

Dr. Anne Kesselring,

Joint work with:

Dr. Marian Klobasa, Dr. Sabine Anatolitis-Pelka,

Michael Haendel, Fabian Liesenhoff (Fraunhofer ISI),

Marian Bons, Sjoerd Pernot (Guidehouse),

Dr. Judith Stute, Dr. Stella Oberle, Dr. Elena Timofeeva (Fraunhofer IEG),

Andras Vekony, Katalin Varga (REKK)

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Forum Europe

Plans, tariffs, and procedures: Insights from a cross-country comparison of electricity distribution grid practices in the EU-27

Distribution grids and the grid package

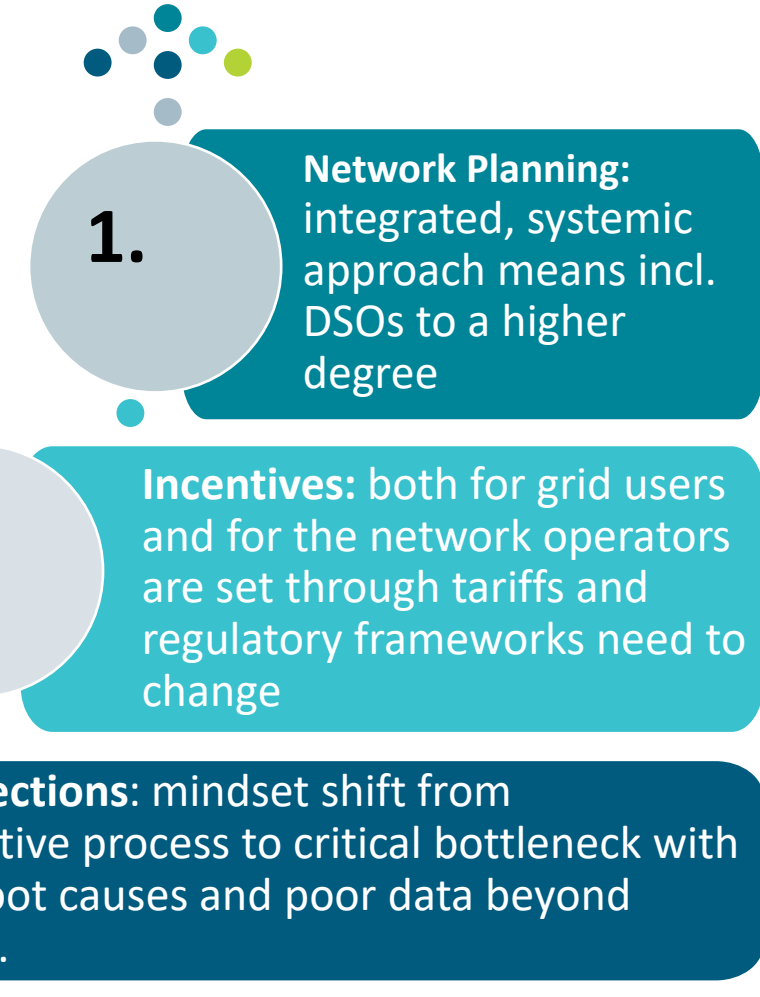
Bottom-up implementation capacity matters along with top-down policy

Why this matters

„70% of assets will be connected at the distribution-grid level“

Eurelectric Grids for Speed report

<https://www.eurelectric.org/grids-for-speed/>



Background: Data collection for the EU Commission in 2025

Study on network development planning, tariff structures and connection requests for electricity distribution grids

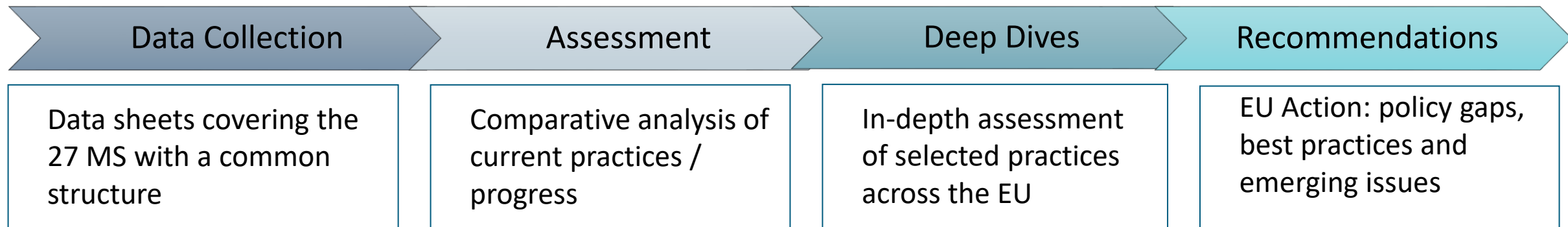
Wide scope covering three topic areas in the 27 EU Member States (MS):

- **1. Planning** Network development planning at distribution-level
- **2. Tariffs** Network tariff regimes and regulatory incentives
- **3. Connections** Treatment of grid connection requests.

Link to full report



Combination of document analysis and interviews:



Distribution Network Development Plans (DNDP)

- State of play presents a risk for grid expansion

DNDP are heterogeneous across the Member States (MS) and do not match system level ambitions

Treatment of flexibility forecasting

- **DNDP are publicly available in 24 MS**, but depth and coverage of “new topics” is inconsistent



Cost-effectiveness compromised if alternative options intransparent

TSO – DSO coordination

- 18 MS have some **form of coordination** between TSO(s) and DSO(s), but their exact involvement differs substantially



Misalignment with TSO-level risks frictions and bottlenecks

Actionability of DNDPs

- In 22 MS **capacity maps** are available, but quality varies across and within MS
- In 19 MS **investment lists / plans** are available but often superficial



Information asymmetry discourages project development

- Grid expansion requires shift: from a compliance exercise (through legal mandates) into a strategic tool considering linkages across grid levels.
- Enforcing the Electricity Directive in an *effective* way: what does distribution network planning need to provide analytically for system-level planning?

Insights from across the EU show that planning is a set of activities, rather than a continuum from “good” to “bad”

Member States with strong progress have:

DSO & TSO harmonization → strong governance structures

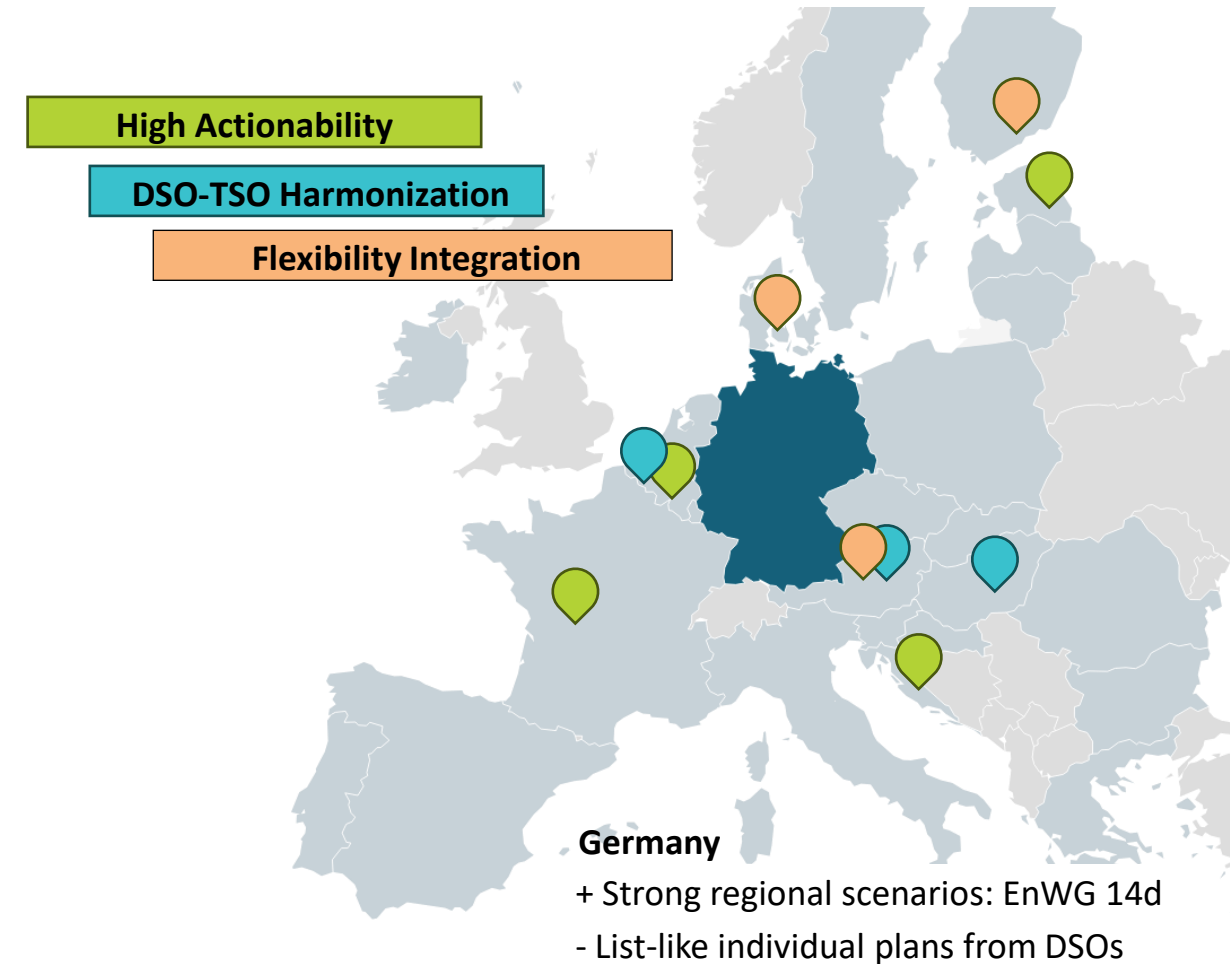
High actionability of NDP → process design beyond regulation

Flexibility integration → forward-looking scenario building

Lessons learnt from comparison:

Actionability is the next “frontier”: from submitting plans to working together

Implementation of Electricity Directive: checking boxes does not deliver results



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Incentive structures

- Connecting network tariffs and regulatory regimes

Incentive structures across the EU-27 have not kept pace with the demands of an active, decentralized grid, but reforms prove economically difficult

(1) Network Tariff Regimes

Means for innovative network tariff regimes

- Withdrawal charges: power-based, time-of-use
- Injection charges: cost-reflectivity vs. market distortion
- Cost allocation models: flexible AND future-oriented?

Exemptions and special rules

- Efficiency vs. other goals

Without cost-reflective tariffs: no incentive for grid users and operators to adjust to system need

(2) Regulatory Incentives for DSOs

Anticipatory investments

- Questions for revenue regulation

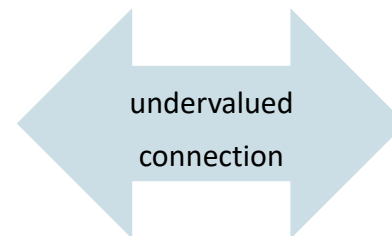
Incentives for smart grid investments

- Outcomes through CAPEX- or OPEX-measures

Flexibility during regulatory period

- Time gap between expense and recognition

Without regulatory frameworks encouraging „new forms“ of investment: underinvestment in distribution grids



Incentive structures: Tariffs and regulatory incentives are connected, although often treated separately in national frameworks.

Member states with strong progress have:

Reform of cost regulatory incentives:

- Easier with fewer DSOs & smaller area
- Willingness-to-adopt before EU clarity

Incentives for grid-friendly behavior:

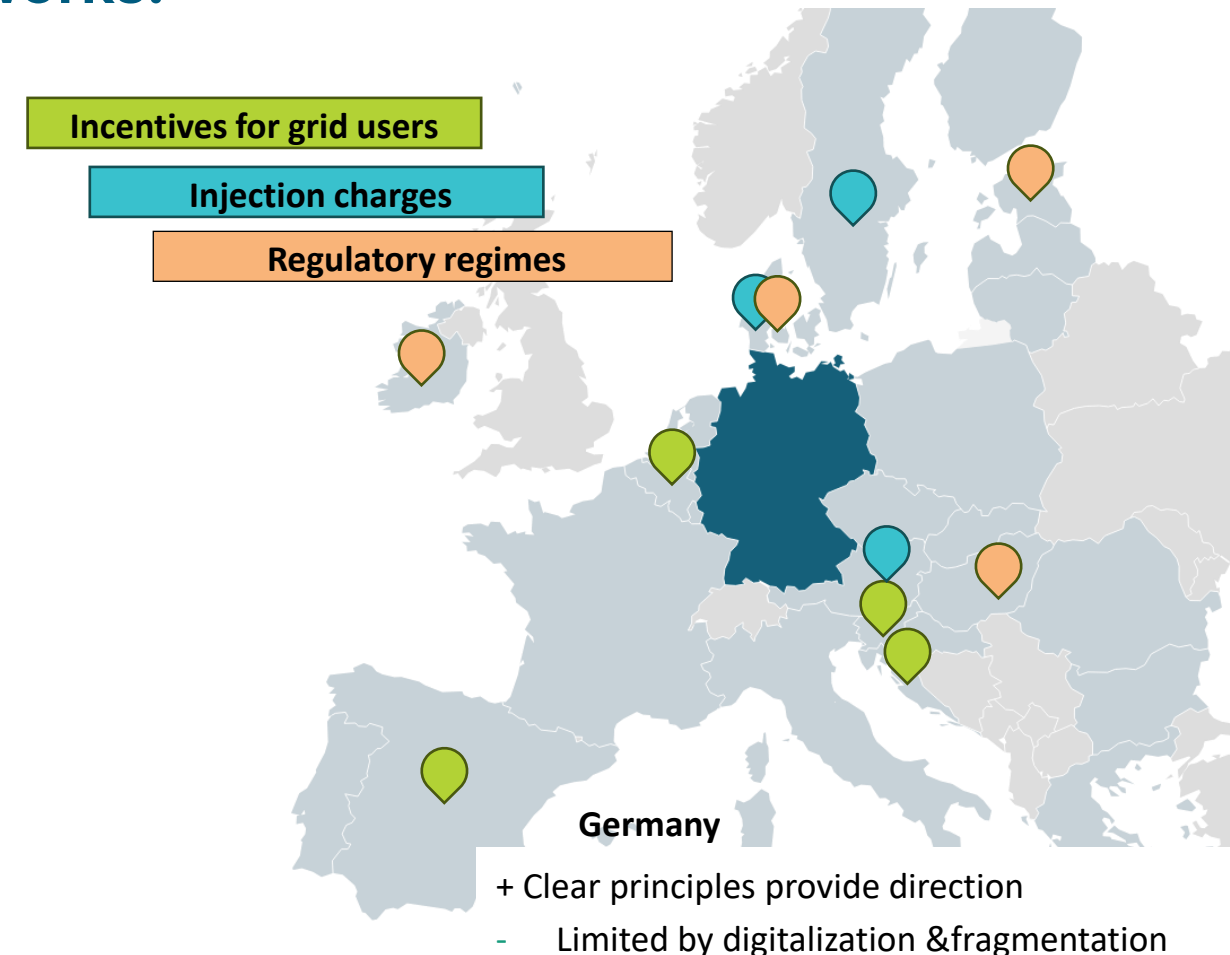
- Digitalization & grid observability
- Less complex economic & regional structures

Lessons learnt from comparison:

Digitalization is the critical pre-condition for deep reform

Political debates and acceptance questions arise late

Incentives for DSOs interact with incentives for grid users



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Grid connection requests

➤ From niche topic to widespread concern

Issues at the lower grid levels extend to technical capabilities and organizational capacity of DSOs

Timelines and Responsibilities

- **Lead times vary** significantly and are not comparable even if available
- **Deadlines** may be legally defined (e.g. in energy laws or network codes) or vaguely stated as **“timely”**

one symptom,
many causes



Causes and Characteristics of Queues

- Key drivers of **backlogs** include:
 - Grid congestion
 - Speculative or over-reserved requests
 - Administrative delays and lack of digitalization
 - Complex, ambiguous procedures
- Queues are often **local or user-specific** (e.g. data centers, storage), and more on generation side

Divergent Tools and Transparency Levels

- Most MS use **capacity maps** or similar tools, but quality varies
- Best practices include interactivity, searchability, downloadability, and open data principles
- Information **granularity**, user interfaces and methods vary

one tool, but inside
a *toolbox*



„procedural obligations“ fall short (ENTSO-E on draft Grid Package)
→ need for a solution portfolio, which MS experiment with

Grid connections at the distribution level mesh technical, regulatory, and administrative constraints

Member states with strong progress have:

Grid congestion or queues → Experienced with issue & solution

High-quality capacity tools → Including GIS + user interface

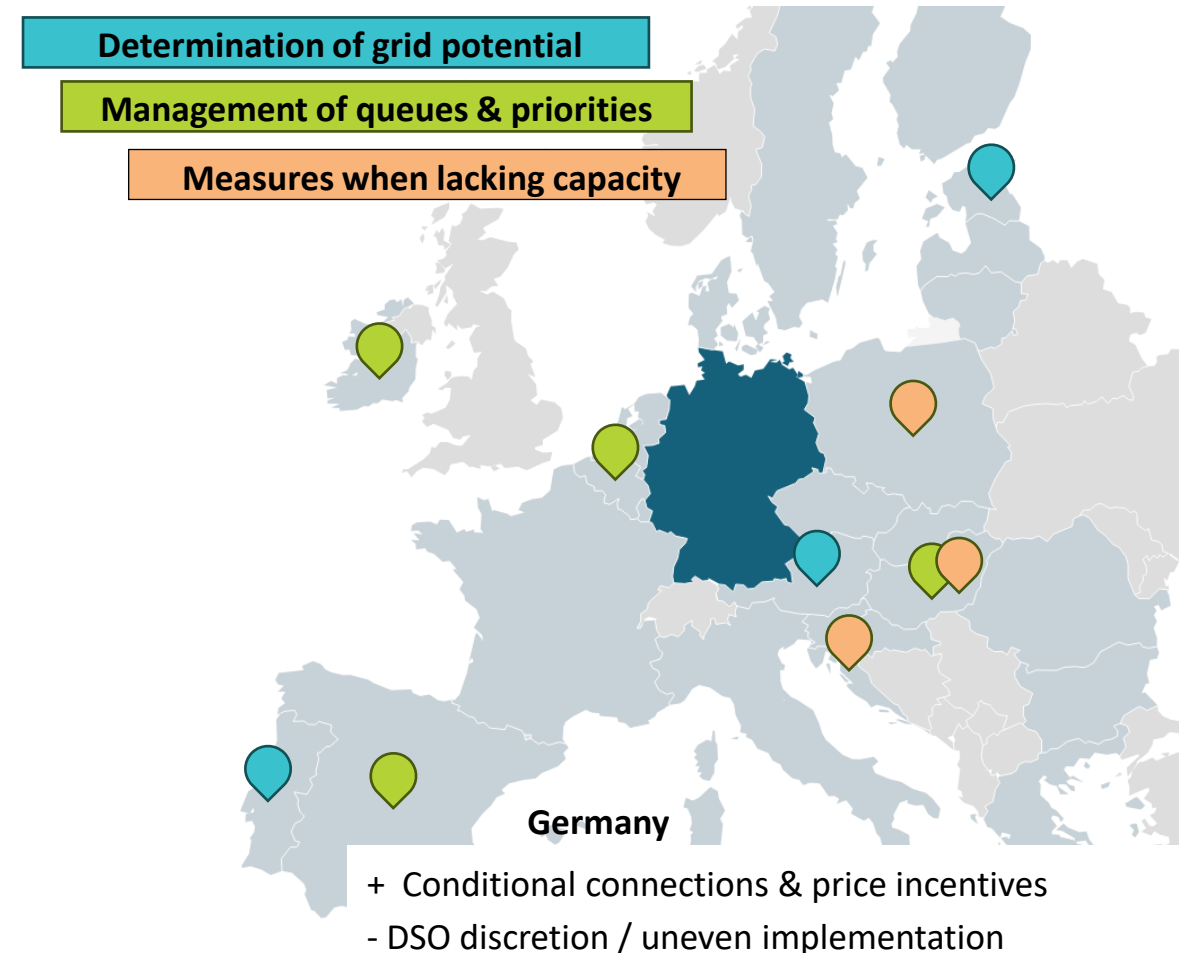
Measures matched to root causes → FCA*, Priorities, DSO intervention

Less learnt from comparison:

Lead times are symptoms, root causes are diverse

Prioritization is the #1 topic, but often politically driven

*Flexible connection agreements following EU 2019/944, Art. 6a



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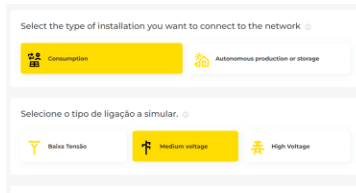
Examples: National solutions vs. EU Capacitypedia

Harmonization efforts are needed, but may disincentivize early movers

E-Grid Map in Estonia:
Strong solution for HV



E-Redes in Portugal:
Connection Simulator + Digital
Counter for LV

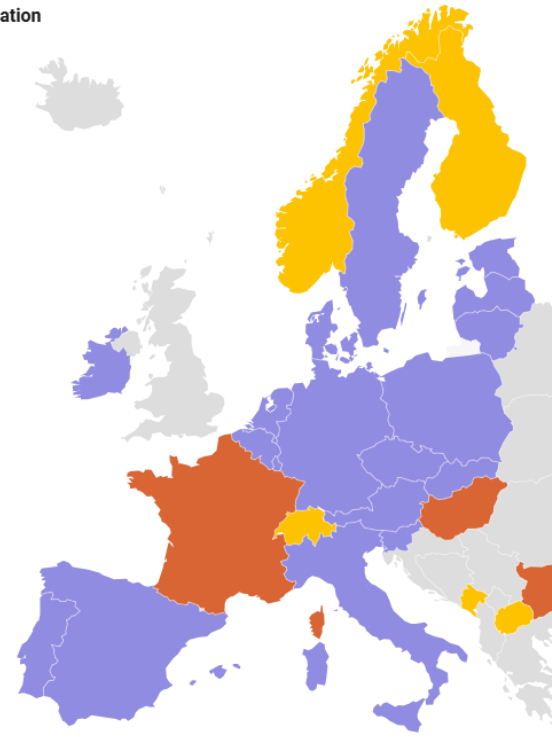
A screenshot of the E-Redes connection simulator interface. It shows two sections: 'Select the type of installation you want to connect to the network' with options for 'Consumption' and 'Autonomous production or storage', and 'Selecione o tipo de ligação a simular' with options for 'Baixa Tensão', 'Medium voltage', and 'High Voltage'.

MitNetz SNAP: Focus on
faster process for RE
generation



Status of Hosting Capacity Information
on the Platform

■ TSO & DSO information available
■ DSO information available
■ TSO information available
■ Not participating at the moment



Map: ENTSO-E / EU DSO Entity - Created with Datawrapper

EU Efforts for Transparency

Capacitypedia on TSO-DSO platform
live after multi-year process

- ✓ Description of what capacity means
- ✓ Summary of national situation
- Explanation, not harmonization
- Limited DSO participation



Sources: Elering/Elektrevi: <https://elering.ee/en/connection-capacity-application-e-gridmap>; E-Redes: <https://www.e-redes.pt/en/simulador>; MitNetz: <https://www.mitnetz-strom.de/unternehmen/blog/blog/2020/07/13/snap-vereinfachter-netzzugang-f%C3%BCr-stromerzeuger-aus-erneuerbaren-energien>

Distribution grids: the implementing piece to the system-level puzzle

➤ Conclusion

Conclusion

Takeaways from the distribution grid perspective

- **Pattern across three topics:** Progress is happening, match of distribution grid implementation with system-level ambition is not there yet and a big puzzle across Europe .
- **Heterogeneity in problems & solutions:** Root causes of connection queues differ & barriers differ by DSO structure, digitalization level, and political economy
- **Grid package success depends on distribution level:** Enablers exist (legislative momentum, links to grid connection guidance, forward-looking capacity tools), but only convert into results with clarity and capacity-building, not just procedural obligations.

Thank you.

Contact:

Dr. Anne Kesselring, Fraunhofer ISI: anne.kesselring@isi.fraunhofer.de

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