The Network for Networks

WG Innovation & Development
Brussels, 1st February 2024

Agenda

I. 09:30	Welcome • Presentation of WG Innovation & Development work plan 2024, topics, position papers	*Ramon Gallart, WG Chairman*
II. 09:35	Follow-up of actions agreed at last WG meeting, 26 September 2023	*Anna Smičková*
III. 09:40	**EU Policy updates** • Electricity Market Design Reform • European Commission's Action Plan on Grids • Other relevant policy files	*Federica Bruni*

IV.
10:00
	Network Codes updates
	• Particular focus on new Network Code Demand Response
	• Short briefing status of
	  ○ Existing Network Codes - NCs for Connection
	  ○ Network Code Cybersecurity
		Hans Taus
		Pablo Lopez
		Georg Hartner
		Geir Magne Abusdal
		Mike Kay
		Erno Leväniemi
		Elisabeth Hufnagl
		Armin Selhofer

V. 10:20	**ACER Report - Demand response and other distributed energy resources: what barriers are holding them back?**	*Cristina VAZQUEZ HERNANDEZ Policy Officer, ACER*
VI. 10:50	Coffee Break	
VII. 11:00	**Opendatasoft & GEODE & E.DSO - The State of European Energy Data Maturity Report**	*Ramon Gallart Fernandez* *Anna Smičková*
VIII. 11:30	**Roundtable discussion: DSOs & Digitalisation** - How to achieve the optimal status?	*WG members*
IX. 12:30	**GEODE Study Trip** – draft proposal	
X. 13:00	Lunch Break	
XI. 13:45	**Energy Sharing – GEODE fact-sheet** – discussion	*GEODE members & GEODE Secretariat*
XII. 14:15	**Tech corner** UK Power Networks – Using energy data to drive energy system decarbonisation	*Yiu-Shing Pang* *UK Power Networks*
XIII. 14:50	AOB & Next meeting	

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Point I. Welcome

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WG Survey

WG Innovation & Development 2023

4
Meetings

- **26 January 2023** (Online & Brussels) – **17 participants** (6 in-person, 11 online)
- **9 May 2023** (Online & Brussels) – **21 participants** (12 in-person, 9 online
- **25-26 September 2023** (Online & Munster) – **20 participants** (9 in-person, 11 online)
- **11 October 2023** (Online) – Ad hoc meeting on Energy Sharing

GEODE Survey — **13** **Replies**

Overall satisfaction 4.3 → All respondents find the WG meetings useful → All respondents are satisfied with the documentation quality → All respondents are satisfied with the frequency of the meetings → All respondents, apart from two, engage in pre-meeting activities → Two respondents would like longer meetings while the rest are satisfied with the current length of the meetings → Two respondents would like to meet in-person more often while one less often. The rest is satisfied by the current hybrid format of the meetings

WG Innovation & Development 2023

Topics

Are there specific topics or themes you would like to see addressed in future meetings?

- Two respondents suggested **flexibility**
- One respondent suggested the **impact of New Network Codes in DSOs and opportunities for energy sharing**
- One responded suggested to devolve **less time to EU DSO Entity**, network codes and policy topics and to move/divide some of them to WG EU DSO Entity so that topics that would benefit DSOs in sharing best practices would be covered more

Improvements & additional comments

Do you have any suggestions for improvements? Do you have any additional comments?

- One respondent suggested **to create the innovation radar concept** to guide WG Innovation & Development exploration and **generate fact-sheet and paper documents** with impact topics and show positioning
- Two respondents would like to talk **less about the network codes** in these meetings
- One respondent commented that formats like in Münster combining **site visits** with the meeting are a good reason to attend in person

Reporting back to companies

Do you report back to your companies on the topics discussed at the meetings?

- Five respondents **always** report back to their companies the topics discussed at the WG meetings
- Seven respondents **usually** report back to their companies the topics discussed at the WG meetings
- One respondent only **sometimes** report back to their companies the topics discussed at the WG meetings

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Summary of 2023

GEODE

2023 Progress

TSO-DSO Cooperation:

Existing NC: Importance NC for connection

Cybersecurity NC

Distributed Flexibility: **NC Demand Response**

Data interoperability:

Implementing acts

Q1	Q2	Q3	Q4

Consultation on access to **electricity metering and consumption data**

TYNDP

Digitalisation of energy action plan

Policy updates:

Electricity market Desing Reform

F-gases Regulation

Broadband cost reduction Directive / Gigabit Infrastructure Act

Interactive round table:

We developed key message about **E-NDPs**

Submetering approaches and practices as a preliminary discussion

GEODE study trip:

Initial discussion and interesting countries to visit

External presentations:

CEER Digitalisation as a driver for better retail market functioning

DG ENER: Energy sharing. Implications about provision in the electricity market design reform

Q1	Q2	Q3	Q4

Tech corner:

UK Charge project – **ConnectMore** tool

CurrENT Europe: New NECPs should be involved for innovative grid technologies to achiever Fit for 55

Gridio: as an APP for EV charging optimalisation

Adaion: as an intelligent grid tool to support. operations and network planning

Adaptricity: as an DT cloud-based network analytics platform using data-driven network analytics

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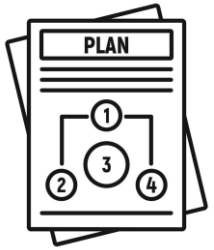
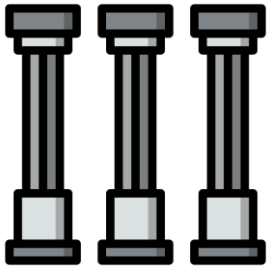
Work Plan 2024

Developing Work plan 2024





Core Focus:

The impact of technological innovation in the development of “smart” energy systems.

Topics:

Presented in the 14th September GEODE Board
Based on three-pillars-strategy

Last factsheet by WG Innovation & Development - Q1 2021 on Energy Communities.

TSO and DSO cooperation:

Demand Response NC
Existing NC.

Energy Sharing:

Elaborating fact-sheet studying DSO impact.

Submetering:

How do not lose smart meter relevance.
Study DSO’ impact.

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II. Follow-up of actions agreed at last WG meeting, 26 September 2023

WG Innovation & Development – Actions

Subject	Action	
Sharing updates on TSO-DSOs cooperation workstreams	• WG Members agree to continue sharing updates on the relevant workstreams as well as ask support to the group if needed.	✓
	• GEODE Secretariat will inform its members about updates on Network Code Demand Response Public Consultation.	✓
	• GEODE Secretariat will contact newly appointed representative from Wiener Netze into the TF TYNDP and Cybersecurity.	✓
	• GEODE Secretariat will inform its members about the public consultation on Network Code Cybersecurity.	✓

WG Innovation & Development – Actions

Subject	Action
GEODE Study trip	• GEODE Secretariat will create and share a survey for WG members to ranking their interested places for a Study trip IX. 12:30 GEODE **Study Trip** – draft proposal

WG Innovation & Development – Actions

Subject	Action	
Energy Sharing – GEODE key messages	• Carmen Gimeno and Anna Smičková propose to set up a dedicated online meeting to discuss energy sharing – doodle will be shared	✓
Tech Corner	• WG members are welcome to propose other projects to be presented at the next WG meetings.	**ONGOING**
AOB	• Harri Salomaki raised a point on **capacity maps** – Elenia is currently discussing its relevance and what is the purpose. He mentioned that he would welcome to have as many examples and experiences as possible, as this is soon going to be mandatory for all DSOs. GEODE Secretariat will share an email with GEODE members to collect the best practices.	✓

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III. Policy updates

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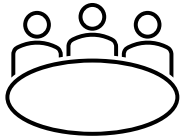
Electricity Market Design

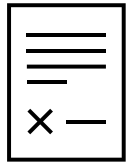
Electricity Market Reform –Timeline

On **13-14 December 2023** the Council and the Parliament reached a **provisional agreement** to reform the EU's electricity market design (EMD).



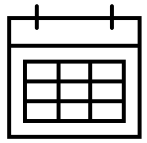
Presented at COREPER **on 22 December, where it was formally endorsed through a letter by the Spanish Chairman.**

ITRE Committee approved the text on the **15th of January**



Next Steps: Provisional agreement to be **endorsed and formally adopted** by EP

Official Journal Publication expected for Spring.



GEODE Webinar on EMD – **21st February 9.30 am**

Consolidated Text
General Rules of the Electricity Market

Peak shaving
(Regulation – Art. 7 a)

- **Possibility by system operators (TSOs and DSOs) to procure peak shaving products subject to assessment by regulatory authorities**
- **Limited** only during a **regional** or **union energy crisis.**
- Requirements for the proposal of peak shaving product

Dedicated measurement device

(Article 7b – Regulation)

- Device intended for **measuring** (not metering) the volume **of demand response, flexibility and storage services** delivered.
- Where no smart meter is available, **DSO to accept data from the dedicated measurement device** for flexibility purposes and demand response **after Consumer's approval**
- Member States to establish **requirements for device data validation**

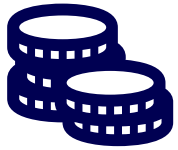
Consolidated Text
General Rules of the Electricity Market

Free choice of supplier

(Article 4 Directive)

- **Customers** free to have **more than one contract at the same time**;
- Entitled to have **more than one metering and billing point covered by the single connection point**
- Where technically feasible usage of **smart metering system** to allow the multiple supply contracts requirements.

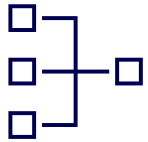
Consolidated Text Network Tariffs & Flexibility



Tariff methodologies

(Article 18 – Regulation)

- Mandatory reference to consider both **CAPEX** and **OPEX**
- Tariff methodologies to incentvise **anticipatory investments to take place**
- Tariff methodologies **to promote efficient and timely investments and enable the use of flexible connections**
- **NRAs to recognize anticipatory investments as eligible for their inclusion in grid tariffs**



Assessment of flexibility needs (Regulation – Art. 19c)

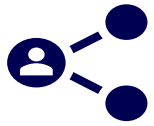
- NRAs to assess and draw up a report on the estimated needs for flexibility at national level for a period of at least **5 years**, 1 year **after approval by ACER of their methodology**
- **DSO to provide data and analysis needed for reporting purposes,** as well coordination with Gas, Hydrogen Sector
- **ENSTO - E & EU DSO Entity to collaborate on a proposal for data type format, and methodology for flexibility needs analysis.**

Consolidated Text
Network Tariffs & Flexibility

Indicative objective for Non fossil flexibility (Regulation – Art. 19d)

- Member States to define provisional indicative separate national objectives for demand response and energy storage for the first report

Consolidated Text
Consumer Empowerment and Protection



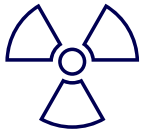
Energy sharing
(Article 15a - Directive)

- Right to energy sharing limited to the same bidding zone ore more geographical limited area.
- Right for Customer to **deduction of injected electricity from total meter consumption, not affecting payment of taxes, levies and cost reflective network charges for shared electricity**
- **Obligation to inform DSOs and Suppliers of Energy Sharing initiatives.**
- **Customer can select an energy sharing agent**
- DSO Obligations:
  - Monitoring, collecting validating and **communicating metering data** every month. (ensuring an **appropriate IT infrastructure** is present)
  - Provide **a contact point to facilitate and register energy sharing arrangements provide practical information, receive information on relevant metering points, changes in location and participation, and, where applicable, validate calculation methods in a clear, transparent and timely** manner.

Consolidated Text
Consumer Empowerment and Protection

Fixed price contracts (Directive – Art. 11)

- Suppliers to offer fixed-price, fixed-term contracts in addition to dynamic price contracts
- **Derogation for suppliers above 200 000 connected customers, if supplier only offers dynamic price contracts and the exemption does not have a negative impact on competition or on sufficient choice of fixed term, fixed price contract**



Supplier risk management (Directive – Art. 18a)

- NRAs to ensure **suppliers have appropriate hedging strategies in place**
- **PPAs** and forward contracts are **considered a supplier hedging strategy**
- MS to set up **enabling conditions for energy communities to access hedging products.**

Disconnection ban (Directive – Art. 28a)

- Ban to disconnection of vulnerable customers or those at risk of energy poverty
- Encouragement to set up self reading every 3 months.

Consolidated Text
Consumer Empowerment and Protection

PPAs
(Directive – Art. 19a)

- **MS promote usage of PPAs to counter volatility** and remove barriers to PPAs
- **Limited to renewables** and exclusion of fossil fuel generated electricity
- Commission to create a **voluntary market platform for electricity purchase agreements**

CfDs
(Directive – Art. 19b)

- Direct price support schemes in the form of bidirectional CfDs **for new investments in new generation electricity facility**
- **Voluntary** for **repowering** investments in **existing power generation facilities.**
- Covered: wind, solar, geothermal, hydraulic, reservoir, nuclear

Consolidated Text
Distribution System Operators Provisions

Tasks of DSOs
(Directive – Art. 31)

- **Publish information on the capacity available for new connections in its area of operation (including flexible connections)** on a quarterly basis
- Provide information about the **status** and **treatment** of **connection requests within 3 month of submission requ**est .
- **MS can derogate** these obligations **for DSO under 100 000 connected customers, however encouraged to publish annually.**

Cooperation between TSOs and DSOs
(Regulation – Art. 57)

- TSOs and DSOs to cooperate in publishing information on the **capacity available for new connections to provide visibility to developers of new energy projects.**

Consolidated Text Final Provisions

Electricity price crisis
(Directive – Art. 66a)

- Council to declare regional or Union price crisis in case of **very high prices** in wholesale markets
  - at least 2 1/2 times average price during previous 5 years and at least 180€/MWh, expected to last at least 6 months
  - Retail price increase of 70 % for at least 3 months
- **MS allow to set temporary targeted public interventions in price setting** for SMEs and household customers

Commission reviews and reports
(Regulation – Art. 69)

- **By 30thJune 2026 EC to review and report to EP**.
- Possibility of submitting a legislative proposal.
- 9 month from publication EC to submit proposal on streamlining the process of capacity mechanism.

Commission reviews and reports
(Directive – Art. 69)

- **By 31st December 2025 EC to review and report to EP**.
- Possibility of submitting a legislative proposal

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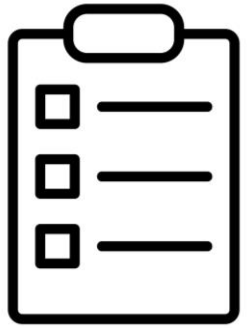
Action Plan on Grids

Action Plan on Grids – 29 November

7 Challenges

14 Actions



Pact for Engagement

7 Challenges

1) Accelerating implementation of existing PCIs and developing new projects

2) Enhancing long-term network planning

3) Introducing a supportive, future-proof regulatory framework

4) Making better use of existing grids and smartening them

5) Improving access to financing

6) Ensuring faster and leaner permitting processes

7) Strengthening supply chains

Key Actions for DSOs

Action 3

EU DSO Entity to support DSO grid planning by mapping the existence and characteristics of distribution development plans.

Action 4

Commission to propose **guiding principles** identifying conditions under which **anticipatory investments** in grid projects should be granted.

Action 6

ENTSO-E and EU DSO Entity to agree on **harmonized definitions** for available grid hosting capacity for system operators and to establish a pan-EU overview.

Key Actions for DSOs

Action 7

ENTSO-E and EU DSO Entity to promote uptake of **smart grid, network efficiency and innovative technologies**.

Action 8

ACER, in its next tariff report, to recommend **best practices** in relation to the promotion of smart grids and network efficiency technologies through tariff design, focusing on the **consideration of OPEX in addition to CAPEX** and benefit sharing.

Action 9

Commission to identify tailored **financing models** and strengthen dialogue to **address obstacles to private financing**.

Key Actions for DSOs

Action 10

Commission to increase visibility on opportunities from **EU funding programmes for smart grids and modernisation of distribution grids.**

Action 11

Commission to **support permitting acceleration** providing guidance and technical support on how to implement existing legislative tools and Member States to implement acceleration measures.

Action 12

Commission to launch a **Pact for Engagement** for early, regular and meaningful stakeholder engagement and regulatory support.

Key Actions for DSOs

Action 13

ENTSO-E and EU DSO Entity to collaborate with technology providers to develop **standard technology specifications and improve visibility of grid project pipelines**, to facilitate investments in manufacturing capacity and supply chains.

Action 14

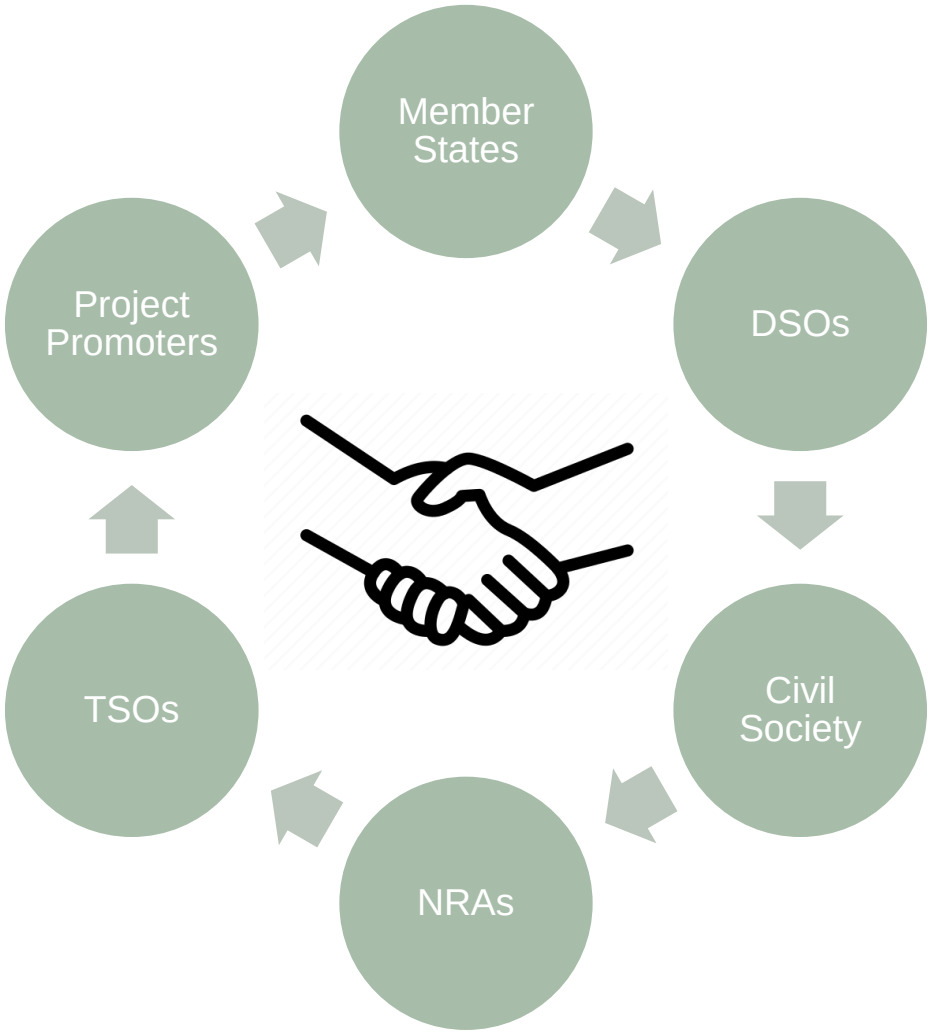
Commission to **promote common technical requirements** for generation and demand connection.

CATEGORY	ACTIONS	TIMELINE
Accelerating the implementation of PCIs and developing new projects	1. Commission, Member States and TSOs to strengthen support to PCI and PMI preparation, faster implementation and funding	**From 2024**
Improving long-term grid planning for a higher share of renewables and increased electrification	2. ENTSO-E to enhance top-down planning towards 2050 by integrating the identification of offshore and onshore system needs and further considering hydrogen	**From Q1 2024**
	3. EU DSO Entity to support DSO grid planning by mapping the existence and characteristics of distribution development plans	**Mid-2024**
Introducing regulatory incentives for forward-looking grid build-out	**4. Commission to propose guiding principles identifying conditions under which anticipatory investments in grid projects should be granted**	**Q1 2025**
	5. Commission to issue guidance on cross-border cost sharing for offshore projects	**Mid-2024**
Incentivising a better usage of the grids	**6. ENTSO-E and EU DSO Entity to agree on harmonised definitions for available grid hosting capacity for system operators and establish a pan-EU overview**	**From adoption**
	7. ENTSO-E and EU DSO Entity to promote uptake of smart grid, network efficiency and innovative technologies	**Q4 2024**
	8. ACER, in its next tariff report, to recommend best practices in relation to the promotion of smart grids and network efficiency technologies through tariff design, focusing on consideration of OPEX in addition to CAPEX and benefit sharing	**Q1 2025**
Improving access to finance	**9. Commission to identify tailored financing models and strengthen dialogue to address financing obstacles**	**From adoption**
	10. Commission to increase visibility on opportunities for EU funding programmes for smart grids and modernisation of distribution grids	**From Q1 2024**
Accelerating deployment through faster permitting and public engagement	**11. Commission to support permitting acceleration providing guidance and technical support on how to implement existing legislative tools and Member States to implement acceleration measures**	**2024-25**
	12. Commission to launch a Pact for Engagement for early, regular and meaningful stakeholder engagement and regulatory support	**From adoption**
Strengthening grid supply chains	**13. ENTSO-E and EU DSO Entity to collaborate with technology providers to develop standard technology specifications and improve visibility of grid project pipelines, to facilitate investments in manufacturing capacity and supply chains**	**Q4 2024**
	14. Commission to promote common technical requirements for generation and demand connection	**By 2025**

Pact for Engagement

Promoting and communicating the **Distribution Grids key role** as enablers of the energy transition.

Fostering cooperation between national & regional authorities ensuring that all organizational conditions are reunited in terms of **smooth permitting procedures** linked to grid deployment.



Contributing to an open dialogue with Ministries, NRAs and relevant authorities to ensure **forward-looking regulatory support** to accompany grid investment planning.

Gas and Hydrogen Market Package

Key steps :

Directive – Agreement found on the 27th November;

Regulation – Agreement found on 8th December

23 January - Validation of both texts in ITRE Committee

Next Steps: European Parliament Plenary voting (10 – 11 April) and adoption at Ministerial level

- **Key achievement for GEODE** within the **Directive** :
  - **Unbundling of Hydrogen Operators (Article 63)** only limited to TSOs and with possibility for Member States to remove the obligation based on a cost-benefit analysis.
  - **Split between Hydrogen Distribution and Transmission** is consolidated (Article 2)
- Still a few points open to be negotiated within Technical Trialogues (4th December):
  - End of the transition period for existing hydrogen networks
  - Definition of geographically confined networks
- **Next Steps – new governance**
  - A separate entity for Hydrogen ENNOH will be created for H2 TSOs
  - **Gas and H2 DSOs will integrate into the EU DSO Entity**

Florinated Greenhouse Gases Regulation

Key steps :

5th October – Agreement found in trialogue negotiations
16 January - EP Plenary Approved text

29 January – Adoption at Ministerial level

Next Steps: Publication within EU Official Journal

- A final agreement on the F-Gases regulation has been found on October 5th, 2023.
- GEODE along with other stakeholders of the Electricity community has circulated and shared a joint statement calling for Negotiators to reconsider a hard ban on SF6 Gases needed for Switchgears. Even though no final text has been circulated to date, it seems that the , cascading principles for the ban, has been taken into consideration within the final text.
- The text has been adopted within the ENVI Committee on the 24th of October and upcoming steps for the regulation are, from the Parliament perspective a Plenary voting currently scheduled for January; from the European Council perspective, Ambassadors have approved the agreement on the 18th of October.

Gigabit Infrastructure Act

Trilogue negotiations: Ongoing.

Next Steps: Next trilogue is planned on 5 February 2024.

- On **19 September 2023,** MEPs in the Industry, Research and Energy Committee adopted their negotiating position on draft legislation. The decision was submitted to the Plenary on **2 October 2023**.
- The Council adopted its position (general approach) on **5 December 2023.**
- Key provisions for DSOs:
  - Article 2 – Definitions
  - Article 3 – Access to existing physical infrastructure
  - Article 4 – Transparency on physical infrastructure
  - Article 5 & 6 - Coordination of civil works

Other Fit for 55 files – State of Play

NZIA

- European **Parliament** has adopted in Plenary reading its **position on 22nd of November**, however extending the coverage of the text on the entirety of the Supply Chain, diverging from the original proposal by the EC.
- Council has adopted its **General Approach on the 7th of December**, the negotiation were halting on the inclusion of nuclear fission in the list of strategic technologies. The Council mandate also include CO2 injection infrastructure.
- **Trialogue negotiations**: 13 December, 22 January and 6 February.

Energy Performance of Buildings Directive

- **Agreement found on 7th of December**
- Negotiations were halting on the question of minimum energy performance standards for building, despite a partial agreement had been found mid-October.
- Phasing out for boilers by 2040 has been retained, however the EC should issue guidance on the definition of a fossil fuel boiler.
  Halt to subsidies for self-contained fossil fuel boilers from 2025.

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IV. Network Codes updates

GEODE represented at Expert Groups

Expert groups are mainly responsible for the technical work on Network Codes related to the operation of DSOs systems. Their composition reflects the technical and geographical diversity across Member DSOs.

Cybersecurity

- **Armin Selhofer**
  Österreichs E-Wirtschaft, AT
- **Pia Hoschek**,
  Wiener Netze GmbH, AT

Distributed Flexibility

- **Adam Nilsson**
  Jämtkraft Elnät AB, SE
- **Georg Hartner**
  Österreichs E-Wirtschaft, AT
- **Hans Taus**
  Wiener Netze GmbH, AT
- **Pablo López Pérez**
  Grupo Cuerva, ES

Data Interoperability

- **Georg Hartner**
  Österreichs E-Wirtschaft, AT

Existing Network Codes

- **Mike Kay**
  ENA, UK
- **Elisabeth Hufnagl**
  Wiener Netze, AT
- **Karl Scheida**
  Linz Netz, AT
- **Erno-Pekka Leväniemi**,
  Elenia, FI

Task Force on TYNDPs

- **Christoph Schred**,
  Wiener Netze GmbH, AT
- **Esa Äärynen**,
  Helen Electricity, FI

Task Force on Digitalisation of Energy Action Plan

- **Hans Taus**
  Wiener Netze GmbH, AT
- **Pablo López Pérez**
  Grupo Cuerva, ES

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Network Code Demand Response

NC Demand Response

EG DF – Achievements September-November

Development Team for Network Code Demand Response

- Launch of public consultation for the NC DR (29th September -10th November)
- 2nd Public workshop completed on 13th October to collect the views from all stakeholders, with a participation of 350 persons.
- 2 Drafting committee meetings (26 September, 25 October)
- 4 dedicated bilateral calls with ACER to reach a common understanding of the draft.
  - 06October – Focus on Market design
  - 11 October – Focus on Market access
  - 11October – TSO-DSO coordination
  - 13 October – Aggregation models
- 1 dedicated workshop with Drafting Committee members (26 October) – Focussed on Aggregation models
- Joint evaluation with ENTSO-E and EC of the NC DR drafting process (including interaction with stakeholders and maturity of the document) and the potential tolerance delayed submission of the NC DR proposal to ACER.
- Internal EU DSO Entity workshop for Distribution Network Development Plans (20th October) to facilitate discussions and gather valuable insights that will **further enhance the NC DR**, taking into consideration ACER's feedback and the input of industry experts.

NC Demand Response

DSO ENTITY
DSOs FOR EUROPE

Looking ahead on 2024 (EG DF)

- ✓ EG DF monitors and supports the Network Code Demand Response (NC DR) Development team.
  - ✓ By 8 May 2024, submission of NC DR draft & Supporting document to ACER
  - ✓ Continuous interaction with ACER after the submission
- ✓ EG DF distributes the key communication messages on flexibility.
  - ✓ Ask-Me-Anything webinar for DSO members
- ✓ EG DF will contribute to the grid action plan items related to distributed flexibility.
- ✓ EG DF will support Joint Working Group on data interoperability under supervision of EG DI.

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Existing Network Codes

Existing Network Codes

NC RfG and NC DC Progress

- ACER submitted their proposed legal text for the two codes to the Commission on 19 December 2023.
- The Commission's timetable is uncertain, likely to conclude around the end of 2024.
- ACER appear to have aligned the grid forming requirements with those proposed by the DSO Entity.
- **ACER have ignored the Entity's suggestions on EVs.**
- There are a small number of areas where ACER's drafting is not as clear as it could be.
- The Entity will write to The Commission about the drafting issues the Entity has identified, and suggest a meeting to help the Commission decide what to do about them

Existing Network Codes

Issues that DSOs should now pay attention to:

1) The lack of legal certainty regarding the application of the current NCs when they are repealed;
2) Development of new processes and documents for EVs and heatpumps;
3) Ensure DSOs know how to aggregate, or not, storage and other generating units;
4) Start developing compliance requirements for mandatory equipment certificates;
5) Consider the effect of new overvoltage requirements for Type B;
6) Carefully review the compliance requirements for EVs;

And possibly:

I. Review how to assess the compliance with stability through changes in short circuit power level resilience for Type B;
II. Consider if there is a need to prepare for new TSOs requirements;
III. Consider if there is a need to react to new oscillatory stability requirements for Type C;

The Network for Networks

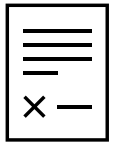
NC Cybersecurity

Network Code Cybersecurity

A **proposal** for the NCCS was first submitted by **ENTSO-e** in cooperation with the **DSO Entity** to ACER on 14 January 2022. **ACER provided their revision** on 14 July 2022. Since then, DG ENER has been reviewing the NCCS and aligning it with NIS2 Directive.

On 24 May 2023, **European Commission's DG ENER** shared a **new version of the Network Code for Cybersecurity** (NCCS).

Public consultation from 20 October 2023 to 17 November 2023 by **European Commission**.



Final text of the NC CS is available. Adoption by the Commission planned before **mid-March 2024**. Afterwards 2+2 Months Period for Parliament and Council to object.

Network Code Cybersecurity

NCCS DELIVERABLES IN 2024 - 2025

Subgroup	Deliverable	Deadline (after entry into force)
General and regulatory aspects	Arrange compliance with neighbouring third country TSOs	18 months
	Support ACER in issuing non-binding performance indicators	12 months
Cross-border cyber risk management	Temporary electricity cybersecurity impact indices (ECII)	4 months
	Temporary list of Union-wide high-and critical-impact processes	6 months
	Proposal for the cybersecurity risk methodologies	9 months
Information sharing	**Proposal for the cyber-attack incident classification scale methodology**	12 months
	Feasibility study to develop a common information sharing tool	24 months
Certification	Temporary list of European and international standards and controls	12 months
Supply chain	**Procurement recommendations for substation automation systems**	No legal deadline

The Network for Networks

V. ACER Report - Demand response and other distributed energy resources: what barriers are holding them back?

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Demand response and other distributed energy resources: what barriers are holding them back?

ACER 2023 Market Monitoring Report

GEODE – WG Innovation & Development meeting

1 February 2024

Cristina VAZQUEZ HERNANDEZ

Akos HOFSTADTER (Contributor)

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ACER monitors barriers to demand response and other distributed energy resources

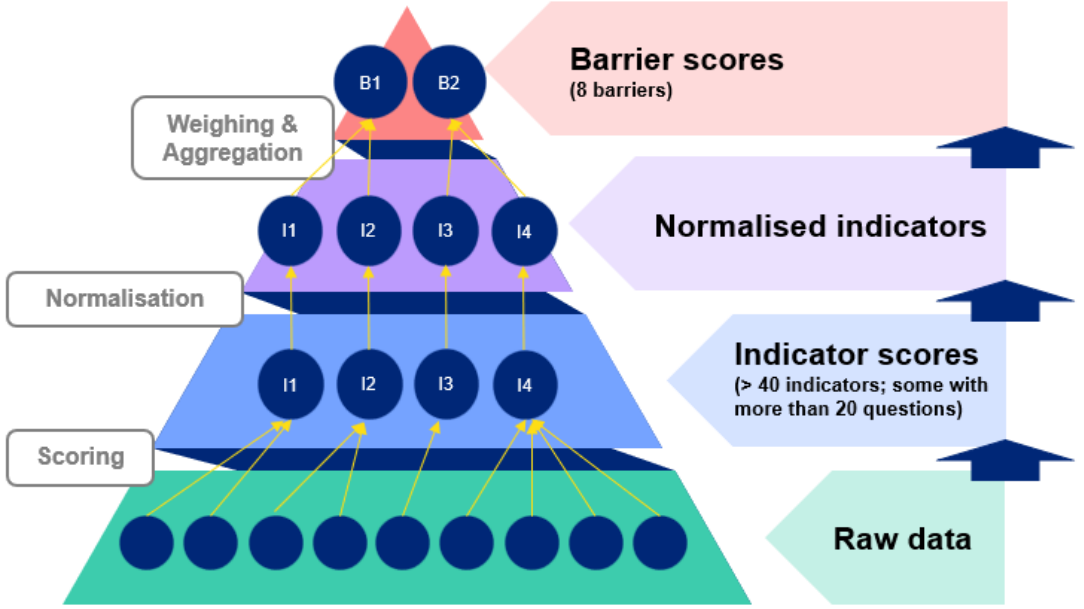
Why?

Flexibility from distributed energy resources brings opportunities…

- ✓ *Ensure **EU market integration***
- ✓ *More **cost-efficient market and system operation***
- ✓ *More **cost-efficient network development***
- ✓ ***Savings** for ALL CONSUMERS*
- ✓ *Make **the most out of resources** (EVs, rooftop solar panels, batteries, etc.)*
- ✓ *(…)*

How?

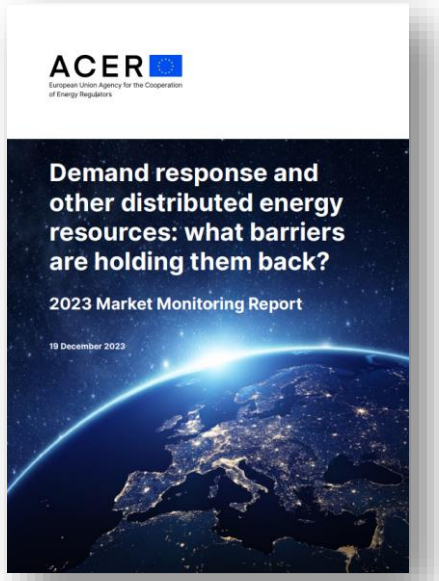
A bottom up approach to measure barriers and ensure comparability between Member States



National Regulatory Authorities are our main data source

Where?

Specific recommendations per Member State



Learn more about our report!

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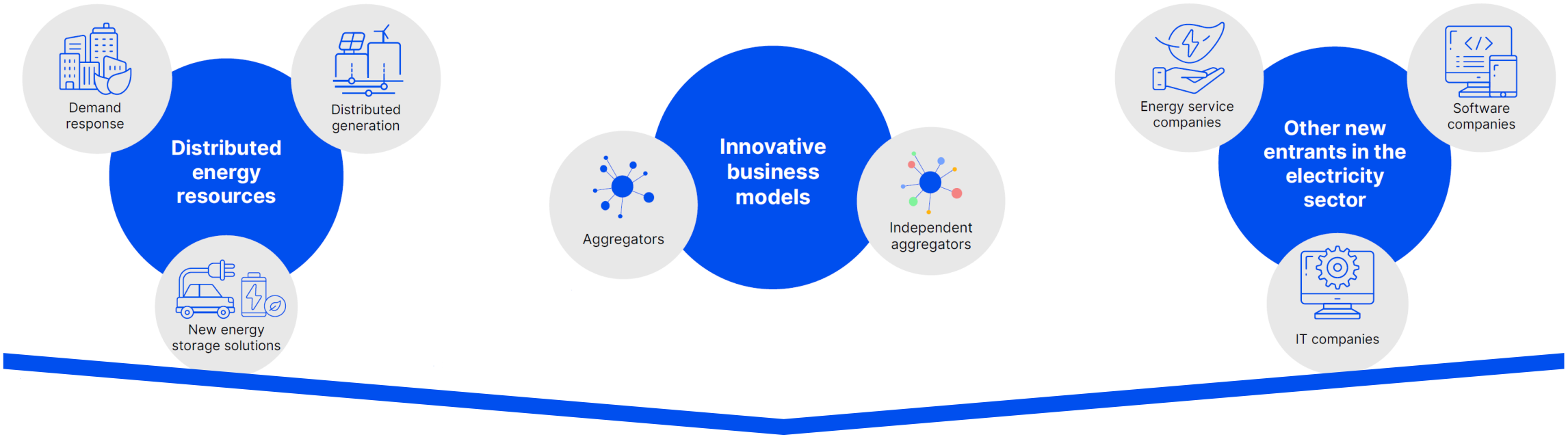
Scope



Regulatory barriers & market restrictions

- Clean Energy Package & some existing EU Guidelines
- Market design and structure

Day-ahead and intraday markets

Balancing services

Congestion management services

Capacity mechanisms and interruptibility schemes

2022 data

Geographical scope

Financial, economic, technological, and behavioural barriers are out of the scope

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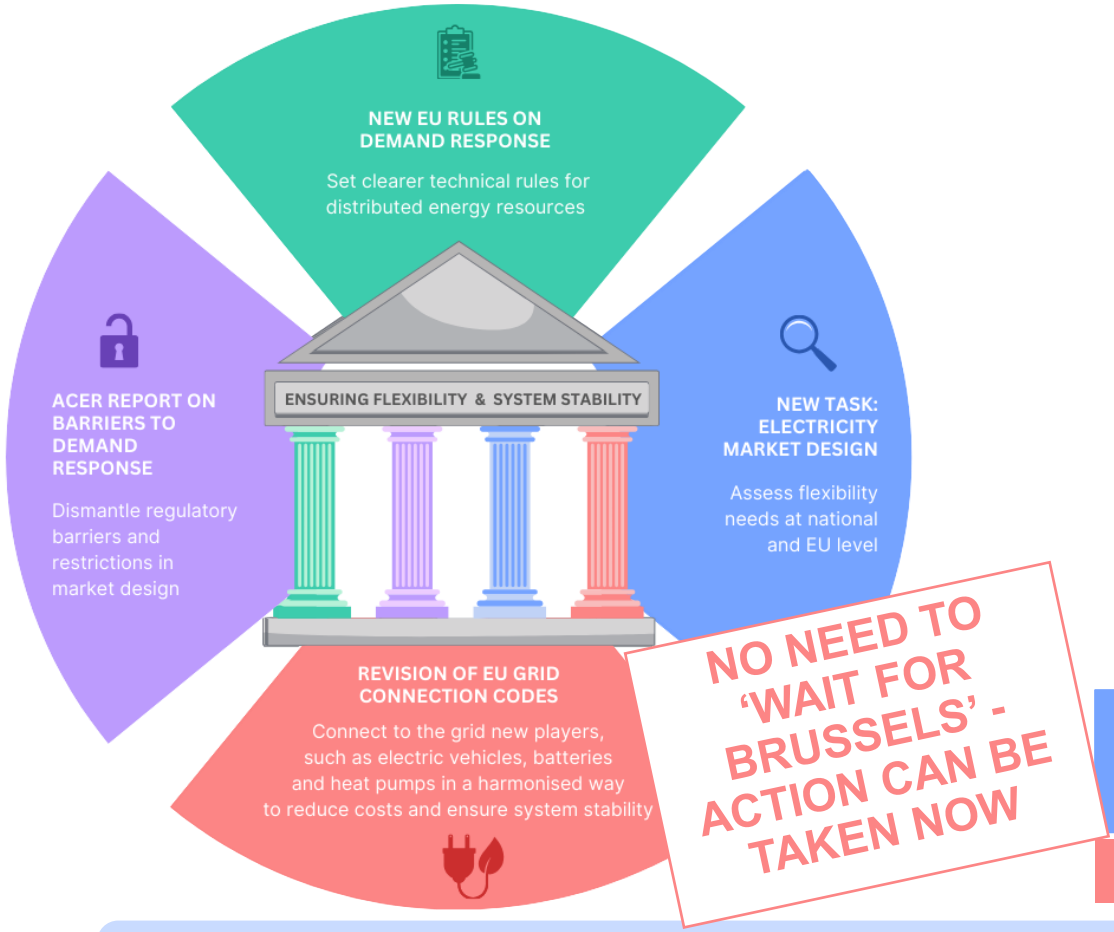
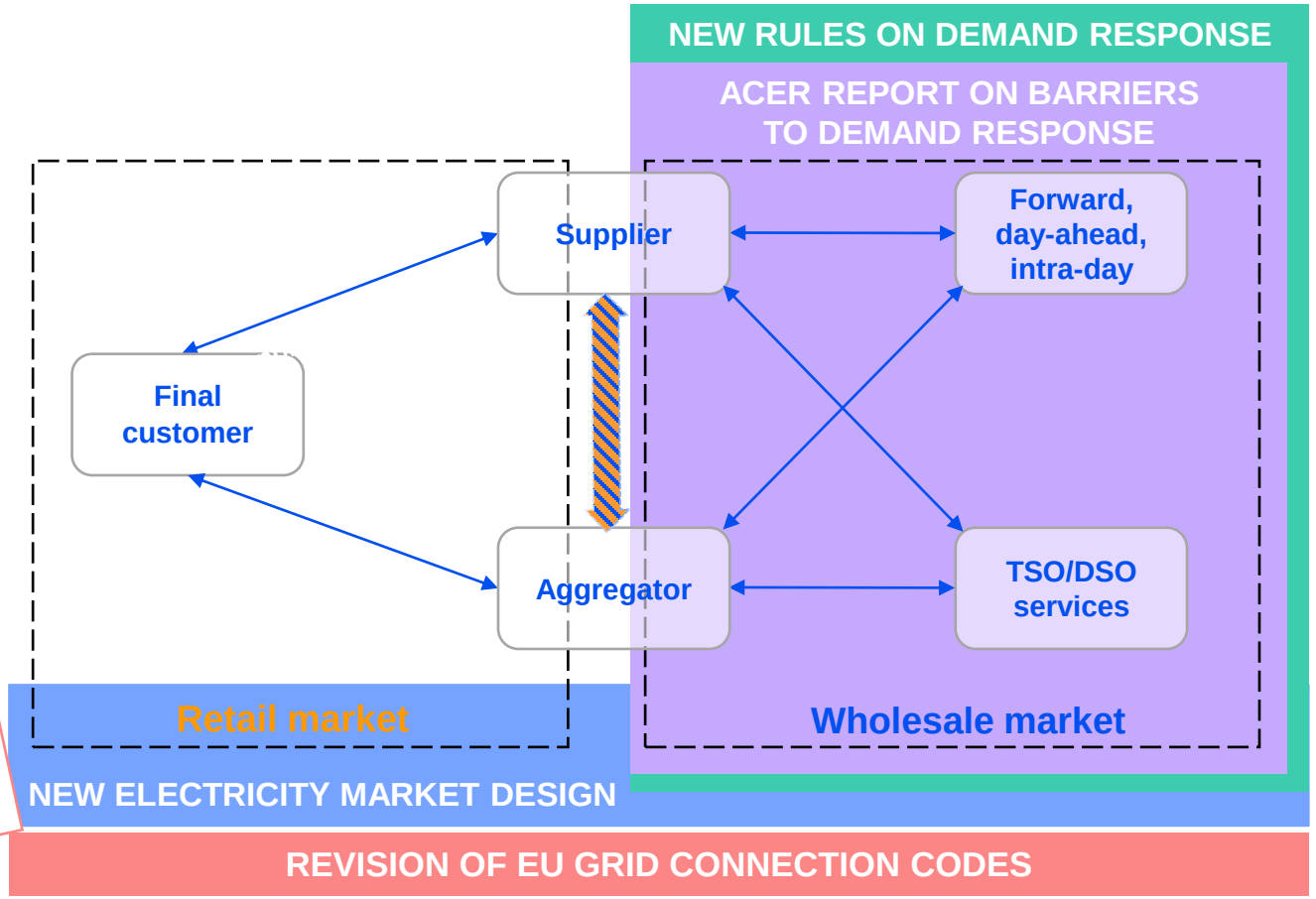
Multiple EU efforts ongoing to 'unlock' flexibility





This report presents **regulatory barriers** and **restrictions in market design** that **merit further consideration and possible removal.**

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Barriers come in many sizes and shapes …

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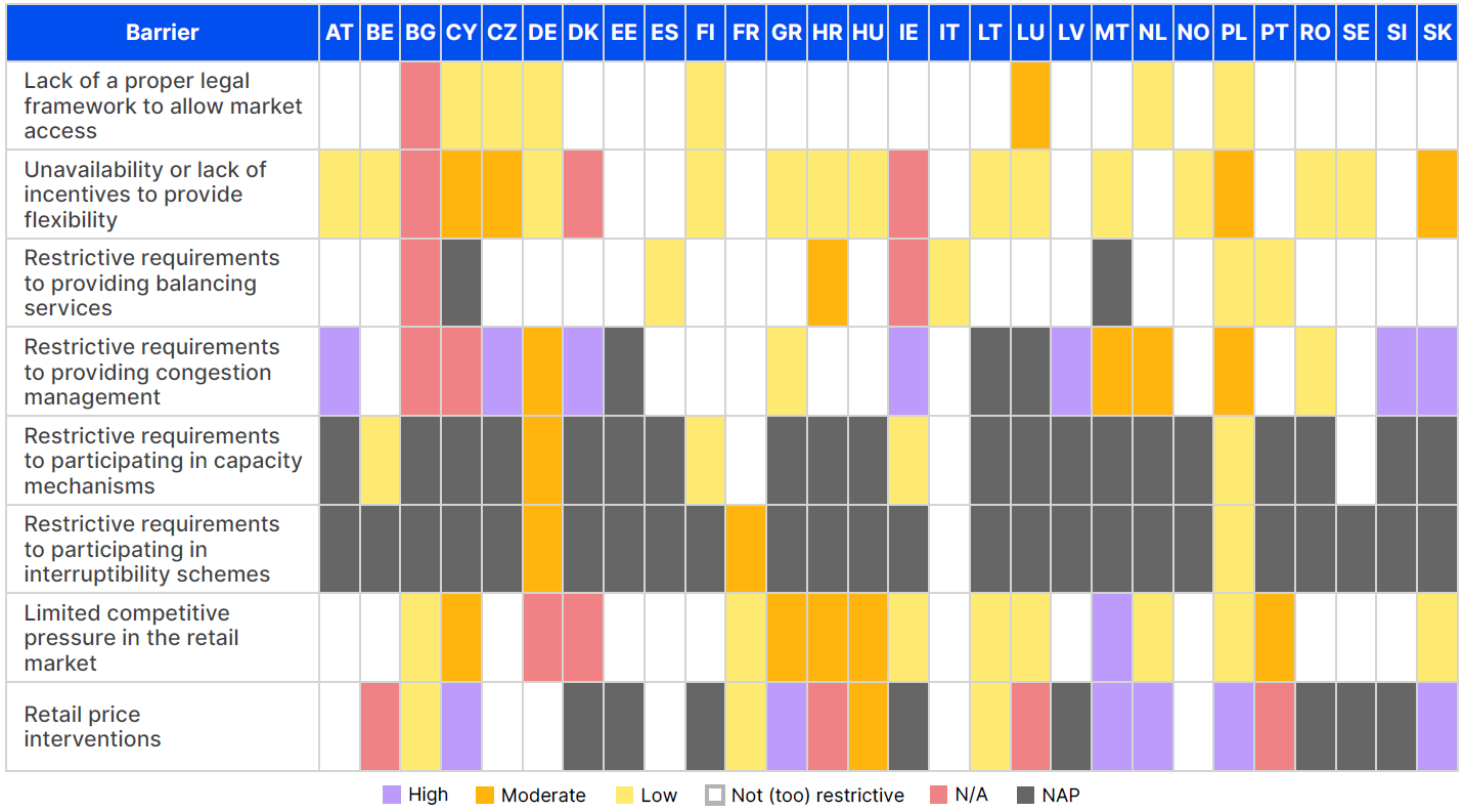
Barriers to distributed energy resources, zooming in …



Barriers to distributed energy resources (including demand response) are **often 'hiding in plain sight'**.
The **sum of many small obstacles can add up to significant barriers**, impeding system flexibility.

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Some examples of barriers holding back distributed energy resources …

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Lack of a legal framework to allow market access

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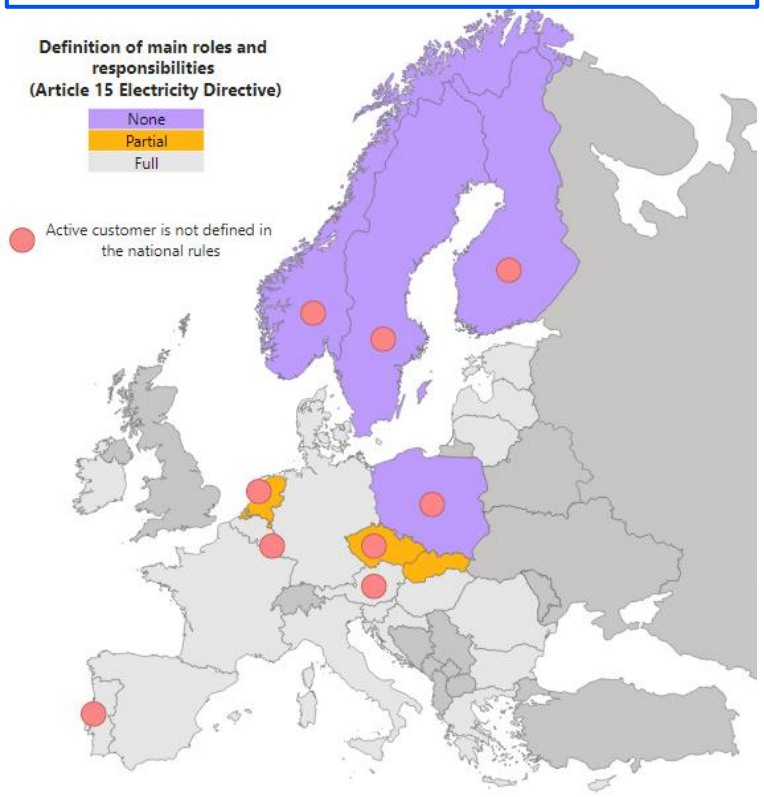
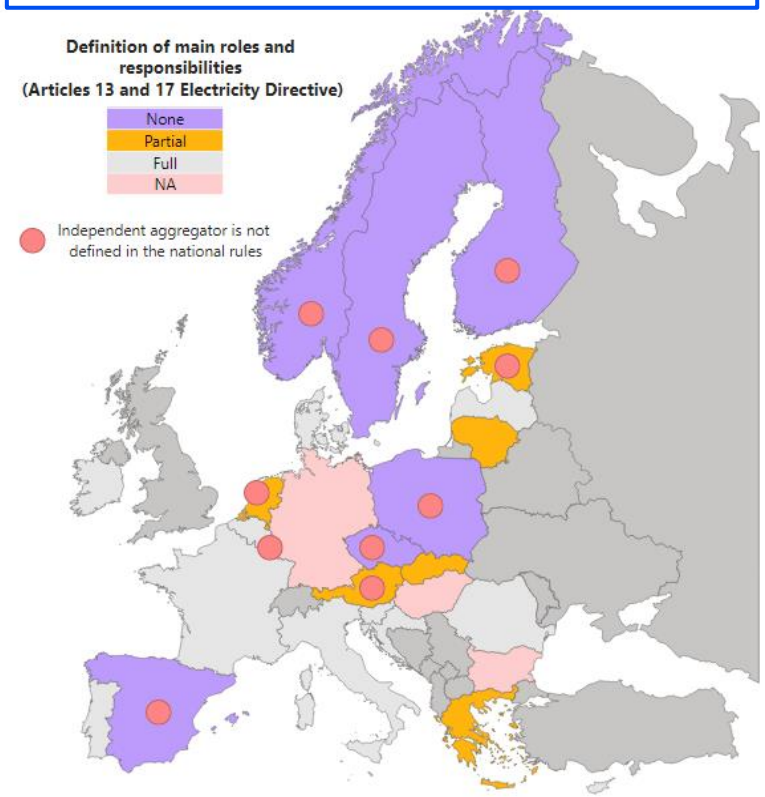
Legal preconditions… still not implemented

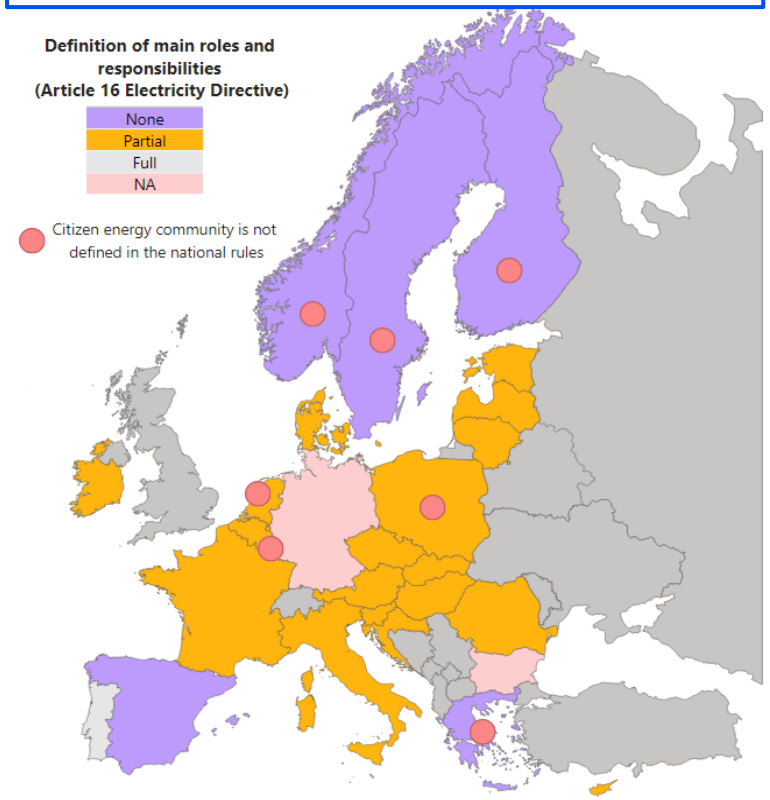
ACTIVE CUSTOMERS



AGGREGATION AND INDEPENDENT AGGREGATORS



CITIZEN ENERGY COMMUNITIES



Many Member States have not yet defined the **main roles and responsibilites** of new entrants and small actors in line with the **Clean Energy Package**.

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Aggregation models in place?

		AT		BE		BG	CY	CZ	DE	DK	EE	ES	FI	FR		GR	HR	HU	IE	IT	LT	LU	LV	MT	NL		NO		PL	PT	RO	SE			SI	SK
Type of aggregation model and maturity level	DA and ID	BaU	P	BaU	BaU			BaU		NA	P	P		BaU	BaU	P	BaU	BaU	BaU				P		P	P	BaU	BaU	BaU		BaU	BaU	BaU	P	BaU	
	CRMs			BaU	BaU								TorP	BaU	BaU				BaU	BaU									BaU						
	FCR	BaU		BaU	BaU	BaU		BaU		NA		Non-market based	BaU	BaU	BaU	BaU	Non-market based	BaU		Non-market based	P				P	P			P	Non-market based	Non-market based	BaU	BaU	P	P	BaU	
	aFRR	BaU	BaU	BaU	BaU	BaU		BaU		NA		BaU	P	BaU	BaU	BaU		BaU		TorP					P	P	BaU	BaU	P		BaU	BaU	BaU	P	P	BaU	
	mFRR	BaU	BaU	BaU	BaU	BaU		BaU		NA	BaU	BaU	TorP	BaU	BaU	BaU		BaU		TorP	BaU		BaU		P	P	BaU	BaU			BaU	BaU	BaU	P	P	BaU	
	RR					BaU		BaU				BaU		BaU	BaU					TorP									P		BaU				BaU	
	TSO redispatching	BaU	P	Non-market based		NA	NA	Non-market based	P	Non-market based	No congestion	No congestion	P		P	P	BaU	Non-market based	Non-market based	BaU	TorP	No congestion	No congestion	No congestion		P	P	BaU	BaU	NA		BaU	BaU	BaU	P	P	No congestion	Non-market based
	DSO congestion management	Non-market based	P	Non-market based				Non-market based	Non-market based	Non-market based	No congestion		No congestion	P	P		No congestion	Non-market based		No congestion	No congestion	No congestion	No congestion	Non-market based	P	P	Non-market based	TorP	TorP	TorP		Non-market based	BaU	TorP	TorP	TorP	P	TorP	
Customer segment	DA and ID									NA		NA											NA				NA	NA								
	CRMs												NA																							
	FCR									NA																									NA	
	aFRR									NA																	NA	NA								
	mFRR									NA																	NA	NA								
	RR																																			
	TSO redispatching					NA	NA					NA															NA	NA	NA							
	DSO congestion management																											NA	NA	NA						

Type of aggregation model

- 1 BRP/connection point + 1 metering point
- Multiple BRPs/connection point + Multiple metering points
- Multiple BRPs/connection point + 1 metering point + No correction of the BRPs
- Multiple BRPs/connection point + 1 metering point + Correction of the BRPs
- NA (Not available: there is an aggregation model in place but the NRA does not have any information)
- NAP (Not applicable: the market/SO service is not in operation or the SO service is non-market-based)
- No aggregation model implemented as BAU or TorP

Maturity level

BaU: implemented as a business as usual approach

TorP: implemented on a trial stage or in a pilot project

NA: NRA does not have information on the maturity level

Customer segment

- Applicable to all customers
- Only applicable to customers connected to LV level
- Only applicable to customers connected to MV and HV level

NA: NRA does not have information on the customer segment

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Aggregation models in place?

		AT		BE		BG	CY	CZ	DE	DK	EE	ES	FI	FR		GR	HR	HU	IE	IT	LT	LU	LV	MT	NL		NO			PL	PT	RO	SE				SI	SK
Type of aggregation model and maturity level	DA and ID	BaU	P	BaU	BaU			BaU		NA	P	P		BaU	BaU	P	BaU	BaU	BaU				P		P	P	BaU	BaU		BaU		BaU	BaU	BaU	P	BaU	
	CRMs			BaU	BaU								TorP	BaU	BaU				BaU	BaU									BaU							
	FCR	BaU		BaU	BaU	BaU		BaU		NA		Non-market based	BaU	BaU	BaU	BaU	Non-market based	BaU		Non-market based	P				P	P			P	Non-market based	Non-market based	BaU	BaU	P	P	BaU	
	aFRR	BaU	BaU	BaU	BaU	BaU		BaU		NA		BaU	P	BaU	BaU	BaU		BaU		TorP					P	P	BaU	BaU	P		BaU	BaU	BaU	P	P	BaU	
	mFRR	BaU	BaU	BaU	BaU	BaU		BaU		NA	BaU	BaU	TorP	BaU	BaU	BaU		BaU		TorP	BaU		BaU		P	P	BaU	BaU			BaU	BaU	BaU	P	P	BaU	
	RR					BaU		BaU				BaU		BaU	BaU					TorP									P		BaU				BaU	
	TSO redispatching	BaU	P	Non-market based		NA	NA	Non-market based	P	Non-market based	No congestion	No congestion	P	P	P	BaU	Non-market based	Non-market based	BaU	TorP	No congestion	No congestion	No congestion		P	P	BaU	BaU	NA		BaU	BaU	BaU	P	P	No congestion	Non-market based
	DSO congestion management	Non-market based	P	Non-market based				Non-market based	Non-market based	Non-market based	No congestion		No congestion	P	P		No congestion	Non-market based		No congestion	No congestion	No congestion		Non-market based	P	P	Non-market based	TorP	TorP	TorP	Non-market based	BaU	TorP	TorP	TorP	P	TorP	
Customer segment	DA and ID									NA		NA											NA				NA	NA									
	CRMs												NA																								
	FCR									NA																										NA	
	aFRR									NA																	NA	NA									
	mFRR									NA																	NA	NA									
	RR																																				
	TSO redispatching					NA	NA					NA															NA	NA	NA								
	DSO congestion management																											NA	NA	NA							

Type of aggregation model

NA (Not available: there is an aggregation model in place but the NRA does not have any information)

No aggregation model implemented as BAU or TorP

Maturity level

NA: NRA does not have information on the maturity level

Customer segment

Only applicable to customers connected to LV level

Only applicable to customers connected to MV and HV level

NA: NRA does not have information on the customer segment

- Lack of at least one aggregation model (up and running or in a trial stage/as a pilot project) in some electricity markets or market-based system operation services in almost half of Member States.
- Missing aggregation models for some customer segments and lack of monitoring of aggregation models.

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Unavailability or lack of incentives to provide flexibility

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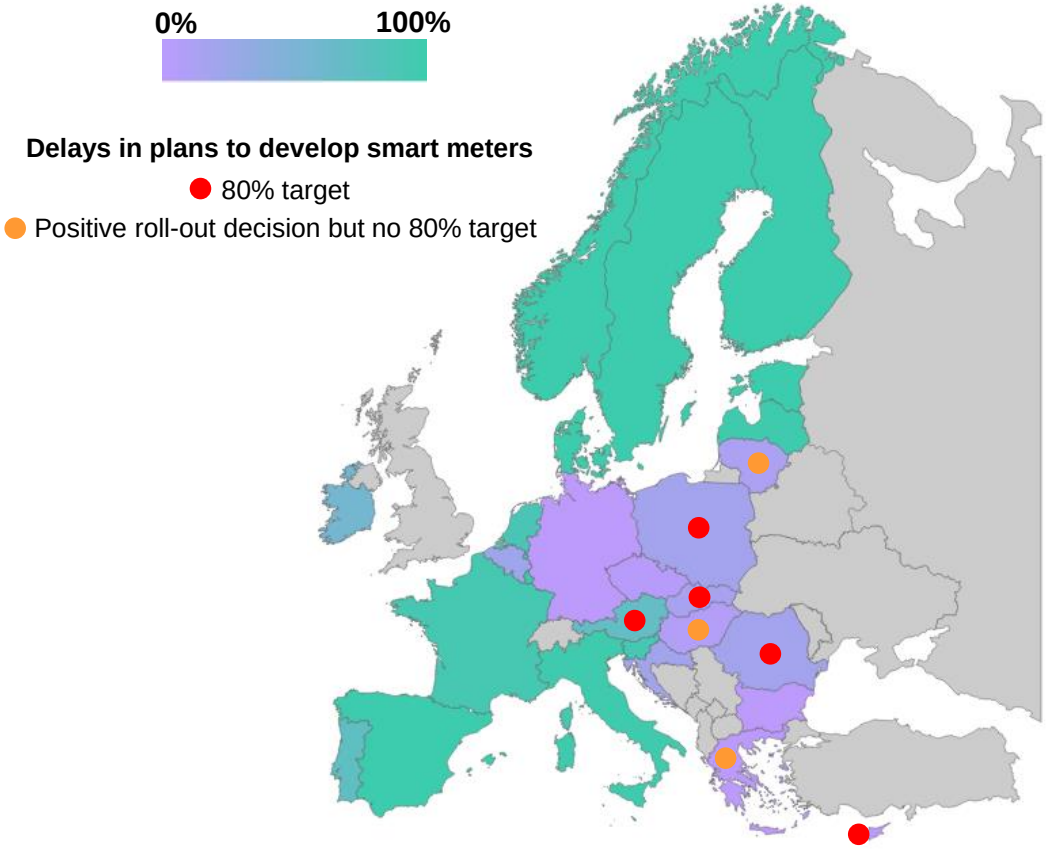
Lack of technical means to activate flexible resources

Smart meters roll-out - 2022



Functionalities of smart meters installed (% ranges) - 2022

	STANDARD VALUE PROPOSITIONS									ADVANCED VALUE PROPOSITIONS					
	Leverage smart meters data	Bill forecasting	Real-time consumption display	Real-time cost display	Unusual usage alert	Historical consumption overview	Real-time carbon impact	Pre-payment capacity	Day-ahead prices	Ability to valorise the provision of explicit demand response to the power markets	Fuel poverty detection	Energy sharing	Integrate prosumers in the market	Facilitate smart charging of EVs at home	Facilitate smart charging of batteries
AT	100%		100%			100%						100%			
BE			0% - 20%									0% - 20%			
BG	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CY	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CZ															
DE															
DK															
EE	100%	100%	100%			100%	100%		100%						
ES	0%	0%	100%	0%	0%	100%	0%		100%	100%	0%	100%	0%	0%	0%
FI															
FR	80% - 100%	80% - 100%	80% - 100%	0% - 20%	0% - 20%	80% - 100%	0% - 20%	0%	0%	80% - 100%		80% 100%		100%	100%
GR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HR															
HU															
IE															
IT	0%	0%	80% - 100%	0%	80% - 100%	100%	0%	80% - 100%	0%	0%	0%	0%	0%	0%	0%
LT	100%	0%	100%	0%	0%	100%	0%	0%	100%	100%	0%	0%	100%	100%	100%
LU	0%	0%	100%	0%	0%	100%	0%	0%	0%	100%	0%	100%	0%	100%	100%
LV	60% - 80%	0% - 20%	100%	60% - 80%	0% - 20%	100%	20% - 40%	20% - 40%	0% - 20%	0%	0%	0%	0%	0% - 20%	0% - 20%
MT	0%	0%	100%		0%	0%	0%	0%			0%	0%			
NL															
NO	100%	100%	100%	100%	0%	100%	0%	0%	100%	0%	0%	100%	100%	100%	100%
PL															
PT	0%	0%	60% - 80%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RO		100%	100%		0%	100%	0%	0%							
SE															
SI	60% - 80%	60% - 80%	80% - 100%	0%	0%	60% - 80%	0%	0%	0%	0%- 20%	0%	0%	0%	40% - 60%	40% - 60%
SK	100%	20% - 40%	60% - 80%												

0%
0% - 20%
20% - 40%
40% - 60%
60% - 80%
80% - 100%
100%
N/A

- Ten Member States with a rollout rate lower than 20% (with five being (almost) 0%).
- Delays in development plans.

- Limited information on functionalities.
- Many consumers likely not having full advantage of smart meters.

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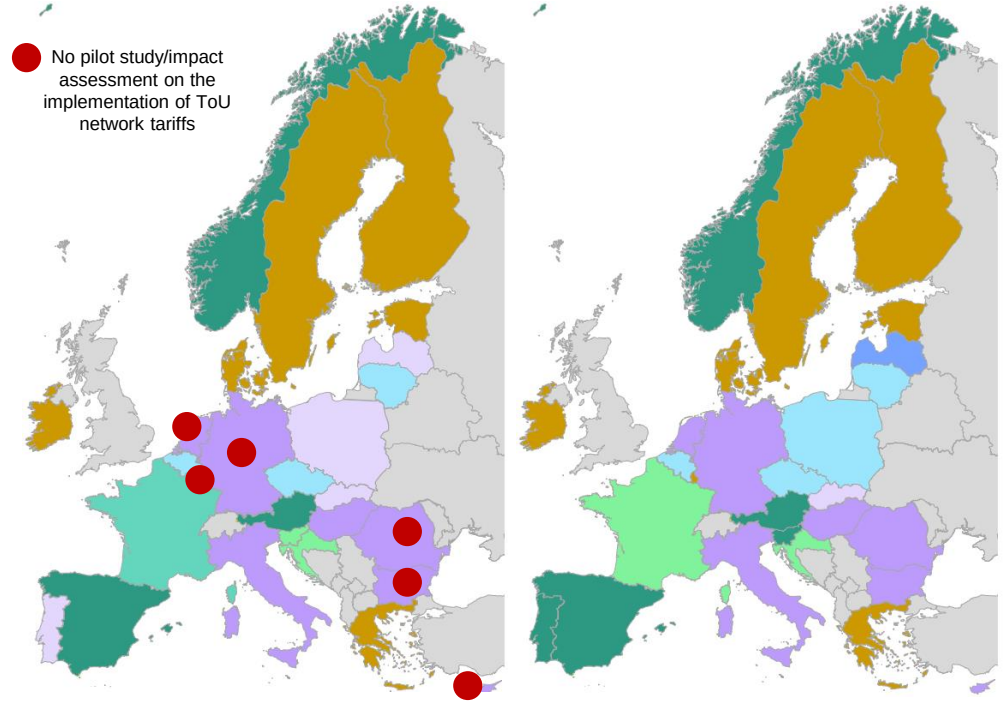
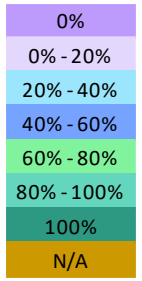
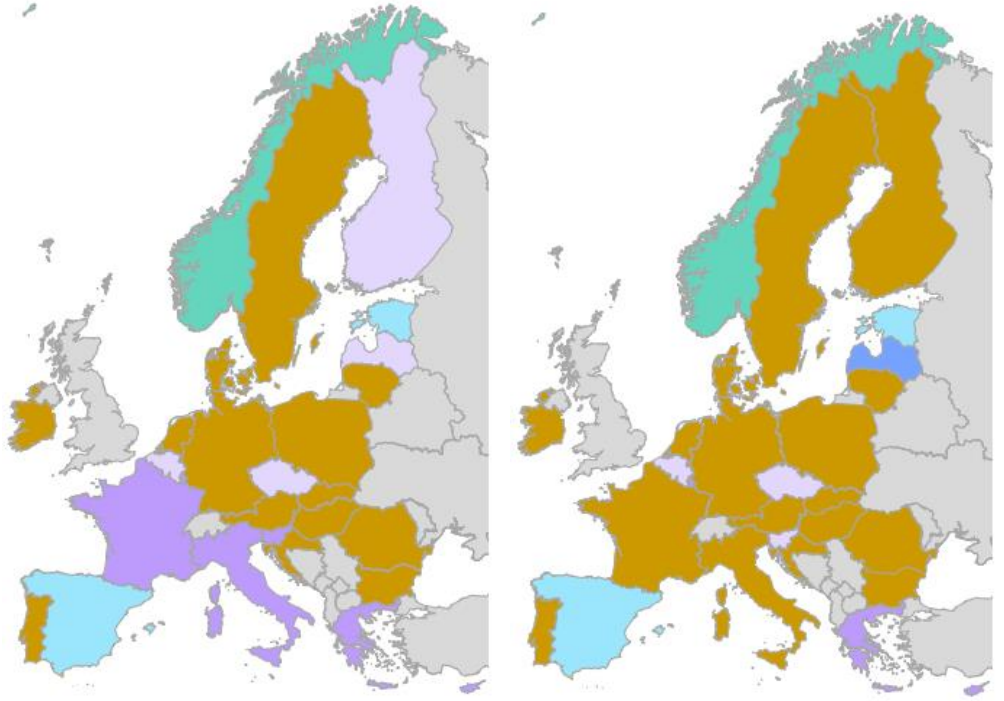
Without price signals or incentives… why respond?

Households (left) and non-households (right) with Time of Use network tariffs with differentiation within the day (% ranges) - 2022





Households (left) and non-households (right) with dynamic electricity price contracts (% ranges) - 2022



- Limited penetration of ToU network tariffs in some Member States.
- Lack of a proper implementation assessment in a few Member States.

Little information on the penetration of retail electricity contracts with time differentiation (e.g. dynamic electricity price contracts)
► Do consumers receive proper price signals?

Note: ToU refers to Time-of-Use network tariffs.

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Restrictions to providing congestion management services

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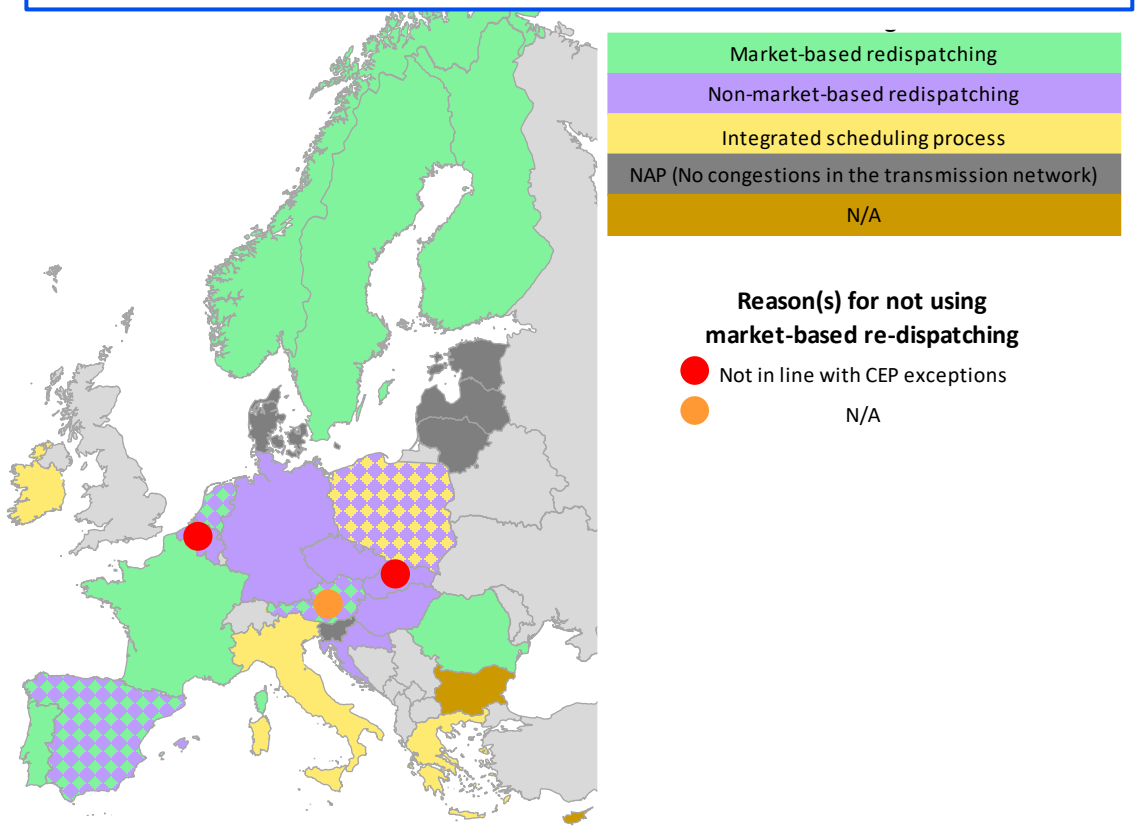
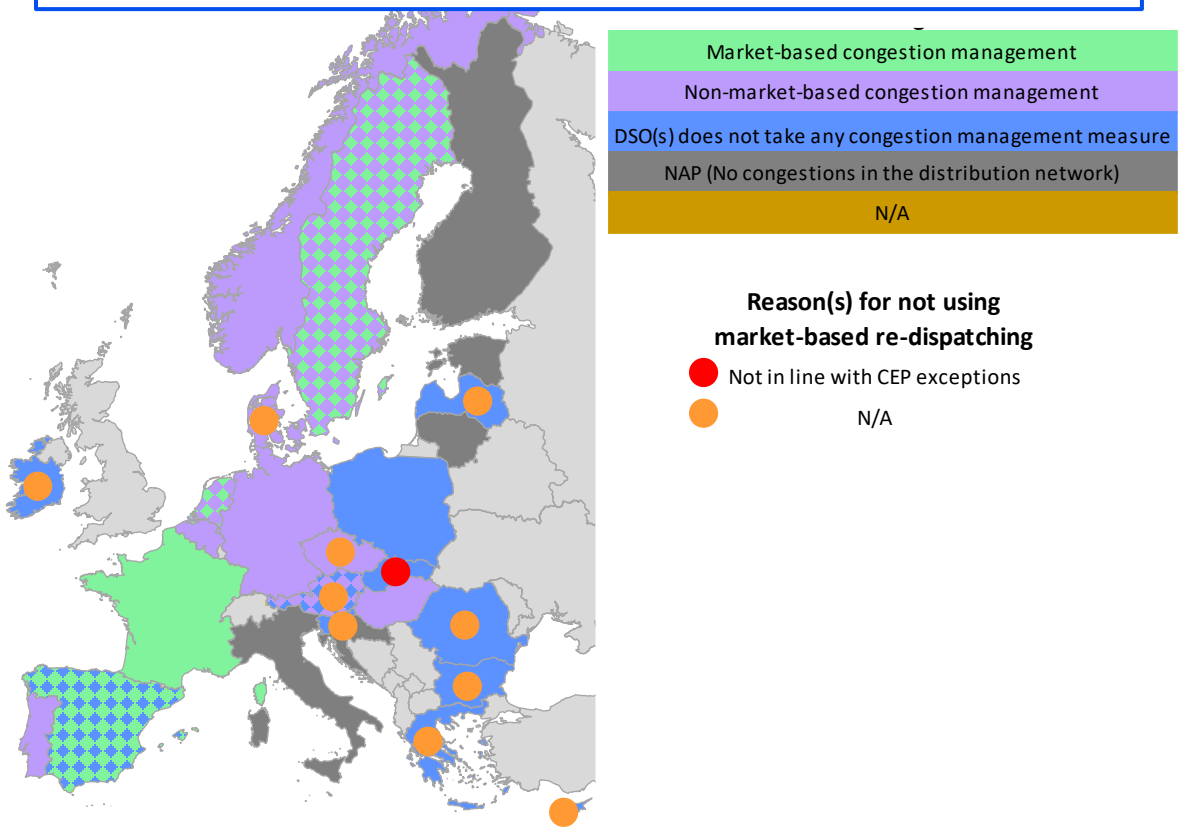
Is market-based re-dispatching typically used?

TSOs congestion management



DSOs congestion management



- No, congestion management measures are usually based on non-market-based procedures, especially at distribution level.
- In many Member States, NRAs cannot ensure whether the reasons for not using market-based re-dispatching, especially by DSOs, are in line with the exceptions allowed by the Clean Energy Package.

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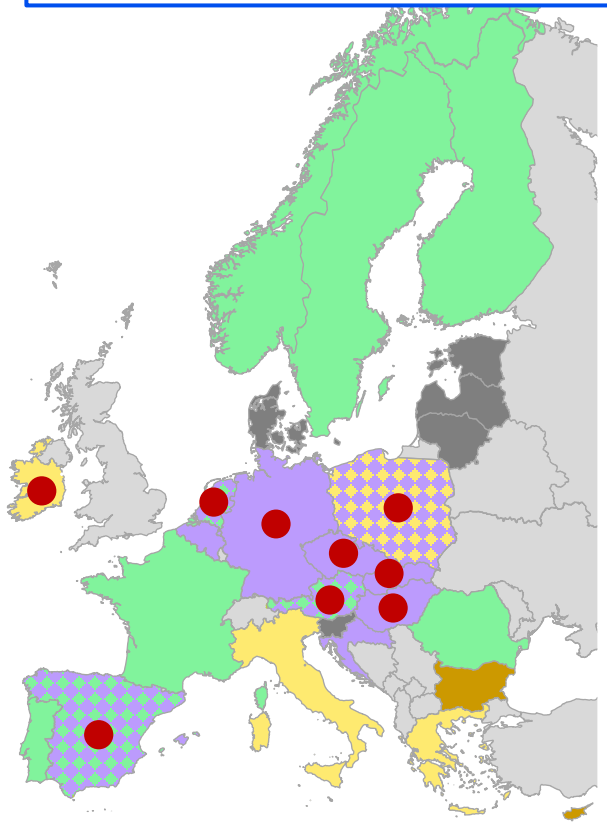
Difficulties for local markets to develop and mature

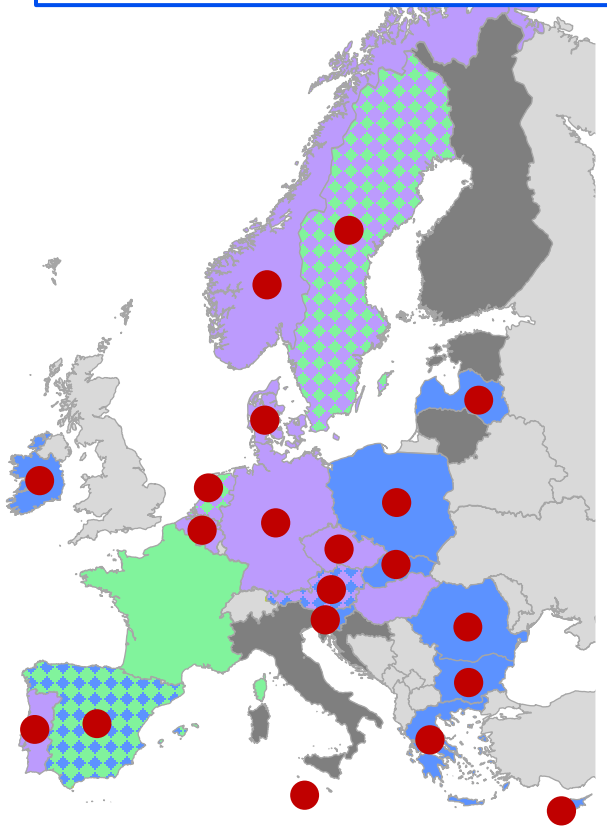
TSOs congestion management



- Market-based redispatching
- Non-market-based redispatching
- Integrated scheduling process
- NAP (No congestions in the transmission network)
- N/A

● **No iterative national reassessment process to review the exceptions from using market-based re-dispatching**

DSOs congestion management



- Market-based congestion management
- Non-market-based congestion management
- DSO(s) does not take any congestion management measure
- NAP (No congestions in the distribution network)
- N/A

● **No iterative national reassessment process to review the exceptions from using market-based re-dispatching**

Most Member States lack an iterative national reassessment process with a transparent decision-making procedure to review whether the exceptions from using market-based re-dispatching.
This hinders distributed energy resources from playing a role in “local markets”.

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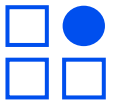
Focal topic: Network tariffs as facilitators or barriers for active customers and demand response

- **No study, pilot project or impact assessment** in most Member States to determine whether network charges for active customers must have some differentiation compared to non-active customers ► Hindering judgment whether network tariffs for active customers are cost-reflective and non-discriminatory.



- No kind of differentiation in network charges for active customers providing explicit demand response services to system operators in most Member States ► Any **differentiation/non-differentiation** should be justified by their corresponding network impact.

- **Exemptions, discounts and/or other differentiations** in the network tariffs for specific consumers (e.g. industrial customers) in multiple Member States. **The justification is often not reported or not network related** ► Potential distortion of cost signals or inefficiency in the development/operation of the power system.

Network design elements that are not cost-reflective and may undermine efforts to unlock flexibility in a few Member States:

- only energy-based transmission and/or distribution tariffs without time-differentiation
- net-metering (i.e. charging based on the difference between withdrawal and injection)

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A possible “To-do list” to address barriers…

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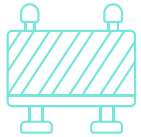
ACER´s main recommendations for governments, regulators and system operators to remove regulatory barriers and restrictions in the market design for demand response and other distributed energy resources

1 **Speed up** implementing regulatory changes to **remove persistent barriers**.

2 Set suitable **rules for new entrants**: clarify roles and responsibilities, define aggregation models, ensure data access, etc.

3 Ensure **open access** to all electricity markets and system operation services (balancing and congestion management services).

4 Provide the **technical means** and **incentives** by speeding up the rollout of smart meters, giving proper price signals in the electricity bills and raising consumer awareness.



5 Remove **restrictive requirements** to participate in balancing markets, capacity mechanisms and interruptibility schemes.

6 Ensure that **local markets for congestion management** have a chance to develop and mature. Define a transparent national process to assess when/where local markets may be implemented.

7 Facilitate new entrants' **access to retail electricity markets**.

8 Be **targeted, tailored and temporary** when considering retail price interventions.

9 Ensure **sufficient granular data** on all restrictions to demand response and other distributed energy resources.

Want to learn more ?

Check out our ACER Market Monitoring Report on Demand response and other distributed energy resources: what barriers are holding them back?

ACER
European Union Agency for the Cooperation of Energy Regulators

Wholesale electricity market monitoring in 2024


KEY DEVELOPMENTS

- Electricity consumption & generation
- Electricity prices
- GHG emissions

CROSS-BORDER CAPACITY

70% transmission capacity available for cross-zonal electricity trade

MARKET INTEGRATION

- Evolution of electricity markets
- Remedial actions

FLEXIBILITY & BARRIERS

- Barriers to distributed energy resources
- Bringing flexibility through the electricity markets

SUMMARY

- Presentation for ITRE committee
- Possible formal recommendation or opinion

[Learn more about our Market Monitoring Reports!](#)

ACER aims to continue monitoring all barriers to market integration.
This includes barriers to distributed energy resources and challenges to bring flexibility through the electricity markets.
Increasing the flexibility and interconnection of the EU electricity system is key to meet the EU Green Deal targets.

ACER
European Union Agency for the Cooperation of Energy Regulators

Have your say!

- On 19 December 2023 ACER launched a public consultation seeking feedback on the ACER 2023 Market Monitoring Report and aiming to gather input to bring more flexibility through the markets.

- ACER will use your input to:
  - ✓ Narrow the scope of ACER 2024 MMR: focus on the most relevant regulatory barriers and restrictions to distributed energy resources
  - ✓ Assess how to unlock flexibility from all resources through the markets
  - ✓ Help define the scope of this MMR in the upcoming years
- If you have any questions, please do not hesitate to contact us (ewpmm@acer.europa.eu).

Thank you for your attention

ACER

European Union Agency for the Cooperation of Energy Regulators

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@eu_acer
linkedin.com/in/EU-ACER/

COFFEE BREAK

The Network for Networks

VII. Opendatasoft & GEODE & E.DSO - The State of European Energy Data Maturity Report

The European Energy Data Summit

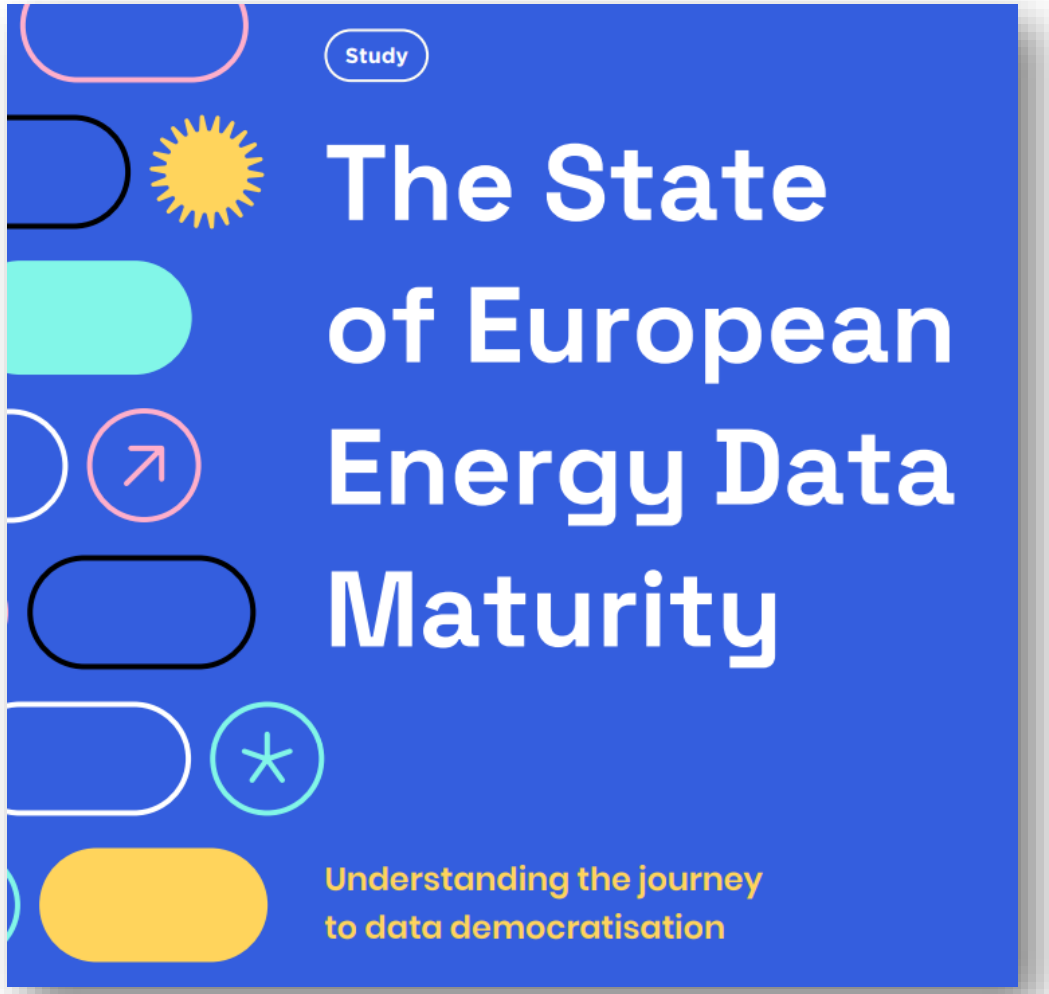
6 December, Brussels

192 registrants and 79 attendees

Attendees

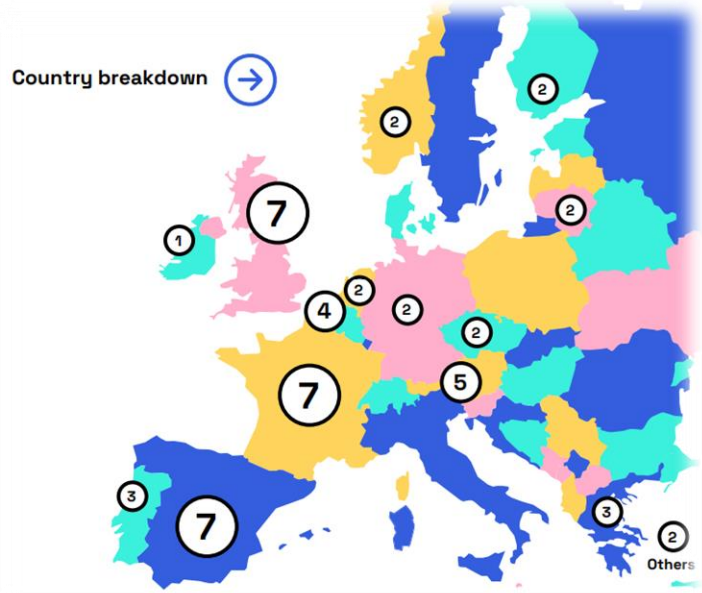
- 40% DSO
- 13% TSO
- 13% TSO/DSO
- 7% other EU organisations
- 27% others
- 11 speakers
- 40 Brussels based organisations

The State of European Energy Data Maturity



Based on a **survey**, with 51 responses (15 GEODE members)

The survey ran from **4th July** 2023 to **15th September** 2023

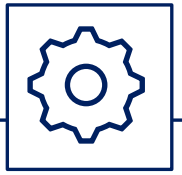


The State of European Energy Data Maturity – Key Findings

Energy players recognise the **benefit of using data: Education is no longer necessary** at a **senior level as organizations understand how data can solve** their pressing **strategic and operational challenges**

96% to **increase transparency** to strengthen relationships with external stakeholders

98% to ensure **digital transformation** and make **data-driven decision**



100% to become **more efficient** and deliver **affordable services**

80% to meet **regulatory requirements**

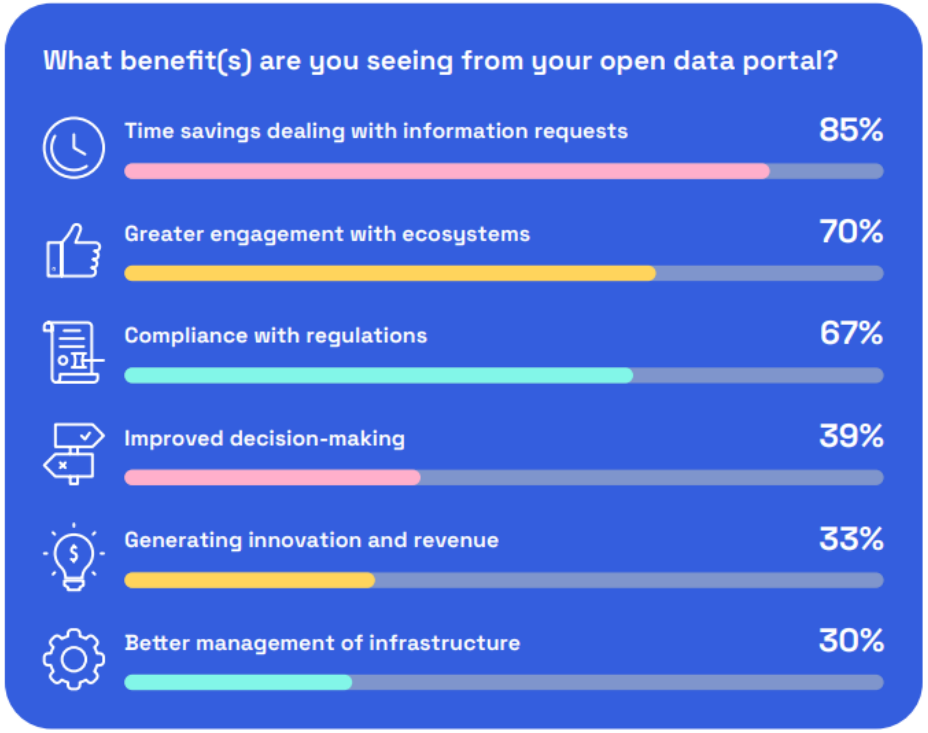
84% to meet the requirements to **decarbonise**

88% to encourage **innovation**

The State of European Energy Data Maturity – Key Findings

Organisational maturity is growing, but **organisations are not yet truly data-centric**

	Agree	Neither agree or disagree	Disagree
My organisation has the financial resources	76%	20%	4%
My organisation has the necessary tech and tools	65%	31%	4%
My organisation has the resources (skills, culture, governance)	59%	33%	8%



Data is primarily being used to **meet regulatory requirements, improve efficiency and deliver affordable services**, rather than to underpin decision-making, collaboration or innovation

The State of European Energy Data Maturity – Key Findings

When a decision is made in your organisation, what is it usually based on?

53%
Your people's experience of how your sector operates

33%
Thorough analysis of the data available to employees

14%
The perceptions of senior managers rather than hard facts

Challenges centre on culture, data quality and technology

- A **lack of data culture** & employee skills, combined with poor data quality and **overly-complex tools** threaten to **derail efforts to share data more widely**, both internally and externally and to accelerate the range of uses.
- **Energy players need to do more** to break down silos between departments and **educate employees** about how they can use data to drive improved company performance

The State of European Energy Data Maturity – Key Findings

Organisations have impressive plans for **future data use**

Which of these datasets do you expect to deliver value for your organisation in the near future when shared externally?	Yes	No
Real-time operational data around the functioning of distribution networks	82%	18%
Asset data showing how specific assets are performing or where they are located, as well as providing information required for maintenance	72%	27%
IoT-based sensor information monitoring key parts of network infrastructure and collecting environmental data	72%	27%
Customer data, including usage via smart meters/meter readings, along with personal identifiable information used for billing and marketing	77%	23%
Partner data, such as local authority data about new housing or producer data about new generating capacity, which all feeds into forward planning	69%	31%

Respondents tick all that apply

What elements to increase data use do you have in place now, and what are your plans for the next 24-36 months?	Already in place	Planned for next 2-3 years
Define and implement an overall data use strategy	45%	47%
Create new roles related to data sharing/use	33%	53%
Increase financial investments in data sharing tools	27%	51%
Specifically train employees on better use of data	20%	61%
Create an internal data sharing space	49%	41%
Create an external data sharing space for partners	43%	39%
Create an external open data project	33%	27%

Companies recognise what they need to do to **accelerate data usage** and the shift to data democratisation.

They have a comprehensive range of **plans** for internal & external data usage to be implemented for the **next 2-3 years**

The State of European Energy Data Maturity – Lessons Learnt

Data democratization is the **process of enabling everybody to access, understand and use data comfortably**, without requiring specialist skills or tools

Companies see the **benefits of using data** in multiple areas

Energy players recognise the benefit of using data 1

Progress in the energy sector involves **strategic investments & leadership** to build a data strategy. **Data maturity** focused on internal use hinders collaboration across the energy ecosystem

Organisational maturity is growing 2

The impact on **decision making** and **collaboration**

The main challenges to achieving data democratisation 3

Increasing maturity through **more formal sharing**

Organisations have impressive plans for future data use 4

The State of European Energy Data Maturity – Recommendations

Understanding **data maturity levels** & strive to improve: Analysts, consultants and governments have created a range of data maturity models, which we've synthesized into a **four-stage process**

Organization does **not see data as important**

DATA LAGGARDS 1

Senior level understanding of importance of data, but **no formal strategy**

DATA AWARE 2

Overall **strategy and funding** in place, including a **clear data leader**

DATA DEVELOPING 3

Data is available at scale **inside and outside the organisation**

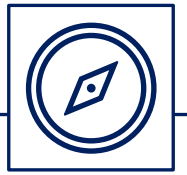
DATA CENTRIC 4

The State of European Energy Data Maturity – General Recommendations

Understanding **maturity levels** & strive to improve

Centralise sharing to break down portals

Always consider **privacy and security**



Data is a journey, not a destination

Learn from others

Be **user-centric**

Show the **benefits**

Make data **appealing**

Widen **ecosystems**

The Network for Networks

VIII. Digitalisation

Gridfy

Powering the energy transformation of the future

GEODE | WG Innovation & Development 01/02/2024

February 2024

Smart Grid Key Performance Indicators

(1) smart_grid_key_performance_indicators_a_dso_perspective-2021-030-0129-01-e-h-B85F16BF.pdf (eurelectric.org)

Smart Grid Key Performance Indicators

THE SIX COMMON CHALLENGES	KPI 1: System Observability	KPI 2: System Controllability	KPI 3: Active System Management	KPI 4: Smart Grid Planning	KPI 5: Transparency in Data Access and Sharing Between Relevant Stakeholders	KPI 6: Local Flexibility Markets and Customer Inclusion	KPI 7: Smart Asset Management
Cooperation in network operation	X	X	X		X	X	
Cooperation in planning the networks				X			X
Exchange all necessary information regarding the long-term planning of network investments			X	X			X
Exchange all necessary information regarding the generation assets and demand side response for the daily operation of their networks	X		X		X	X	
Cooperate with each other in order to achieve coordinated access to resources	X		X		X	X	
Ensure cost-efficient, secure and reliable development and operation of their networks	X			X	X	X	X

(1) smart_grid_key_performance_indicators_a_dso_perspective-2021-030-0129-01-e-h-B85F16BF.pdf (eurelectric.org)

Smart Grid Key Performance Indicators

(1) The **Electricity Directive** tasks the NRAs to develop a methodology that can help to monitor and target the neccesary infrastructure upgrade, in the *Article 59 (l):*

The regulatory authority shall have the following duties…:

(l) monitoring and assessing the performance of transmission system operators and distribution system operators in relation to the development of a smart grid that promotes energy efficiency and the integration of energy from renewable sources, based on a limited set of indicators, and publish a national report every two years, including recommendations;

(1) smart_grid_key_performance_indicators_a_dso_perspective-2021-030-0129-01-e-h-B85F16BF.pdf (eurelectric.org)

Smart Grid Key Performance Indicators

In the previous work performed in 2021 by ENTSO-E and the DSO associations of CEDEC, E.DSO, EUROELECTRIC and GEODE, 7 Smart Grids Indicators have been identified:

SGI1: System Observability

SGI2: System Controllability

SGI3: Active System Management

SGI4: Smart Grid Planning

SGI5: Data Access and Sharing

SGI6: Local Flexibility Markets

SGI7: Smart Asset Management

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SGI4: Smart Grid Planning

SGI5: Data Access and Sharing

SGI6: Local Flexibility Markets

SGI7: Smart Asset Management

SGI Definition

To measure the capability to keep under “proper monitoring” of the relevant nodes / lines of the grid.

- The measurements are performed in the most significant nodes/lines (critical or concentrated areas, high energy flows, etc.)
- Allow the determination of the significant electrical magnitudes: voltage, current, active and reactive power, frequency, etc.

Smart Grid Key Performance Indicators

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SGI3: Active System Management

SGI4: Smart Grid Planning

SGI5: Data Access and Sharing

SGI6: Local Flexibility Markets

SGI7: Smart Asset Management

SGI Definition

To measure the capability to keep the grid under “proper control”

- Relevant / critical grid equipment /assets cand be effectively controlled
- All the lines and nodes do not have the same importance (it’s not the same a line that provides energy to a town or a line that provides it to a single user)

Smart Grid Key Performance Indicators

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SGI3: Active System Management

SGI4: Smart Grid Planning

SGI5: Data Access and Sharing

SGI6: Local Flexibility Markets

SGI7: Smart Asset Management

SGI Definition

To measure the capability to perform active management of the grid in a daily / short-term operation

For example, voltage regulation, grid reconfiguration, islanding, etc.

Smart Grid Key Performance Indicators

In the previous work performed in 2021 by ENTSO-E and the DSO associations of CEDEC, E.DSO, EUROELECTRIC and GEODE, 7 Smart Grids Indicators have been identified:

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SGI3: Active System Management

SGI4: Smart Grid Planning

SGI5: Data Access and Sharing

SGI6: Local Flexibility Markets

SGI7: Smart Asset Management

SGI Definition

To measure the capability to use desing and planning procedures to fulfil actual grid needs in medium and long-term, guaranteeing cost efficiency in grid updating and most efficient use of existing assets.

Smart Grid Key Performance Indicators

In the previous work performed in 2021 by ENTSO-E and the DSO associations of CEDEC, E.DSO, EUROELECTRIC and GEODE, 7 Smart Grids Indicators have been identified:

SGI1: System Observability

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SGI4: Smart Grid Planning

SGI5: Data Access and Sharing

SGI6: Local Flexibility Markets

SGI7: Smart Asset Management

SGI Definition

To measure the capability to make accesible and share data between stakeholders

Data can be used for different purposes: grid observability, new services, settlements, energy managements

Smart Grid Key Performance Indicators

In the previous work performed in 2021 by ENTSO-E and the DSO associations of CEDEC, E.DSO, EUROELECTRIC and GEODE, 7 Smart Grids Indicators have been identified:

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SGI4: Smart Grid Planning

SGI5: Data Access and Sharing

SGI6: Local Flexibility Markets

SGI7: Smart Asset Management

SGI Definition

To measure how much the customer is involved in grid management and enabled to provide services to the grid and to measure how much the local flexibility market / customer agreements are implemented and how much it can contribute to grid (and system) management

Smart Grid Key Performance Indicators

In the previous work performed in 2021 by ENTSO-E and the DSO associations of CEDEC, E.DSO, EUROELECTRIC and GEODE, 7 Smart Grids Indicators have been identified:

SGI1: System Observability

SGI2: System Controllability

SGI3: Active System Management

SGI4: Smart Grid Planning

SGI5: Data Access and Sharing

SGI6: Local Flexibility Markets

SGI7: Smart Asset Management

SGI Definition

To measure the use of advanced asset management strategies, tolos and methods focusing on assets condition monitoring and risk mitigation

Smart Grid Key Performance Indicators

In the previous work performed in 2021 by ENTSO-E and the DSO associations of CEDEC, E.DSO, EUROELECTRIC and GEODE, 7 Smart Grids Indicators have been identified:

SGI1: System Observability

SGI2: System Controllability

SGI3: Active System Management

SGI4: Smart Grid Planning

SGI5: Data Access and Sharing

SGI6: Local Flexibility Markets

SGI7: Smart Asset Management

SGI8: Customer Engagement

SGI Definition **by Gridfy**

To measure the capability of implemeting measurings and tolos to improve user satisfaction through process automation, energy education and the status of their electricity in a transparent and honest way

How can we measure it?

$$KI\ 1.2\ ObservabilityNRT = \frac{1}{\sum_{i=8}^{12} w_{NRTi}} \sum_{i=8}^{12} (KI\ 1.i \cdot w_{NRTi})$$

$$KI\ 1.1\ ObservabilityRT = \frac{1}{\sum_{i=3}^{7} w_{RTi}} \sum_{i=3}^{7} (KI\ 1.i \cdot w_{RTi})$$

$$\textbf{Transparency Data Access Sharing} = \text{TDAS} \cdot \frac{\sum_{i=1}^{9} (KI\ 5.i \cdot w_{TDASi})}{\sum_{i=1}^{9} w_{TDASi}}$$

$$KI\ 2.2\ ControllabilityDER = \frac{1}{\sum_{i=7}^{11} w_{CDERi}} \sum_{i=7}^{11} (KI\ 2.i \cdot w_{CDERi})$$

$$KI\ 2.1\ ControllabilityDSOAsset = \frac{1}{\sum_{3=1}^{6} w_{CDSOi}} \sum_{i=3}^{6} (KI\ 2.i \cdot w_{CDSOi})$$

$$\textbf{Active System Management} = ASM \cdot \frac{\sum_{i=1}^{7} (KI\ 3.i \cdot w_{ASMi})}{\sum_{i=1}^{7} w_{ASMi}}$$

$$\textbf{Smart Grid Planning} = AGAA \cdot [KPI\ 1(System\ Observability) \cdot w_{AGAA1} + ActiveDesignCapability \cdot w_{AGAA2}] / \sum_{i=1}^{2} w_{AGAAi}$$

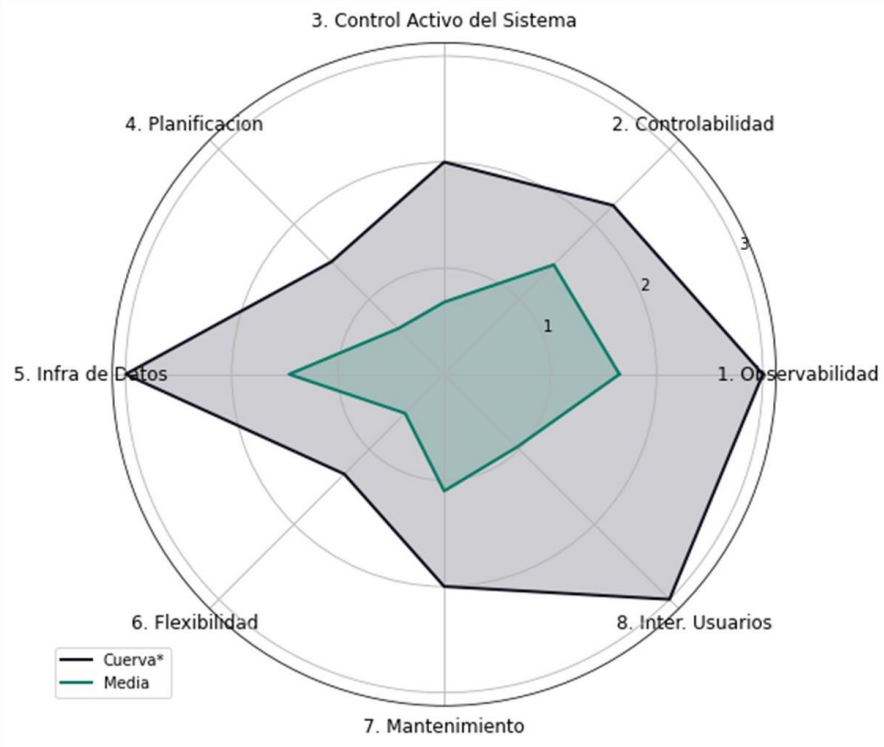
Gridfy Methodology

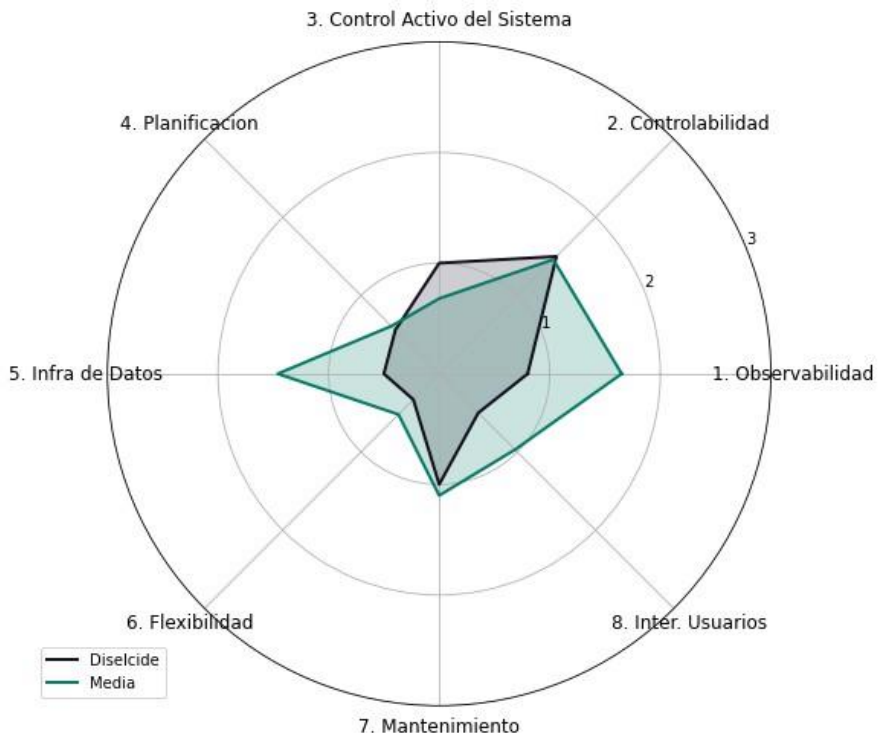
The calcuation of each SGI is not an easy task, and depends a lot on the type of grid and their particularities. Gridfy has developed their own methdology, bases on those SGIs, in order to assess the digitalisation status of a distribution grid with a “simple” evaluation, for instance, for the first SGI:

SGI1: System Observability

Level 1	Level 2	Level 3
- To have data collected automatically of all the users of the grid - To have hourly data collected automatically of the boundary points of the grid (distribution-distribution and generation-distribution)	- To have visibility of the electrical variables (voltajes, currents, etc.) in real time (<15 min) in most of the secondary substation - To know the losses, in HV and LV - To know in which line and pase is connected each user	- To have visibility of the electrical variables in each LV line and phase - To have fault location and isolation systems - To automate the decisions in each secondary substation to improve the quality of the supply

Gridfy Radar





Gridfy Meth

5 → SGI1: System Observability*

Select all those with which you feel most identified.

Choose as many as you like

- A I have smart meters in the 95% of the users of my grid
- B I have electrical measurements close to real time in medium voltage in most of the secondary substations
- C I have hourly load curves (active and reactive power) of the users and the boundary potins of my grid, at leats, and I recieve it at leats, one per day
- D I have electrical measurements close to real time in low voltage per feeder and phase in most of the secondary substations
- E I have tools to simulate power flows in my grid and its behaviour with new users (consumption, generation, electrical vehicle, etc.)
- F I have tools that allow me to know in which feeder and phase are connected the LV users

Powe

6 → SGI2: System Controllability

*

Select all those with which you feel most identified.

Choose as many as you like

- A I can control remotely the main nodes of my grid
- B I have SCADA to control and monitor my medium voltage grid
- C I change the operation of my grid depending on the consumption and generation of the users
- D I have SCADA to control and monitor my low voltage grid
- E I have tools to optimise the voltage regulators (TAP) in the secondary substation
- F I have tools for self-healing and auto-reconfiguration in a fault event
- G I don't really have tools to improve the controllability of my grid

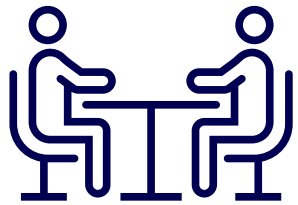
Pow

Gridfy Meth Link

The Network for Networks

Roundtable discussion : DSOs & Digitalisation - How to achieve the optimal status?

Roundtable discussion : DSOs & Digitalisation - How to achieve the optimal status?

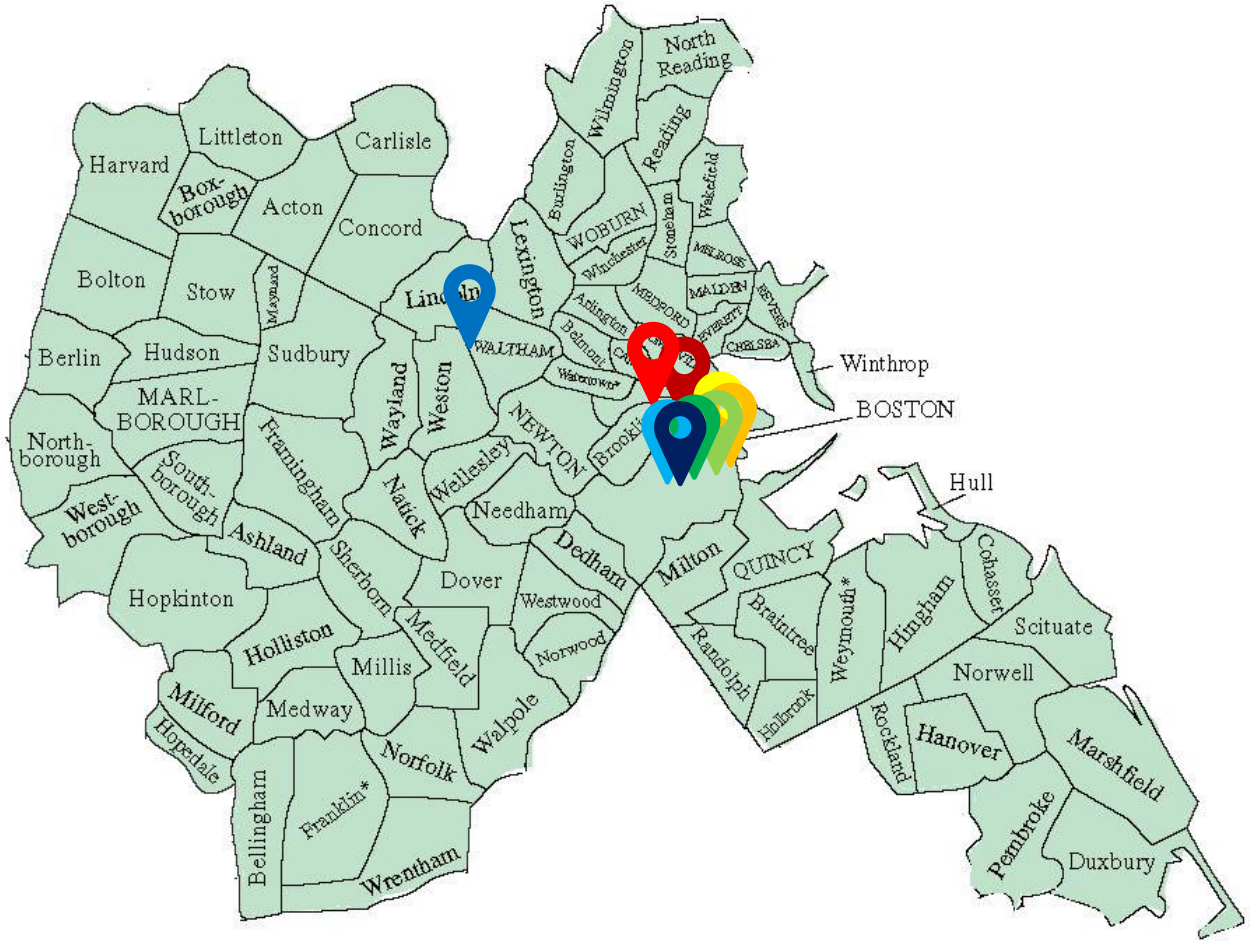


- What is the current level of digitalisation of your grid?
- What do you think is the ideal level of digitalisation of your grid?
- If you have to develop a strategy, could you identify 3 important milestones in the digitalisation journey?
- What benefits do you see that digitalisation is bringing your company?
- What challenges or barriers have you encountered in the process of digitalisation of your grid?

The Network for Networks

IX. GEODE Study Trip

Boston, Massachusetts, USA



Massachusetts Institute of Technology (MIT)
Harvard University
Department of Public Utilities
Massachusetts Clean Energy Center
Grid Modernization Advisory Council
Boston Community Choice Electricity
Eversource Energy
National Grid
Avangrid

Boston, Massachusetts, USA

UNIVERSITIES

Massachusetts Institute of Technology (MIT)

Harvard University

REGULATORY

Department of Public Utilities (DPU)

Massachusetts Clean Energy Center (MassCEC)

Grid Modernization Advisory Council (GMAC)

Boston Community Choice Electricity

UTILITIES

National Grid

Eversource Energy

Avangrid

INNOVATION

Vineyard Wind One

Bay Transportation Authority (MBTA)

Microgrid projects

Medway Grid Energy Storage System

Massachusetts Institute of Technology

77 Massachusetts Ave, Cambridge, MA 02139, United States

- Considered by numerous rankings as **one of the best and most prestigious universities** at the international level.
- The **MIT Department of Electrical Engineering and Computer Science** brings the world's most brilliant faculty and students together to innovate and explore. From foundational hardware and software systems, to cutting-edge machine learning models and computational methods to address critical societal problems.
- The **MIT Energy Initiative** is MIT's **hub for energy research, education, and outreach**. Their mission is to develop low- and no-carbon solutions that will efficiently meet global energy needs while minimizing environmental impacts and mitigating climate change.
- The **Future Energy Systems Center** examines the accelerating energy transition as emerging technology and policy, demographic trends, and economics reshape the landscape of energy supply and demand.

Massachusetts Institute of Technology

MIT Energy Initiative

Harvard University

Massachusetts Hall, Cambridge, MA 02138

- Private **Ivy League research university** in Cambridge, Massachusetts. Founded in 1636 as Harvard College and oldest institution of higher learning in the United States.
- Harvard University established the **Visitor Center** in 1962 as the front door to the University, where students greet visitors from all over the world, answer questions about campus, and provide official tours of Harvard.
- The **Harvard University Center for the Environment**, a center of the Salata Institute for Climate and Sustainability, is an interdisciplinary hub of research, learning, and collaboration for all things related to the environment on campus and beyond. Some of its research areas include **Climate and Energy**.

HARVARD UNIVERSITY

Harvard University
Center for the Environment

Department of Public Utilities (DPU)

1 South Station, 3rd floor, Boston, MA 02110

- **Regulator** of Massachusetts.
- Adjudicatory agency overseen by a three-member Commission responsible for **oversight of investor-owned electric power, natural gas, and water utilities** in the Commonwealth.
- Charged with developing alternatives to traditional regulation, **monitoring service quality, regulating safety in the transportation and gas pipeline areas**, and the siting of energy facilities.
- Its mission is to **ensure that consumers' rights are protected**, and that utility companies are providing the **most reliable service at the lowest possible cost**.

Massachusetts Clean Energy Center

294 Washington St Suite 1150, Boston, MA 02108, United States

- **State economic development agency** dedicated to accelerating the growth of the Massachusetts clean energy sector.
- Fosters cutting-edge clean transportation technologies, enables new finance and business models for electric vehicle deployment, and accelerates the growth of clean transportation companies in Massachusetts.
- **Supports technologies** that enable a transition to a modernized and smarter grid, **innovative business models**, and market development policies for delivering resiliency, risk management, and clean energy.
- The **Northeast Clean Hydrogen Hub partnership**, formed in March 2022, included the States of Connecticut, New York, New Jersey, the Commonwealth of Massachusetts, the States of Rhode Island and Maine. The proposal represents a **$3.62 billion investment** and includes over one **dozen projects across seven Northeast states** that advance clean **electrolytic hydrogen production, consumption, and infrastructure projects**.
- The **Massachusetts Clean Energy Center** and Massachusetts Department of Energy Resources are working with the New York State Energy Research and Development Authority, as well as agencies in Connecticut, New Jersey, Rhode Island and Maine.

Grid Modernization Advisory Council (GMAC)

100 Cambridge Street, 9th Floor, Boston, MA 02114.

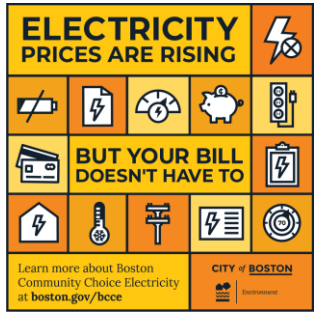
- **Reviews and provides recommendations** on Massachusetts **investor-owned electric distribution companies**' (EDCs) **electric-sector modernization plans** (ESMPs).
- It is an integral part of increasing transparency and stakeholder engagement in the **grid planning process**. The GMAC provided its recommendations on the EDCs' first draft ESMPs on November 20, **2023**.
- The Governor appoints GMAC members who serve for five-year terms. The Commissioner of the DOER chairs the GMAC, which is supported by DOER staff. GMAC members, voting and non-voting, represent a wide array of organizations and interests.

Boston Community Choice Electricity

75 Arlington Street, 7th Floor, Boston, MA 02116.

- Boston Community Choice Electricity (BCCE) is a **municipal aggregation program**. Through this program, a municipality (town or city) **purchases electricity** in bulk from a competitive supplier **on behalf of the residents and businesses** within the community.
- The Program allows the City to secure electricity at a competitive rate. By using the City's collective buying power, they aim to provide **affordable and renewable electricity** to the program's customers
- BCCE gives Bostonians greater control over the electricity that powers their homes, places of worship and small businesses.

CITY of BOSTON



Eversource Energy

800 Boylston St, Boston, MA 02199.

EVERSOURCE

- Founded in 1966, Eversource Gas and Energy generates, **transmits and distributes electricity and natural gas**. In 2015, the company and all its subsidiaries rebranded themselves as "Eversource Energy".
- Currently serves nearly **4.4 million electric and natural gas customers** in New Hampshire, Massachusetts, and Connecticut.
- Focuses include maintenance activities, station enhancements, transmission and distribution line upgrades and more. Some **projects in Boston** include:

  - Andrew Square to Dewar Street Reliability Project - A new transmission line will address reliability concerns in the Boston area.

  - Hyde Park to Dorchester Supply Initiative - There is an imminent need for electrical infrastructure in Boston to enable clean energy delivery and meet electrification goals.

  - Mystic to East Eagle to Chelsea Project - Two new transmission lines have been constructed and a new substation will be built to increase electric supply in the area.

  - Seaport Transmission Line Relocation Project - Relocate two existing transmission lines to accommodate the new alignment of Northern Avenue in Boston's Seaport District.

National Grid

170 Data Dr, Waltham, MA 02451.

- One of the largest investor-owned energy companies in the US — **serving more than 20 million people** throughout New York and Massachusetts.
- They aim to transform their electricity and natural gas networks with smarter, cleaner, and more resilient energy solutions to meet the goal of reducing greenhouse gas emissions. They work with stakeholders to promote the development and implementation of more sustainable, innovative and affordable energy solutions.
- Some of the most **innovative and state-of-the-art technologies** they're trialling or adopting, to solve issues or evolve their electricity systems.
    1) Robot dog: sniffs out faults and keeps humans safe.
    2) Autonomous drones: performing pilot-free infrastructure inspections of overhead wires, pylons and substations.
    3) LineVision: helping up to 40% extra flow through power lines.
    4) AI satellite technology: supporting our biodiversity and natural environment.
    5) Molten metal manipulation: Stopping SF6 leaks without pausing power.
    6) Solar Grazing: a natural way to keep solar panels working effectively.

Avangrid

Avangrid A member of the Iberdrola Group

GEODE

75 Arlington Street, 7th Floor, Boston, MA 02116.

- Part of the **Iberdrola Group**, Avangrid Networks **owns and operates eight electric and natural gas utilities**, serving **more than 3.3 million customers** in New York and New England.
- Leading sustainable energy company transitioning America toward a clean and connected future headquartered in Orange, CT, and has a footprint in 24 states with $41 billion in assets.
- The Berkshire Gas Company was established in 1853, Berkshire Gas operates 738 miles of natural gas distribution pipeline, serving approximately 40,600 customers across 20 Western Massachusetts communities.
- Avangrid as part of a 50-50 Joint Venture with Copenhagen Infrastructure Partners, is constructing the **first large-scale offshore wind project** in the United States, **Vineyard Wind One**. The project is located 14 miles south of Martha's Vineyard, off the coast of Massachusetts.

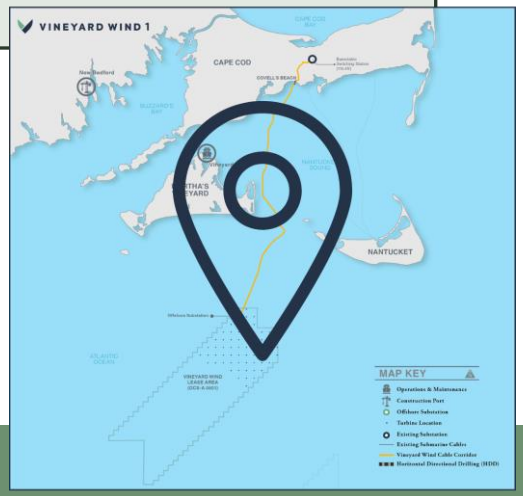
VINEYARD WIND

Vineyard Wind

14 miles south of Martha's Vineyard, off the coast of Massachusetts.

- **First large-scale offshore wind project** in the United States, **Vineyard Wind One**.
- The project is currently under construction, and on track to achieve **full commercial operations in 2024**, delivering clean energy to **400,000 homes and businesses** in the Commonwealth, **reducing carbon emissions** by over **1.6 million tons** per year.
- Vineyard Wind 1 will consist of an array of 62 wind turbines, spaced 1 nautical mile apart on an east-west and north south orientation. The turbines are General Electric Haliade-X turbines, each capable of generating 13 megawatts of electricity.
- From the onshore cable landing site, the cables will be **installed underground along public roads to an onshore substation** in the village of Hyannis. The Vineyard Wind 1 onshore substation will be adjacent to an existing Eversource substation.

VINEYARD WIND



Massachusetts Bay Transportation Authority (MBTA)

45 High St, Boston, MA 02110.

- The **Massachusetts Bay Transportation Authority**, more commonly known as the T, is one of the oldest **public transit systems** in the United States. It's also the largest transit system in Massachusetts.
- As of January 2021, 100% of the MBTA's system is **powered by certified renewable electricity**. Additionally, they **have on-site energy generation via wind turbines and solar arrays**.
- The MBTA's Environmental Management Sustainability Policy lays out the guiding principles to reduce greenhouse gas (GHG) emissions and other air quality impacts, and diligently maintain and exceed environmental compliance at our facilities.
- The MBTA has partnered with True Green Capital to install, operate, and maintain solar canopies at MBTA parking lots. This is in addition to the small scale solar energy arrays on MBTA property at Orient Heights and Braintree stations. The MBTA is also working toward adding solar arrays to new capital projects like Quincy Bus Facility and Riverside parking garage.

Massachusetts Bay Transportation Authority

Microgrid projects in Massachusetts

Boston, Worcester and Chelsea, Massachusetts.

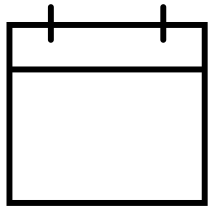
- **RUN-GJC Chinatown – Boston**: The proposal includes eight affordable housing complexes. The project team is strongly committed to modeling a grassroots-driven microgrid project which seeks to address energy justice challenges by engaging politically and economically marginalized communities who are disproportionately affected by high energy costs and the impacts of climate change.
- **CoMWIT - Boston:** This proposal involves a community microgrid centered on Wentworth Institute of Technology campus, serving a collection of university students with 72 percent of students requiring need-based scholarships. Population density in neighborhoods adjacent to the project continue to increase, making the project an opportunity to address capacity issues, potentially saving on utility infrastructure upgrade costs.
- **Community Clean Energy Project (CCEP) – Worcester:** The CCEP seeks to integrate local renewable energy resources with existing community generation assets to provide lower cost electricity, as well as strengthen the energy infrastructure and resiliency, of the Main South neighborhood, an economically disadvantaged community. The project also seeks to create a replicable community energy model by creating a membership-based cooperative.
- **RUN-GJC - Chelsea**: The proposed project seeks to assess a community-led microgrid in low-income neighborhoods in the highly-diverse and densely populated city of Chelsea. The project includes important critical facilities such as public schools, a health care facility, and the New England Produce Center, the second largest produce distribution center in the country.

Medway Grid Energy Storage System

Milford Street, Medway, MA.

- The **Medway Grid Energy Storage System** will use a group of rechargeable batteries to store excess electrical energy at times of low demand, which can then be released later in response to increased demand.
- It will enhance the flexibility and reliability of the grid without creating emissions or waste products.
- System Details:
  Generation: 250 MW/2 Hours
  Parcel Area: 10.6 Acres
  Location: Milford Street, Medway, MA
  Located strategically near an existing utility substation and transmission right of way.

Possible dates



1) Monday **23 September 2024** – Friday **27 September 2024**
2) Monday **28 October 2024** – Friday **1 November 2024**

- Duration: **4/5 working days**
- Other events close to the date:
  - ASEME Annual Meeting (Spanish members): **3 – 4 October 2024**
  - ENLIT: Milan **22 – 24 October 2024**
  - GEODE Autumn Seminar: **11 – 12 November 2024**

LUNCH BREAK

The Network for Networks

XI. Energy Sharing – GEODE Fact-sheet

Energy Sharing – Follow up Meeting 11 October

KEY ELEMENTS

- **Grid cost not necessarily benefit from Energy Sharing** – e.g. the Sun in Northern Europe is mostly shining in the summer – not in the winter when we have highest consumption, therefore collective self consumed energy will not reduce the load in the grid (and thereby not the grid cost), PV will only reduce the consumption in the summer, when the consumption is low anyway (and the capacity in the grid is high)
- **Virtual Energy Sharing** - If you are virtually adjusting meter values based on sharing, you are at the same time removing the connection between the physical flow of energy and the payment for it. If sharing is done in a „local area“ – me and my neighbor – the problem is still there, but smaller than sharing over distances. If the virtual correction on meter values is only done on energy (net grid tariffs) this problem will not occur
- **Grid tariffs** – If you do not reduce grid cost, the benefit from sharing should only be given on electricity price/energy
- **Harmonisation of procedures** between adminitrations, DSOs, installers
- **Data exchange** between actors, consumers, DSOs, suppliers
- **Establishment of an „energy sharing coordinator**“ for communication with DSOs, suppliers (e.g. communication of energy sharing agreement)
- **Permitting**

GEODE Fact-sheet on Energy Sharing Drafting Team

Volunteers from WG Regulation

- Lisbeth Vingås (Norway)
- Per Everhill (Sweden)

Volunteers from WG Innovation & Development

The Network for Networks

XII. Tech corner - Using energy data to drive energy system decarbonisation

Using energy data to drive energy system decarbonisation

GEODE Innovation & Development Working Group

Yiu-Shing Pang

UK Power Networks
Delivering your electricity

INVESTORS IN PEOPLE™ We invest in people Platinum

NES NATIONAL EQUALITY STANDARD

THE UK'S TOP 5 BEST BIG COMPANIES TO WORK FOR 2023

About UK Power Networks

8.3M homes and businesses

28% of UK Total

9.3GW+ Distributed Generation Connected

32% of UK Total

16GW+ Peak Demand

28% of UK Total

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UK Electricity System 2022

+5.6%

Total electricity generated in 2022 (326TWh)

-3.9%

Overall load reduction in 2022

41% (135TWh)

Renewable Generation +10% on 2021

+25% (80TWh)

Record levels of wind generation

56%

Of UK energy mix was from low carbon sources

5.3 TWh

UK net export- first time in 40y

By 2035 the UK needs 150GW of low carbon generation to run the system in Net Zero mode, serving 65GW. There is 340GW in the accepted que to connect, where we only require an additional 100GW

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Situation- Renewables at UKPN level

Decarbonising Electricity

9.4GW of distributed generation connected, **7.3GW** renewable

10GW DG accepted, not yet connected

410MW of storage connected, **3.3 GW** accepted and yet to connect

National ambition to run the system in Low carbon mode by 2035

Decarbonising Transport

440k Plug-in vehicles charging off our network today, volumes multiplying annually

Forecasting **2.6m** EVs by 2030

22,500 Public charge points, **36%** of the country

172MW of Hydrolyser applications

Decarbonising Heat

30,000 heat pumps connected to our networks today

2025 Future homes standard will drive volumes of heat pumps, by 2028 gov expect **800,000** a year nationally

By 2030 we expect **712k – 1.1m** to connect to our network

Demand of 15GW

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Challenges driven by DER uptake

Challenges
Limited capacity for DER connections (driven by Solar growth)
Lack of visibility at LV networks
Dynamic network
Rush for storage
Ambitious EV targets

UK Power Networks DSO Strategy

1. Facilitate cheaper and quicker connections using proven innovation
Continue rollout of Flexible DG that uses Active Network Management

2. Use customer flexibility as an alternative to network upgrades
Run market tenders for flexibility services such as Demand Side Response

3. Develop enhanced System Operator capabilities
Develop TSO – DSO Commercial Framework, DER Dispatch capability and readiness for smart meters

4. Collaborate with industry to enable GB wide benefits
Actively participate in industry forums to make this transition a reality

5. Prepare and facilitate the uptake of Electric Vehicles
Enable connections using smart solutions and ensure business readiness

We set out our strategy to transition to a Distribution System Operator in July 2017

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Open data

Deliverables

- Across the business in various areas – regulatory reporting, connections, environment,
- Regulatory incentive revenue
- Usership – monthly users: 4,400 vs 1,750 (2023 vs 2022)

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Data

58 records

Active filters Clear all

Portal Status 3 - Published, Open

Filters

Search records...

Triage Outcome

1 - Open	57
2 - Public with some restrictions	1

Portal Status

0 - Awaiting Data	4
1 - Awaiting Upload	1
2 - Published, Test Environment	8
3 - Published, Open	58
4 - Published, Restricted	3
6 - Not Published	17

Data Roadmap and Tracker

Edit

Information | Table | Analyze | Export | API

	ID	Dataset Title	Description	Triage Outcome	Portal Status	Estimated/Actual Date for Publi...	Refresh Rate	Raw/Processed	Link to Dataset	Link to Triage
1	OD001	Areas of Outstanding Natural Beaut...	Shapefile showing the areas within ...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
2	OD006	UK Power Networks primary substati...	A shapefile containing the approxim...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
3	OD007	Long Term Development Statement ...	Long Term Development Statement ...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
4	OD008	Long Term Development Statement ...	This is Table 2a from our current LTD...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
5	OD009	Long Term Development Statement ...	This is Table 2b from our current LT...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
6	OD010	Long Term Development Statement ...	This is Table 3a from our current LTD...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
7	OD011	Long Term Development Statement ...	This is Table 3b from our current LT...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
8	OD012	Long Term Development Statement ...	Long Term Development Statement ...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
9	OD013	Long Term Development Statement ...	This is Table 4b from our current LT...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
10	OD014	Long Term Development Statement ...	Long Term Development Statement ...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
11	OD015	Long Term Development Statement ...	Long Term Development Statement ...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
12	OD016	Long Term Development Statement ...	Long Term Development Statement ...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
13	OD017	Long Term Development Statement ...	Long Term Development Statement ...	1 - Open	3 - Published, Open	2022-11-30 00:00:00	Bi-annual (May and Nov)	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
14	OD018	Power Quality Data	This dataset contains data captured ...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Annual	Raw	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
15	OD019	Local authorities within UK Power N...	Shapefile showing local authority bo...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
16	OD021	Embedded Capacity Register	The Embedded Capacity Register (E...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Monthly	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
17	OD022	Low Carbon Technologies (LCT) con...	Volume of Low Carbon Technologies...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Monthly	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
18	OD024	Earthing EPR Data for Grid and Prim...	The EPR dataset includes the fault c...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Weekly	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
19	OD025	Earthing Soil Data for Grid and Prim...	The soil dataset includes multi-layer ...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Weekly	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
20	OD026	Earthing Fault Level Data for Grid an...	The earthing fault level dataset inclu...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Weekly	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
21	OD030	Key characteristics of active Grid an...	List of Active Grid and Primary Sites ...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
22	OD031	UK Power Networks Licence Area Fl...	Shapefile showing the areas within ...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	Daily	Raw	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
23	OD032	UK Power Networks Licence Area 33...	Shapefile showing the position of U...	1 - Open	3 - Published, Open	2021-12-13 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
24	OD033	UK Power Networks Licence Area 13...	Shapefile showing UK Power Networ...	1 - Open	3 - Published, Open	2021-12-13 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
25	OD034	London Power Networks (LPN) area ...	Shapefile showing operational boun...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	One-Off	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
26	OD035	South Eastern Power Networks (SPN...	Shapefile showing operational boun...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	One-Off	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
27	OD036	Eastern Power Networks (EPN) area ...	Shapefile showing operational boun...	1 - Open	3 - Published, Open	2021-10-06 00:00:00	One-Off	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
28	OD040	UK Power Networks Licence Area 33...	A dataset showing the location of U...	1 - Open	3 - Published, Open	2022-07-04 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
29	OD041	UK Power Networks Licence Area 13...	A dataset showing the location of U...	1 - Open	3 - Published, Open	2021-11-04 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
30	OD050	Secondary Sites	List of secondary substations and ke...	1 - Open	3 - Published, Open	2023-02-20 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
31	OD052	2030 projections for Blue Badge hol...	As part of our Enable project, we est...	1 - Open	3 - Published, Open	2022-04-04 00:00:00	One-Off	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
32	OD053	Rota Load Disconnection	Showing primary feeder areas and t...	1 - Open	3 - Published, Open	2022-12-09 00:00:00	One-Off	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
33	OD054	UK Power Networks Licence Area Gri...	National Grid sites (Transmission Sys...	1 - Open	3 - Published, Open	2022-07-04 00:00:00	Annual	Processed	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
34	OD056	Streetworks - open works	List of street works (including Privat...	1 - Open	3 - Published, Open	2022-12-06 00:00:00	Every Two Hours	Raw	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
35	OD061	PI data	PI data ranges through the voltages ...	1 - Open	3 - Published, Open	2023-11-17 00:00:00	Live	Raw	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...
36	OD068	Streetworks - proposed works	Live map of our proposed steet wor...	1 - Open	3 - Published, Open	2023-05-30 00:00:00	Daily	Raw	https://ukpowernetworks.opendatas...	https://ukpowernetworks.sharepoint...

Suggest a new record

Delivering your electricity

Data products

Electricity network data

Other data

Property developers

Agriculture

Local government /authorities

Emergency services

Private individuals

Other utilities

Transport

Generation developers

Flexibility

Academia

Everyone else…

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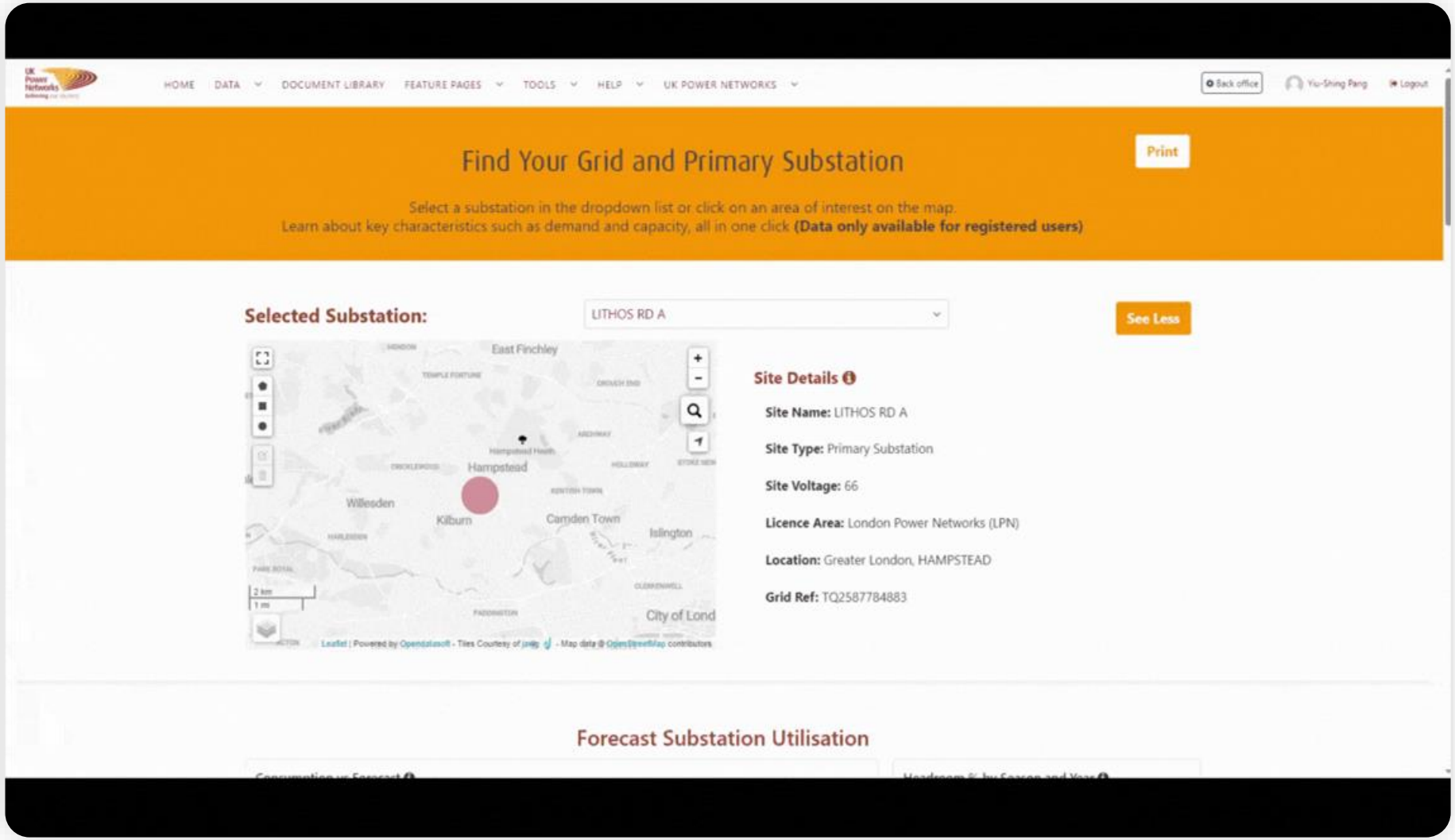
Grid and Primary Dashboard



UK Power Networks
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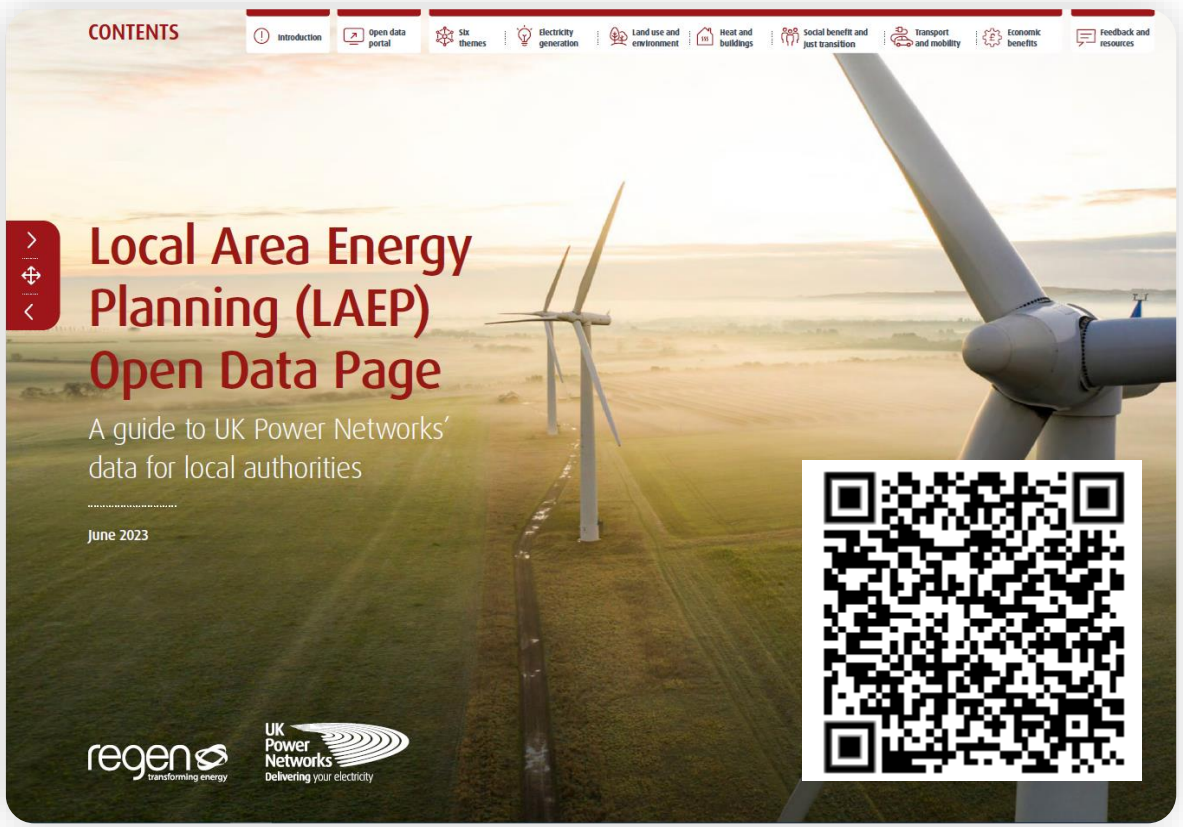
Local Area Energy Plan

UK Power Networks
Delivering your electricity

Local Area Energy Plan

Our most prioritised use case for Open Data

- Surveyed the 200+ people at our launch event
- Focus group event to drill down on details
- In depth engagement with two local authorities over 2022
- Arrived at 30 top use cases and the 150+ underlying datasets
- New Net Zero team (DSO) to “hand hold” local authorities



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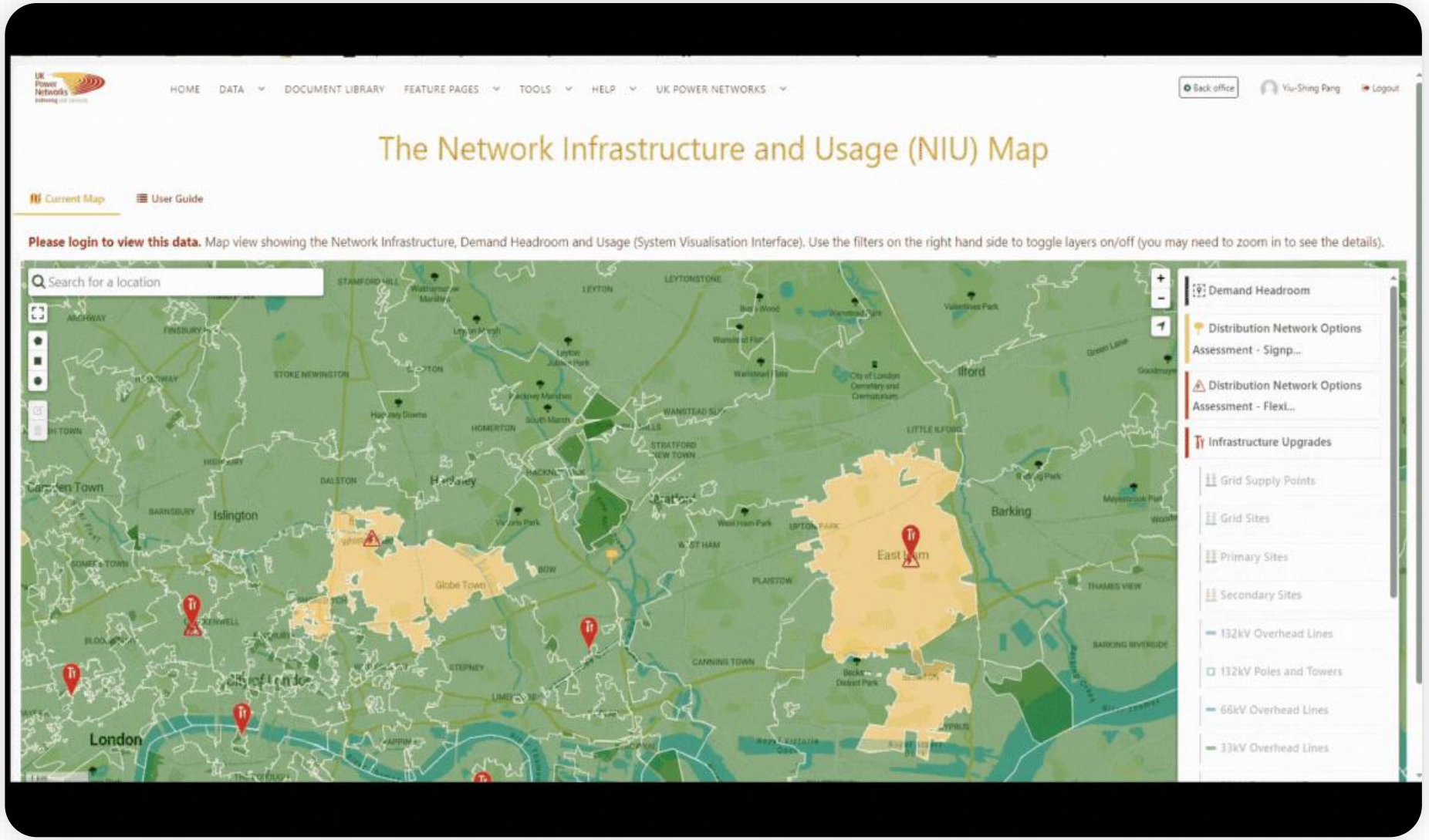
Network Infrastructure and Usage Map



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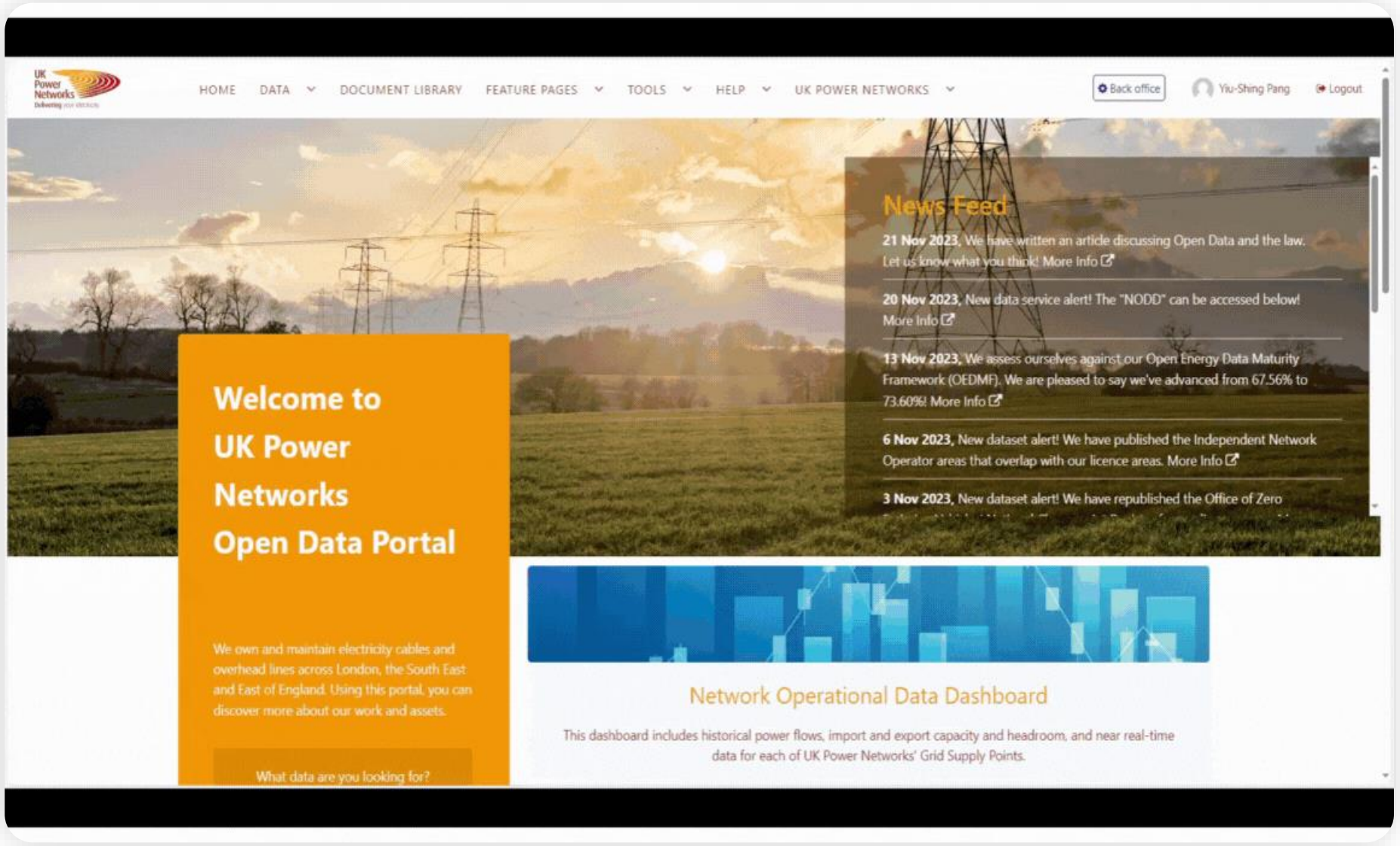
Network Operational Data Dashboard



UK Power Networks
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Use cases

Overhead lines for safety

From dataset: UK Power Networks Licence Area HV Overhead Lines shapefile

Heathpatch

We used this dataset to copy the overhead power lines onto the 'The Land App' software, overlaying it with our farm fields. This could then be printed and added to 'Harvest Packs' for contractors to refer to when working on the farm for Health and Safety awareness, to show where power lines and poles are.

Real-time power cut alerts to EV drivers

From dataset: Live faults

ev.

We're bringing peace of mind to our drivers in the UK with real-time alerts via the UK Power Networks power cut API.

After a successful trial with hundreds of EV drivers in this region, we're delighted to launch this groundbreaking new feature to all drivers in the UK Power Networks region - covering London, the South East, and East of England.

Through Powercast, we're minimising the disruption caused in the rare event of a power cut, empowering drivers to make the switch to an electric vehicle with confidence.

Rachel Jessup 1 December 2023 09:00

Assessing the network for connection opportunities

From dataset: Embedded Capacity Register 2 - 1MW and above

AURA POWER

I work for a large scale solar and battery developer and part of my role is to identify new grid opportunities by assessing the network. I have used the ECR for identifying substations which have a lot of sites already connected which may therefore look constrained and would be better avoided, and substations with accepted connections so we can watch these and see if they fall away and allow capacity to become available. This also enables us to see parts of the network which have few connected and accepted sites.

Greater London Authority's London Heat Map

From dataset: Key characteristics of active Grid and Primary sites

The London Heat Map is a tool designed to help users identify areas of high heat demand and to construct heat network models and assess their feasibility. The waste heat layer will be a new feature on the London Heat Map. The UKPN Key characteristics of active Grid and Primary sites will be used to show the waste heat potential from transformers across London. Electricity substations on both the transmission and distribution networks contain transformers to convert power from one voltage to another. Transformer coils are usually cooled and insulated by being immersed in insulating oil. A heat recovery data tool, using assumptions from previous Buro Happold project experience, has been used to calculate the transformer waste heat potential.

Pippa Corbett 25 July 2023 09:42

UK Power Networks • Following
Utilities

⚡ Our #OpenData has helped inspire the next generation of global engineers.

Victor Mukora, a recent Virginia Tech graduate, used predictive models to analyse our datasets about how environmental variables can affect solar panels. With the help of his advisors, Victor's research was published in the Virginia Journal of Business, Technology, and Science!

Victor, who moved to the US from Kenya at a young age, said one of the words he was most proud of spelling as a first-grader was 'electricity.'

He watched videos of power stations and electrical transformers, doodled substations on his papers, and stood outside the fence of a local facility with his uncle "just so I could see what a substation looked like in close up."

"My whole research project has been building on understanding different aspects of how environmental conditions affect the panel, and how we can go from that to optimising the design of a panel. UK Power Networks was really a jackpot for my research."

Amazing work, Victor — we love to see it! 🤩

4 months ago • Edited

51 4 6

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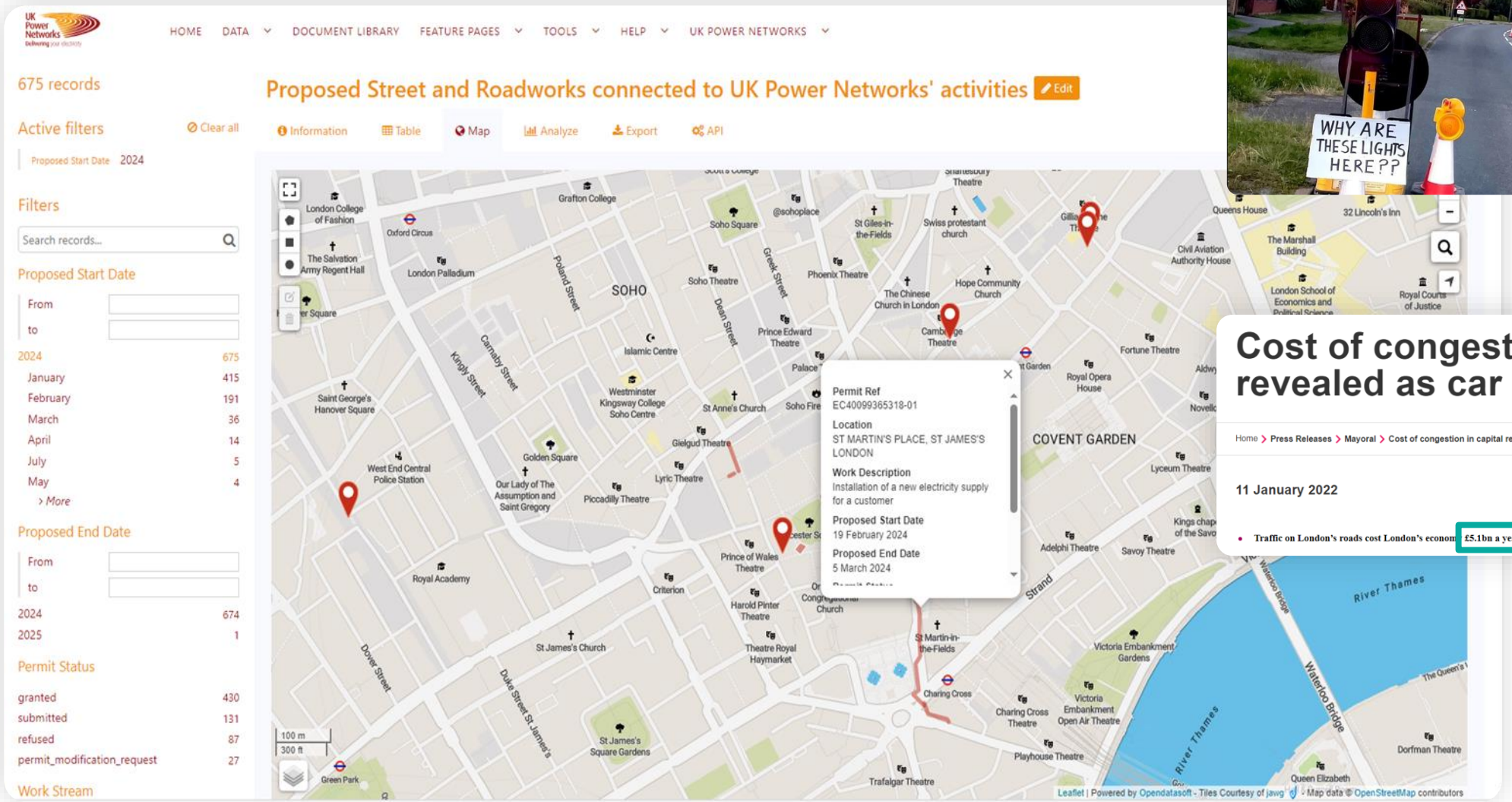
Not all energy related…

Streetworks - collaboration



Cost of congestion in capital revealed as car use remains high

Home > Press Releases > Mayoral > Cost of congestion in capital revealed as car use remains high

11 January 2022

- Traffic on London's roads cost London's econom **£5.1bn a year, or £1,211 per driver**

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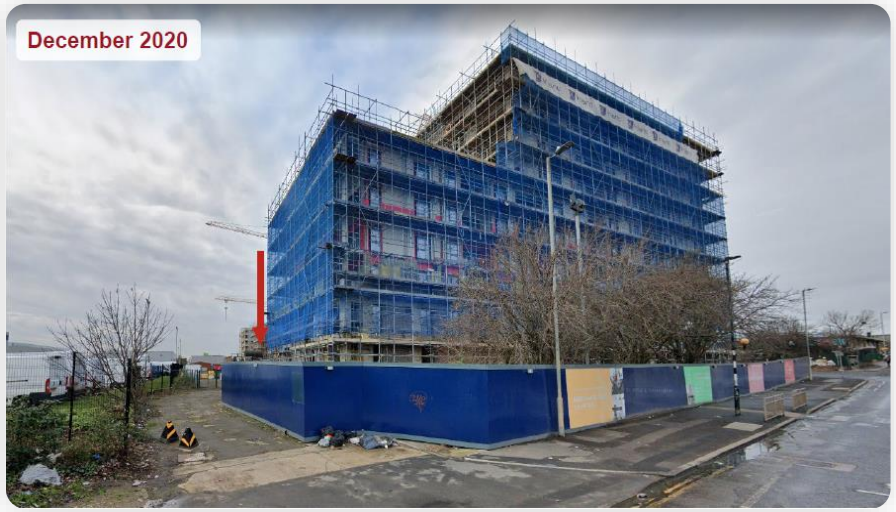
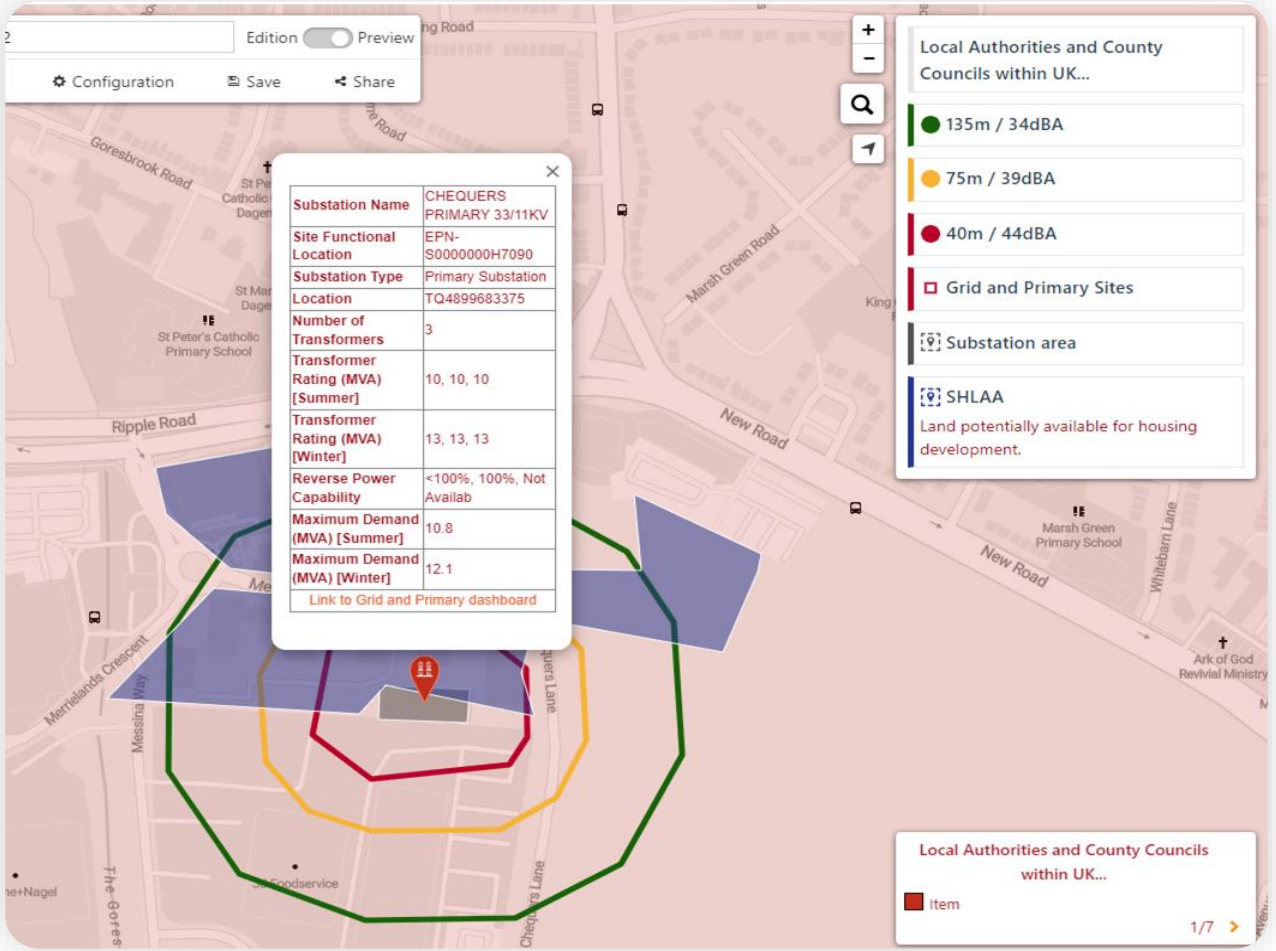
Noise





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Governance

Summary Toolbar Data Triage Assessment Form: Underground Cables dataset (24/0 Openness Rating: Can we publish this data? WITH SOME RESTRICTIONS Status: Approved

ID	Standard Enterprise Risk	Category	Inherent Likelihood	Inherent Impact	Inherent Risk Score	Can this be mitigated?	Mitigation Approach (see guidance)	Residual Likelihood	Residual Impact	Residual Risk Score	Comment
1	Published data conflicts with existing regulatory submissions resulting in reputational damage and regulatory action	Regulatory Requirements	Low	High	8	No				8	We report the length/volume of cable data to Ofgem as part of RIGs. It is not directly comparable to this dataset.
2	Published data is inaccurate or misleading, resulting in a serious loss of reputation for UK Power Networks	Quality	Low	Medium	6	No				6	The dataset should be caveated that it is to improve safety, but suitable methods to detect cable location on-site should be used
3	Published data enables someone with hostile intentions to compromise the security of UK Power Networks	Security	Medium	High	12	No				12	Data on underground cable "pinch points" is considered a safety risk to share openly, and should only be shared with known trusted parties. Additionally, identification of urban tunnels may also be used by "urban explorers" which can be dangerous.
4	Personally identifiable information is published without a legal basis, resulting in reputational damage and regulatory	Privacy	N/A	High	0	N/A				0	No personal data
5	Published data breaches a license or other intellectual property agreement resulting in legal action against UK Power	Legal	N/A	Medium	0	N/A				0	No licencing required
6	Commercial stakeholders are able to gain a commercial advantage by abusing our published data to overcharge us	Commercial	Medium	Low	6	N/A				6	For competitions in connections, we need to be able to share this information with trusted parties. There is a risk the data could also be used by agents to gain insight about our network to secure commercial benefit through seeking property payments.
7	Published data enables discrimination against individuals or a given community resulting in inequality	Ethics	Very Low	Medium	3	N/A				3	N/A
8	Published data has a negative impact on electricity markets resulting in a less favourable situation for consumers	Consumer	N/A	Medium	0	N/A				0	N/A

Open Data... and the law

Yiu-Shing Pang
Open Data Manager at UK Power Networks

3 articles

November 9, 2023

Open Immersive Reader

- Regulated utilities have to adhere with numerous legislation and licence conditions
- Open Data in the energy sector is emerging, and has offered exciting new products and services, and realised efficiencies for its users
- However, despite the best intentions of legislation and Open Data, the conflict between the two are increasingly prevalent as we publish more granular data

Introduction

At UK Power Networks, we deliver value to our customers by maintaining a secure, reliable and resilient electricity network to 8.5 million homes and businesses, equating to over 20 million people across London, the South East and East of England.

In 2021, we launched our 'open data' programme following the Energy Data

Like Comment Share 93 · 24 comments

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Governance continued…

K	L	M	N
Substation Type	Substation Name	Substation Number	Grid Reference
Pole Mtd	Police Vhf		

Another DNO

- Tasty search terms:
  - RAF, HMP, Government, Hosp, Pol, Army, telecoms, radio, mast
- Water specific terms: P/S, SPS, WPS, P/STN, booster…
- Would the other utilities be comfortable with this data out there?

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Using energy data to drive energy system decarbonisation

DSO

Data is crucial to efficient system operation and delivers

Ease of access

Open data means ease of access for all stakeholders

Clear licence – CC BY 4.0

API

Security

Be careful what you are revealing

Critical National Infrastructure and pinch points

GDPR/Privacy – Risk assessment

Other use cases

Environment – noise

Streetworks

Opendata@ukpowernetworks.co.uk

The Network for Networks

XIII. AOB & Next Meeting

GEODE Events

Thank You!

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