Norway, Slovakia, and Denmark experienced over a 60% reduction in spending from 2022 to 2023.

GB, France, Germany, Spain and Switzerland each spent over €600M on ancillary services open to DSF.

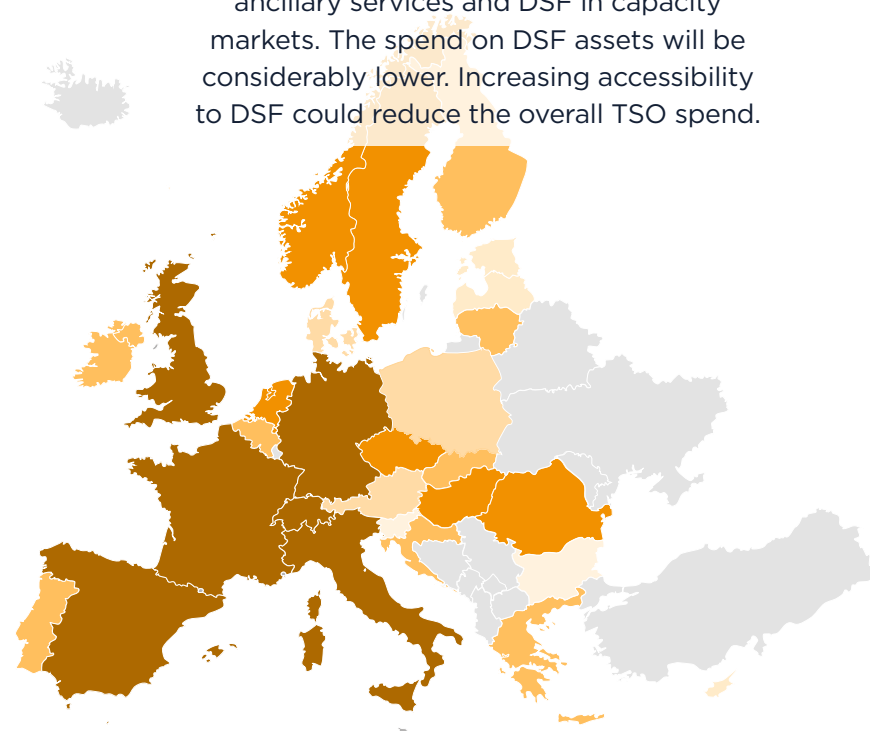
France, Portugal, Bulgaria, and Poland collectively spent over €600M on ancillary services, some markets are still inaccessible to DSF.

High spend indicates the total addressable market and does not reflect DSF participation.

## Spotlight: Spain

Spain had the highest spend on ancillary services, reaching €1.59 Billion even without a remunerated market for FCR. However, regulatory barriers, such as prohibitive regulations for independent aggregation, mean accessing this value is challenging for DSF.

This map shows total TSO spend on ancillary services and DSF in capacity markets. The spend on DSF assets will be considerably lower. Increasing accessibility to DSF could reduce the overall TSO spend.



Market size for accessible ancillary and capacity market value streams



# Participation of DSF in capacity markets

## We looked at:

- Can DSF participate?
- Can storage participate?
- In independent aggregation allowed?
- Min bid size  $\leq 1$  MW
- Clearing mechanisms.
- Volume of DSF (if any) participating.
- Spend on DSF participation.

## Interpreting the results

There are only eight countries with commercially accessible capacity markets. Of those, only five (Belgium, France, GB, Ireland and Poland) awarded contracts to DSF. Poland awarded the most volume to DSF with 13% in the last auction. Overall, the participation of DSF in resource adequacy mechanisms is very low.

Italy has a capacity market and Germany a strategic reserve. Both are technically open to DSF, but no contracts were awarded during the last auction due to prohibitive accessibility requirements.

For this map we have not included interruptible loads.

## Spotlight: France

2,702 MW was awarded to DSF in 2030 as part of the AOE auctions - the highest volume awarded for DSF across Europe.

This volume amounts to total spend from RTE of €182,000,000 on DSF for the AOE auctions. No capacity was awarded in the AOLT in 2023 (no action since 2018).

Presence of accessible capacity markets is sporadic. Even those with relatively high volumes of DSF participation could be from demand side generators.



## Capacity Market accessibility and spend



No activity Low High

# Wholesale spot market accessibility and volatility

## We looked at:

- Mechanisms that enable DSF participation in wholesale markets (day ahead and intraday) without BRP obligations.
- Average daily spread in day-ahead market €/MW.
- Legal accessibility of DSF, aggregation and independent aggregation.

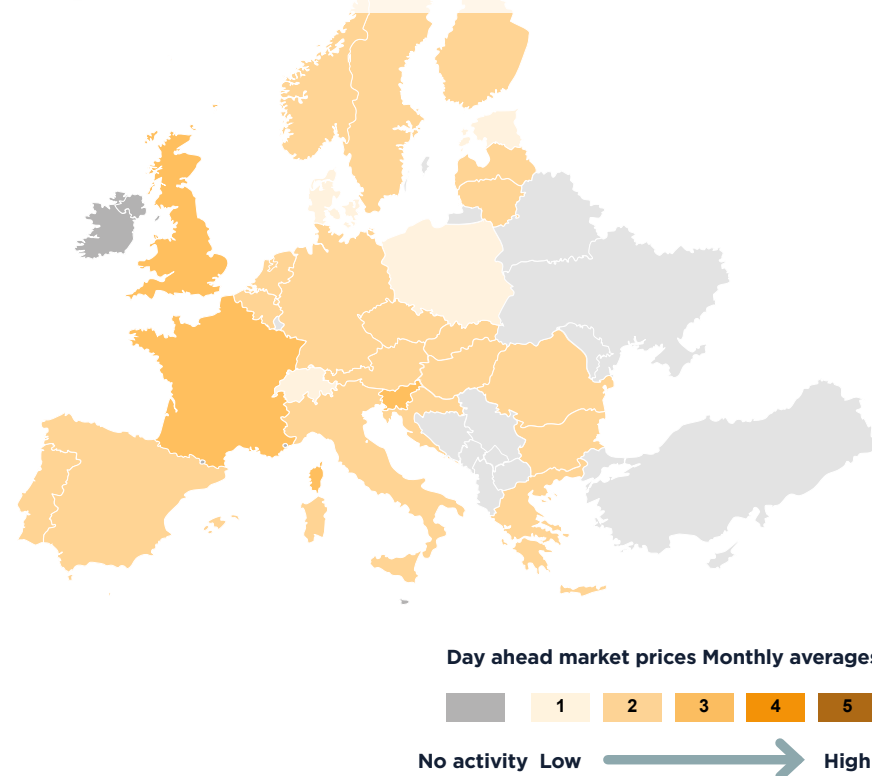
## Interpreting the results

Accessibility of DSF into the day-ahead market is limited, primarily to commercial and industrial assets. The trading of flexibility from low voltage assets in wholesale markets independent of the balance responsible party is not (yet) possible. The most significant development to enable this is within the GB market where changes have been made to enable Virtual Lead Parties to access the wholesale market.

### Spotlight: Great Britain - P415 modification

A modification to the Grid Code has been approved for implementation in 2024 that will allow demand side assets that are controlled by a Virtual Lead Party to participate in the day-ahead and intraday market independently to the BRP. Ofgem approved the modification despite concerns that an entity could be both a BRP and VLP, and thus be compensated for imbalances they cause.

Direct access to wholesale markets for distributed, flexible assets is still limited, even for industrial consumers. Progress towards access for independent flexibility service providers is beginning to emerge.



# Future development of demand side flexibility

## We looked at:

- Participation in FCR co-operation, PICASSO, MARI and TERRE.
- Installed base of flexible residential assets.
- Targets for growth of renewable generation.

## Interpreting the results

The 2023 updates to National Climate and Energy Plans (NECPs) saw many EU states increase renewable energy targets for 2030, although still falling short of the overall EU ambition.

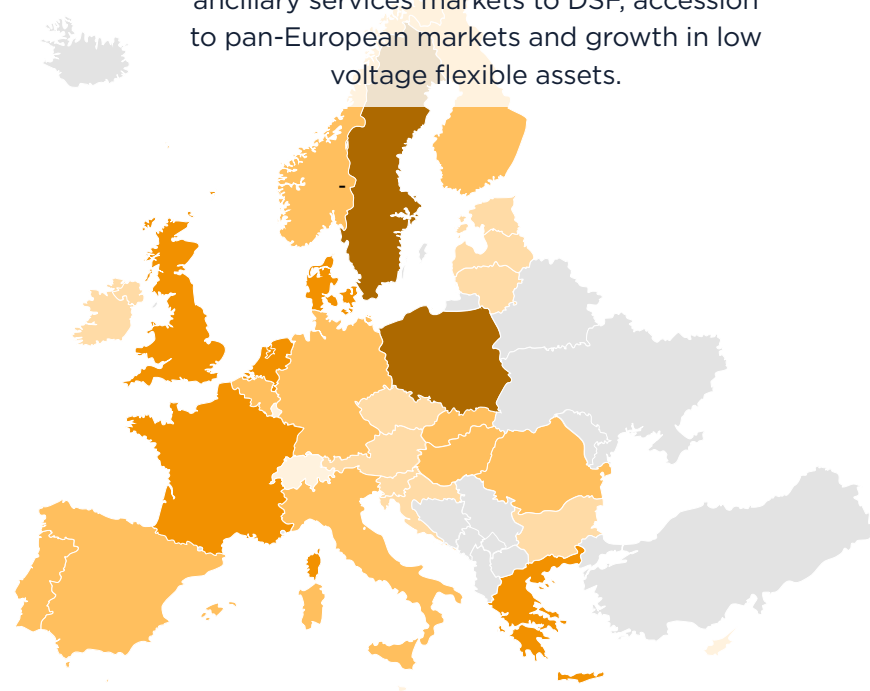
The need for flexibility across Europe will continue to grow with the increase of variable renewable generation. The increased installed base of flexible residential assets, such as EVs, batteries and heat pumps, highlights a growing base for which this flexibility can be accessed.

Scores reflect plans to join the pan-European market coupling in 2024. Portugal opening mFRR and RR to DSF in 2023 is reflected in an increase in accessibility of DSF in ancillary services, and a decrease in future development.

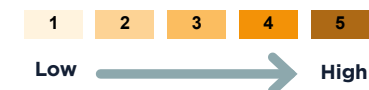
## Spotlight: Poland

Multiple European aggregators have entered the Polish market in anticipation of ancillary services opening to demand side assets in June 2024, with aggregation and independent aggregation being phased in throughout 2024 and 2025.

Future development is based on planned renewable generation increase, opening of ancillary services markets to DSF, accession to pan-European markets and growth in low voltage flexible assets.



Future Development of DSF



# Capacity market requirements

	Belgium	Finland	France	GB	Germany		Ireland	Italy	Poland	Netherlands	Norway	Sweden	Spain	Switzerland
<b>Type of RAM</b>	Capacity Market	Strategic Reserve	Multiple Capacity Mechanisms	Capacity Market	Strategic Reserves	Grid Reserve	Capacity Market	Capacity Market	Capacity Market	NA	NA	NA	NA	NA
<b>Date/year of last auction</b>	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	-	-	-	-
<b>Can DSF participate?</b>	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	-	-	-	-	-
<b>Is independent aggregation allowed?</b>	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	-	-	-	-	-
<b>Min. bid size</b>	1 MW	1 MW	1 MW	1 MW	5 MW	0.1 MW	10 MW	1 MW	2 MW	-	-	-	-	-
<b>Clearing mechanism</b>	Pay-as-bid	TSO contract	Pay-as-clear	Pay-as-clear	Pay-as-clear	TSO contract	Pay-as-clear	Pay-as-clear	Pay-as-clear	-	-	-	-	-
<b>Total auction volume (MW)</b>	1,576	729	92,402*	43,001	1,086	4,616	5,470	41,500	7,017	-	-	-	-	-
<b>Volume of DSF in last auction (MW)</b>	49	22	5,347	925	0	0	264	0	978	-	-	-	-	-
<b>Volume of storage in last auction (MW)</b>	364	0	397	1,284	0	0	35	1,100	1,738	-	-	-	-	-
<b>Contract duration</b>	1 - 15 years	1 year	1 - 10 years	1 - 15 years	1 year	1 year	1 - 10 years	1 - 15 years	1 - 17	-	-	-	-	-

\* Total certified MW according to the capacity register for delivery year 2023

# Glossary

Country	Acronym	Name	Description
EU	aFRR	Automatic Frequency Restoration Reserve	The reserves primary purposes are to continually: (1) balance the supply and demand, and (2) maintain system frequency. The use of aFRR enables activated FCRs to deactivate and be ready to use in case of new disturbances.
EU	AS	Ancillary Services	Services procured by the transmission system operator to support the transmission of electric power from generators to consumers. They are used to maintain the proper flow and direction of electricity, address imbalances between supply and demand, and help the system recover after a power system event.
EU		Availability	Price and volume of balancing capacity reserved in EUR/MW/hr and MW
GB	BM	Balancing Mechanism	One of the tools used by National Grid ESO, the Transmission System Operator in Great Britain, to balance electricity supply and demand close to real time.
GB	BMU	Balancing Mechanism Unit	Units of trade within the Balancing Mechanism. Each BM Unit accounts for a collection of plant and/or apparatus, and is considered the smallest grouping that can be independently controlled.
EU	BRP	Balancing Responsible Party	Entities responsible for maintaining supply and demand on the energy markets. Each BRP must strive to be balanced in real time, and that BRP is financially responsible for the imbalances to be settled with the connecting TSO.
EU	BSP	Balancing Service Provider	A market participant providing balancing services to its Connecting TSO.
EU	BTM	Behind the meter	An asset located behind a demand meter on a customer site.
EU	C&I	Commercial and Industrial	Non-domestic customers
EU	CEP	Clean Energy Package	A set of eight EU directives and regulations aims to provide an update to the European energy policy framework, aiming at facilitating the energy transition and providing a modern European energy market.
EU	CHP	Combined heat and power	A technology that generates electricity and captures the heat that would otherwise be wasted to provide useful thermal energy. CHP can be located at an individual facility or building, or be a district energy or utility resource.
EU	DA	Day ahead	The day before delivery. Generally used in the context of electricity spot markets.
EU		De-rating	Rating factors applied to assets to represent the confidence of system operators in the reliability of the contribution they make to the system.



# Glossary

Country	Acronym	Name	Description
EU	DSO	Distribution System Operator	The operating managers (and sometimes owners) of energy distribution networks, operating at low, medium and, in some EU member states, high voltage levels (LV, MV and HV).
IE	DS3		Collective name for Ireland's ancillary and reserve services markets.
		Dynamic time of use tariff	Customer tariff based on wholesale prices. Prices vary at least daily with price reflective on hourly wholesale prices. This contrasts with other variable tariffs with day/night or 3 or 4 hourly bands.
EU	EBGL	Electricity Balancing Guidelines	The EBGL was created as a result of an EU Regulation that aims to enable countries to share balancing resources.
EU	FCR	Frequency Containment Reserve	Active power reserves which are automatically controlled to maintain system frequency as supply and demand constantly changes.
EU	FCR-D	FCR - Disturbance	Frequency Containment Reserve for Disturbances contains the frequency during disturbances and aims to limit the deviation when the frequency goes outside the standard range.
EU	FCR-N	FCR - Normal	Frequency Containment Reserve for Normal Operation contains the frequency during normal operation and aims to keep the frequency within the standard frequency range.
EU	FFR	Fast Frequency Reserve	Fast Frequency Reserves are being introduced as grid inertia declines. It is currently the fastest acting ancillary service and higher volumes are required for periods of low inertia. In the GB market this is referred to as Dynamic Containment (DC).
EU	FOM	Front of meter	An asset connected directly to the electricity network, instead of behind a customer meter.
EU		Free bid	If a BSP has additional capacity they can offer this as a 'free bid'. Free bids are selected using the same price-based merit order as obligated bids but have no penalties for non-delivery.
GB	GSP	Grid Supply Point	Connection point between the transmission network and the distribution network
EU	ID	Intraday	The day of delivery. Generally used in the context of electricity spot markets.
EU	mFRR	Manual Frequency Restoration Reserve	This reserve is activated when a serious grid imbalance or congestion issues arise. The primary purposes of mFRR are to resolve: (1) major or systematic supply and demand imbalance, (2) a significant frequency variation, and (3) major congestion issues. This reserve is activated manually.
EU		Net-metering	Net-metering refers to charging electricity consumers based on the net volume of imports and exports. The exports are remunerated at the full retail import tariff, and do not reflect the prevailing wholesale price.

# Glossary

Country	Acronym	Name	Description
EU		Prosumer	Denotes a consumer who both produces and consumes electricity
EU	RR	Replacement Reserve	Replacement reserves enable activated FRRs to deactivate and be ready to use in case of new disturbances. This is an ancillary service in approximately half of the EU countries.
EU	RA	Resource Adequacy	Inclusive term referring to the products countries use to ensure peak demand can be met. For example, capacity market/mechanism, strategic reserve or capacity remuneration scheme.
GB	STOR	Short-term operating reserve	STOR is a reserve product in Great Britain that maps to the EBGL definitions of mFRR and RR.
EU	SME	Small, medium enterprise	Non-subsiary, independent firms which employ fewer than a given number of employees. This number varies across countries. The most frequent upper limit designating an SME is 250 employees, as in the European Union.
GB	TCR	Targeted Charging Review	A significant code review being conducted by the regulator in Great Britain, Ofgem, which will bring in changes to the charging methodology of transmission network use of system charges.
EU	TERRE	Trans European Replacement Exchange	The European implementation project to create a common marketplace across Europe for exchanging replacement reserves
EU	ToU	Time-of-use	A type of electricity tariff that varies at different times of day
EU	TSO	Transmission System Operator	The operating manager of the transmission system and party responsible for system balance.
EU		Utilisation	Price and volume of balancing energy activated in EUR/MWh and MWh
IT	UVAM	Virtually Aggregated Mixed Units	Italian ancillary service product dedicated to distributed resources
GB	VLP	Virtual Lead Party	A non-BRP participating in the balancing mechanism, typically an independent aggregator.

## About LCP Delta

LCP Delta is a trading name of Delta Energy & Environment Limited and Lane Clark & Peacock LLP. References in this document to LCP Delta may mean Delta Energy & Environment Limited, or Lane Clark & Peacock LLP, or both, as the context shall require.

Delta Energy & Environment Limited is a company registered in Scotland with registered number SC259964 and with its registered office at Argyle House, Lady Lawson Street, Edinburgh, EH3 9DR, UK.

Lane Clark & Peacock LLP is a limited liability partnership registered in England and Wales with registered number OC301436. All partners are members of Lane Clark & Peacock LLP. A list of members' names is available for inspection at 95 Wigmore Street, London, W1U 1DQ, the firm's principal place of business and registered office. Lane Clark & Peacock LLP is authorised and regulated by the Financial Conduct Authority and is licensed by the Institute and Faculty of Actuaries for a range of investment business activities.

LCP and LCP Delta are registered trademarks in the UK and in the EU. Locations in Cambridge, Edinburgh, London, Paris, Winchester and Ireland.

Copyright © 2024 LCP Delta.

## Disclaimer and use of our work

These materials contain generic information only, do not constitute advice and may not be relied upon by you or any third party. If you would like further information or assistance then please get in touch with your LCP Delta or smartEn contact or one of the people listed on our website at <https://lcpdelta.com/>.



# *Thank you for reading*

For further information please contact our team.



*Lucinda Murley*  
*Flexibility Service Manager,*  
*LCP Delta*

lucinda.murley@lcp.com  
+44 (0) 131 659 9142



*Jon Ferris*  
*Head of Flexibility and Storage Research,*  
*LCP Delta*

jon.ferris@lcp.com



*Andrés Pinto-Bello Gómez*  
*Head of Research and Projects,*  
*smartEn - Smart Energy Europe*

lucinda.murley@lcp.com  
+44 (0) 131 659 9142