

## Empowering Grids from Planning to Practice

Two-day Expert Workshop

### About this report

*Europe's electricity system is undergoing a profound transformation, placing new demands on how electricity networks are planned, operated and governed. In response, the Renewables Grid Initiative (RGI) convened a two-day expert workshop bringing together TSOs, DSOs, regulators, policymakers, researchers and industry representatives to examine how coordination across system levels can be strengthened and how flexibility can be more effectively integrated into system planning. This report summarises the discussions held during the two-day expert workshop, "Empowering Grids from Planning to Practice". It reflects a consolidated understanding of the discussions and insights shared by participants and does not represent the views of individual organisations.*

#### DISCLAIMER

All statements in this document have been summarised by [Renewables Grid Initiative](#) based on the common understanding of the discussions carried out at the workshop. The opinions expressed in this document shall not be used to reflect the views of specific participants. You can access the expert presentations [here](#).

### Background

Europe's energy transition is reshaping how electricity networks are planned, operated, and governed. As **renewables scale up and electrification accelerates**, system operators face increasing complexity in ensuring **security, stability, reliability, and efficiency** across all voltage levels. This transformation requires robust coordination mechanisms and new system planning practices that reflect both operational realities and long-term decarbonisation commitments, progressing along **two interdependent pillars**:

1. **Closer cooperation between TSOs and DSOs**
2. **Effective integration of flexibility resources**, supported by a common EU framework for assessing flexibility needs.

Against this backdrop, RGI convened a two-day expert workshop, "[Empowering Grids from Planning to Practice](#)", bringing together TSOs, DSOs, regulators, industry, NGOs, academia and system modelling experts. The aim was to improve collective understanding of the technical, regulatory, and governance challenges that arise as electricity systems become more decentralised and more dynamic.

**Day 1** focused on practical TSO–DSO collaboration, exploring how improved coordination in **planning and operations** can unlock system value, improve efficiencies, and ensure that flexibility can be used effectively. Discussions examined concrete examples from across Europe, illustrating how integrated

approaches can improve the connection of renewables, prepare grids for electrification, and enhance real-time operations.

**Day 2** shifted from practice to methodological considerations, examining the newly adopted **Flexibility Needs Assessment (FNA)** framework under Article 19e of the [Electricity Regulation \(EU\) 2024/1747](#). The FNA represents both a methodological milestone and a strategic opportunity to strengthen coordination between TSOs and DSOs during national implementation. With Member States now required to carry out Flexibility Needs Assessments (FNAs) by mid-2026, day 2 of the workshop aimed to discuss how national actors can interpret the methodology, navigate data requirements, and how FNAs complement other planning processes such as [European Resource Adequacy Assessment](#) (ERAA) and [Ten-Year Network Development Plan](#) (TYNDP).

Together, the two workshop days connected **practical cooperation** with **methodological clarity**, reflecting RGI's objective to support actors in translating Europe's energy transition goals **from concepts to action**.

## Workshop Format

### *Day 1: Enhancing TSO-DSO Collaboration in Planning and Operations*

*Setting the scene*

*Session 1: Collaboration for long-term planning*

*Session 2: Collaborating for system operations*

*Interaction Session: What makes TSO-DSO collaboration work?*

### *Day 2: From Methodology to Mandate: Implementing the Flexibility Needs Assessments*

*Session 1: FNA Methodology deep dive*

*Session 2: Complementarity of FNAs with adequacy and TYNDP*

*Session 3: From potential to practice – flexibility capabilities and enablers*

## Day 1: Enhancing TSO-DSO Collaboration in Planning and Operations

**Setting the Scene:** Vertical Coordination in Liberalised and carbon-constrained energy systems: bridging network boundaries

The opening session established the systemic context: Europe's grids are under intensifying pressure due to electrification, variable renewables, and increasing distribution-level complexity. While TSOs and DSOs already collaborate in many European countries and partly at the EU level, for instance, through ENTSO-E and the EU DSO Entity on common methodologies, scenarios and regulatory processes, presenters argued that *vertical coordination* – between TSOs and

DSOs – is no longer about optimising discrete system layers, but about ensuring coherence across **planning, markets and operations**. Key insights from the opening discussion included:

- Coordination cannot purely rely on bilateral goodwill, requiring clear regulatory alignment, data governance, joint planning processes, and shared responsibilities.
- Information asymmetry remains one of the most persistent barriers: TSOs have limited visibility of downstream assets, while DSOs lack insight into transmission-level constraints and overall system level dynamic (e.g. market operations).
- Markets and operational tools were not designed for bidirectional flows, making even well-intentioned data sharing insufficient without integration into operational decision-making.

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*We don't lack tools, we lack a coordinated way to use them*

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### Session 1: Collaboration for long-term planning

This roundtable showcased national examples illustrating different models of TSO–DSO planning coordination.

#### 1. TenneT (Netherlands): Joint Scenario Building

TenneT and Dutch DSOs jointly develop national energy system scenarios using a shared modelling environment that is compatible with TYNDP. This enables unified assumptions for alignment with the European grid planning process, providing coherence across voltage levels and sectors, for early identification of local constraints with system-wide implications.

Participants emphasised that scenario alignment primarily take place at the national level between TSOs and DSOs. Such shared scenarios increase consistency of planning assumptions and recognisability toward stakeholders, facilitate coordinated alignment with policymakers and help navigate uncertainties around, among others, electrification and hydrogen uptake.

#### 2. RTE (France): Coordinated Renewable Integration

France's renewable connection process was presented as a case where systematic, structured coordination is embedded through shared connection capacity maps, joint spatial planning processes and iterative feedback loops on connection requests. Planning together provides visibility and investment certainty.

Emerging Points and Open Questions:

- **Consensus:**

- Joint scenario building at national level between TSOs and DSOs is becoming foundational to integrated planning and to coherent inputs into European planning processes.
- DSOs should have a stronger presence nationally, and, via aligned national scenarios, that strengthened national input should then feed into European processes.
- **Debate:**
  - Should regulators mandate joint planning, or can voluntary cooperation scale sufficiently?
  - How should shared scenarios reflect local flexibility potential without overestimating usability?

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*If we don't align assumptions early in planning, we end up correcting them later in operations — at much higher cost*

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## Session 2: Collaborating for system operations

Operational coordination was explored through examples from 50Hertz and Fingrid. Presenters illustrated how real-time visibility, redispatch coordination and market-based flexibility mechanisms can support system operations, while also exposing governance and data limitations - particularly at low and medium voltage levels.

### 3. 50Hertz (Germany): Operational cooperation and system visibility

50Hertz presented its experience with operational coordination at the transmission–distribution interface, focusing on congestion management and redispatch processes. The presentation highlighted how improved data exchange and tools can support operational decision-making but also revealed the limits of current arrangements.

Even where technical capability exists, governance arrangements often require formal requests and sequential decision-making, reducing the effectiveness of operational responses. The example illustrated how operational coordination requires not only data access, but also shared operational understanding and clearly defined roles between TSOs and DSOs.

### 4. Fingrid (Finland): Market-based flexibility for operational needs

Fingrid presented the Finnish experience with [FinFlex](#), a market-based congestion management mechanism that enables the activation of DSO-connected flexibility resources. The model demonstrates how flexibility can be integrated into operational processes through transparent market signals, while maintaining system security.



The presentation underscored that effective use of operational flexibility depends on alignment between market design, network constraints and activation responsibilities. While FinFlex has delivered positive results, scaling such approaches requires robust coordination to prevent conflicting signals across voltage levels and to ensure that flexibility activation at the distribution level does not create new challenges at the transmission level.

#### Emerging Points and Open Questions:

- **Consensus:**
  - Operational visibility is the most repeated challenge across Europe – TSOs cannot rely on DSOs' data, and DSOs cannot rely on TSOs' signals, causing avoidable inefficiencies.
  - Operational cooperation requires shared tools and aligned operational philosophies, not just more data.
- **Debate:**
  - Should flexibility be TSO-activated, DSO-activated, or hybrid?
  - How to address conflicts when flexibility activation relieves one network layer but worsens another?

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*Most operational problems today are not caused by a lack of flexibility, but by limited visibility and unclear responsibility for activating it*

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#### **Interactive Session:** What makes TSO-DSO collaboration work? Bridging Planning, Operations, and the Flexibility Needs Assessment

The interactive session served as the linchpin of Day 1, transforming the insights from earlier presentations into a shared diagnosis of the system's biggest coordination challenges. Moving beyond one-directional knowledge sharing, participants worked in mixed TSO–think tank–industry groups to evaluate and refine five preliminary recommendations drafted in advance by RGI.

These recommendations – covering governance, shared planning, data interoperability, transparency, and the potential role of the new Flexibility Needs Assessment – were not presented as conclusions but as hypotheses to be stress-tested against real-world experience.

Across groups, three themes emerged that directly connect Day 1 to the regulatory and methodological focus of Day 2.

## 1. Unclear roles and governance across voltage levels remain the deepest barrier and the biggest opportunity for TSO-DSO collaboration

Participants agreed that clarifying roles and responsibilities between TSOs and DSOs is essential, but is frequently blocked by misaligned national regulations, divergent timelines and incentives, capacity gaps between large and small grid operators at the lower voltage levels, and uncertainty about who should hold decision-making authority in joint planning.

Several groups emphasised that regulation should enable collaboration, not follow it, echoing Fingrid's and 50Hertz's earlier presentations. Yet, they also pointed out that prescriptive EU-level rules risk ignoring national specificities.

## 2. Data interoperability must be purpose-driven and model-aware

Participants warned that “data interoperability” risks becoming a vague aspiration unless tied to a specific operational or planning problem. For example:

- Data interoperability must be designed around **clear operational and planning use cases**; otherwise, increased data exchange risks creating complexity without improving decision-making.
- Modelling tools used by TSOs and DSOs (e.g. PyPSA, Calliope, proprietary tools) often rely on different datasets, assumptions and levels of granularity, which can lead to inconsistent results if not aligned.
- Without coordination between modelling approaches, **flexibility may appear available in one model but be unusable or conflicting in another**, undermining both planning and operational outcomes.

Groups strongly converged around the need to articulate **why data is being exchanged**, not just which data.

## 3. The FNA can be a testbed, but only if its scope extends beyond a compliance exercise

Many participants agreed that the FNA's implementation window creates a unique opportunity to:

- formalise TSO-DSO coordination practices,
- align long-term planning with operational flexibility needs,
- test shared modelling assumptions.

At the same time, some participants cautioned that this potential will only be realised if the FNAs move beyond a narrow compliance focus toward long-term flexibility integration. Concerns included:

- FNAs currently focus on the short-term procurement horizon,
- interactions with existing capacity markets remain unclear,
- data uncertainties risk undermining modelling credibility,

- Member States differ widely in their starting points.

### Cross-cutting insight: Operational coordination remains the missing link

Short-term operation coordination is dramatically under-represented in current policy debates and planning-oriented recommendations. While flexibility is increasingly recognised in long-term assessments and methodologies, participants stressed that its system value is ultimately realised—or lost—through operational decision-making.

Participants raised recurring challenges, including real-time visibility of low-voltage networks, conflicting signals for EV charging, batteries causing reverse flows that are not visible to TSOs and misaligned incentives for DSOs to unlock flexibility.

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*Long-term planning processes alone cannot deliver the system value of flexibility. Operational coordination must evolve in parallel.*

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The interactive session surfaced the structural gaps that neither planning frameworks nor operational procedures currently resolve. In doing so, it prepared participants for Day 2's focus on the Flexibility Needs Assessment. The discussions made clear that FNAs cannot be treated as a narrow modelling obligation; instead, they must become a vehicle for institutionalising TSO–DSO collaboration, clarifying roles, improving data flows, and grounding flexibility procurement in real operational needs.

## Day 2: From Methodology to Mandate: Implementing the Flexibility Needs Assessments

The second day shifted from the organisational and operational realities of TSO–DSO coordination to the recent methodology designed to institutionalise it. Building on the gaps surfaced in the interactive session, related to governance, data purpose, and operational visibility, Day 2 interrogated whether Europe's first FNAs can meaningfully respond to those systemic challenges.

### Session 1: FNA Methodology deep dive

ENTSO-E and EU DSO Entity walked through the structure, governance, timeframes, and data needs of the newly approved FNA methodology. Participants welcomed the distinction between **system needs** (including RES integration, ramping and forecast error needs) and **Transmission and Distribution network needs** (such as identification of local constraints and “fine-tuning” loop to avoid double-counting). The session also highlighted the

importance of coordination mechanisms, such as evolving Q&A processes, to support harmonised implementation.

**Governance challenges** were also a significant discussion. Speakers clarified that each Member State must appoint a **National Designated Entity**, which could be a ministry, regulator, TSO, DSO, or a combination, responsible for issuing the final FNA report. While this governance choice is left to national discretion, it becomes the anchor point for quality control and political accountability.

They emphasised that the FNA's technical outputs, including the flexibility needs across different timeframes and the guiding criteria that help policymakers choose **flexibility solutions**, are only half the story. The other half is the **coordination framework** being developed by ENTSO-E and EU DSO Entity to support national actors. FNAs serve not only to quantify needs, but to **formalise cooperation, clarify responsibilities and harmonise assumptions**. This session provided essential technical grounding, and participants noted it was their first clear overview of what FNAs will concretely entail.

Building on the methodological overview, ACER situated the FNA within the wider European system planning ecosystem, linking flexibility needs to adequacy assessments, network planning and security-of-supply mechanisms, including emerging flexibility markets.

### Emerging Points and Open Questions

- **Consensus:**
  - The methodology's split between system and network needs, combined with the fine-tuning loop, is essential to avoid double-counting flexibility needs and resources across system and network levels, and to maintain technology neutrality for policy choices.
  - A coordinated implementation process, such as central monitoring and support by ENTSO-E and EU DSO Entity with country Single Points of Contact (SPOCs) and evolving Q&A will be critical to harmonise implementation.
- **Debate:**
  - Several participants questioned whether time blocks and granularity should better reflect operational realities (minutes vs. hours vs. seasonal), especially given the variability of implicit demand-response.
  - There was uncertainty over how to measure baseline implicit flexibility (tariffs, automation, behavioural response), and how consistently this can be done across Member States.



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*The challenge is not defining the methodology, but implementing it consistently across very different national starting points.*

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## Session 2: Complementarity of FNAs with adequacy and TYNDP

The second session examined how FNAs interact with existing assessment frameworks, including European Resource Adequacy Assessment (ERAA), national adequacy studies, and the TYNDP. Presentations and inputs from OET, TransnetBW, Artelys and Elia stressed that **FNAs cannot stand alone**; they must sit within a larger ecosystem of modelling and planning processes:

- Open-source models (e.g., PyPSA) improve transparency but still lack full intraday modelling and full regulatory alignment.
- National adequacy studies (e.g., [TransnetBW's 2050 study](#), [Belgium's Adequacy & Flexibility Report](#)) show that some TSOs already consider flexibility and adequacy jointly and that **flexibility, including storage, hydrogen, and prosumer behaviour will reshape system economics and operations.**

A central insight, echoing discussions from Day 1, was that **the challenge is not the lack of assessments, but the lack of coordination between them.** Participants warned that without alignment between ERAA, TYNDP and FNAs, Europe risks planning the system multiple times without optimising it as a whole. Even a methodologically robust FNA will struggle to inform investment or operational decisions if its underlying scenarios diverge from national and European planning assumptions.

### Emerging Points and Open Questions

- **Consensus:**
  - Scenario coordination across ERAA → TYNDP → FNA is critical; otherwise, FNAs risk being methodologically sound but operationally misaligned with adequacy, infrastructure planning and other processes.
  - EU-level feedback loops, such as the recent ACER “Security of EU electricity supply” report and potential future Commission flexibility strategy are needed post-implementation to ensure harmonisation.
- **Debate:**
  - Cross-border dependencies: how should national FNAs leverage neighbouring flexibility (e.g., interconnectors, hydro in neighbouring systems) when national reports are validated domestically?
  - Integrating flexibility into capacity mechanisms; avoiding market complexity while ensuring locational signals.

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*Even a robust Flexibility Needs Assessment will not deliver value if it is disconnected from adequacy and network planning*

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### Session 3: From potential to practice: flexibility capabilities and enablers

The final session shifted the focus from methodology to the real-world cross-sector flexibility resources that will ultimately meet the quantified needs, such as demand response, automation, and market access.

Insights from the [BeFlexible project](#), showed that while cross-sectoral flexibility potential is large, activation remains uneven, with rebound effects, interoperability issues, and commercial barriers (particularly for EV fleet operators). Regulatory Assistance Project (RAP) underlined that consumer-side automation and tariff design will be crucial for scaling demand-side flexibility and keeping electricity bills affordable. SolarPower Europe illustrated the complementary role of batteries and hybrid assets in enhancing both flexibility and system stability.

#### Emerging Points and Open Questions

- **Consensus:**
  - Scaling up distributed flexibility (EVs, heat pumps, water heaters) depends on automation, interoperability and fair market access; smart-meter roll-out remains uneven.
  - Tariff & market design levers exist and must ensure implicit flexibility does not worsen local constraints.
  - DSOs and TSOs need coherent locational and temporal signals and conflict resolution protocols.
- **Debate:**
  - Participants discussed how to value resilience-related services (e.g., inertia, black start) alongside flexibility in planning frameworks.
  - Questions were raised about how to ensure that tariff reforms do not create distributional inequities or penalise vulnerable consumers who cannot automate consumption.

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*Flexibility exists across households, transport and industry — but without automation, interoperability and fair market access, most of it will remain untapped*

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## Takeaways/recommendations

1. **Flexibility should be treated as a system-wide, cross-sectoral resource, increasingly enabled by consumers and distributed assets.**  
Planning, markets and operational frameworks must better reflect the growing role of demand-side flexibility, electrification, storage and sector coupling.
2. **Coordination between TSOs and DSOs must evolve from information exchange to joint decision-making across planning and operational processes.**  
Improved data sharing alone is insufficient; clearer roles, shared assumptions and coordinated decision-making are needed to ensure that flexibility and grid investments deliver system-wide value.
3. **Effective governance structures are as important as technical reforms for integrating flexibility into the energy system.**  
Clear responsibilities, aligned incentives and regulatory frameworks are essential to enable TSOs and DSOs to collaborate consistently across voltage levels and time horizons.
4. **FNAs provide a new structural platform for integrated system planning if embedded coherently within existing assessment frameworks.**  
To deliver value, FNAs must be coordinated with adequacy assessments, network development planning and operational realities, rather than treated as standalone or compliance-driven exercises.
5. **Misaligned incentives, particularly at the distribution level, continue to limit the effective use of flexibility and require regulatory evolution.**  
Enabling DSOs to actively engage in flexibility procurement and coordination is critical to unlocking cost optimisation and reducing overall system costs.

## Conclusions and next steps

Across two days, the workshop highlighted both the scale of Europe's system needs and the strategic opportunity presented by FNAs and enhanced TSO–DSO collaboration. The workshop provided a rare opportunity for practitioners, regulators and systems thinkers to connect **practical cooperation** with **methodological clarity**. Through dynamic expert discussions, *Empowering Grids from Planning to Practice* demonstrated that **flexibility, planning, and operations constitute an integrated system**, not parallel or sequential processes, for Europe to achieve a secure, efficient and decarbonised energy system.

The publication of the 2025 [European Grids Package](#), following the “Empowering Grids from Planning to Practice” Expert Workshop, reinforces the relevance and

timeliness of the workshop's findings. The Package places increased emphasis on system-wide coordination, improved use of flexibility, and better integration of planning processes across network levels, reflecting many of the challenges and opportunities identified by workshop participants. These policy developments directly support the workshop's conclusion that flexibility must be considered as an essential system element and that coordinated planning across TSOs and DSOs is crucial to achieving a decarbonised and resilient European energy system.

In the coming months, RGI will explore opportunities to analyse how emerging EU initiatives and policies (European Grids Package, potential Flexibility Strategy) align with practical lessons from this workshop.



## Agenda of Empowering Grid Workshop

Day 1: Enhancing TSO-DSO Collaboration in Planning and Operations	
10:00	Welcome, agenda and workshop's objectives
<b>Session 1: Setting the scene</b>	
10:10	Vertical coordination in liberalised and carbon-constrained energy systems: bridging network boundaries Dimitra Apostolopoulou, Oxford Institute for Energy Studies
10:30	Collaboration across voltage levels – experience from planning of the European system Rodrigo Barbosa, ENTSO-E
10:45	Discussion: Session 1
<b>Session 2: Collaboration for long-term planning</b>	
11:05	Joint scenario building between a TSO and DSOs in the Netherlands Tim Gaßmann, TenneT
11:25	The connection of renewables in France: planning of grid infrastructure implemented through close TSO-DSO cooperation Alexis Cauzit, RTE
12:00	Discussion: Session 2
12:20	Lunch Break
<b>Session 3: Collaborating for system operations</b>	
13:20	Collaborating for system operations – the case of Germany Paula Munstermann and Valerian Watson, 50Hertz
13:40	TSO-DSO Synergy in Finland: FinFlex Congestion Management Market Jutta Kallanto, Fingrid
13:55	Discussion: Session 3
14:15	Coffee Break
14:35	Interactive Session
15:15	Conclusion and Next Steps

## Day 2: From Methodology to Mandate: Implementing the Flexibility Needs Assessments

10:00	Welcome, agenda and workshop's objectives
<b>Session 1: FNA Methodology deep dive</b>	
10:10	Overview of FNA methodology Mario Sisinni, ENTSO-E (confirmed) & Daniel Davi Arderius, EU DSO Entity
10:40	EU Flexibility needs methodology: context and challenges Daniel Ihasz-Toth and Arthur Lynch, ACER
10:55	Discussion: Session 1
11:15	Coffee Break
<b>Session 2: Complementarity of FNAs with adequacy and TYNDP</b>	
11:25	How Open-Source Models Can Support Adequacy, Network Development and Flexibility Assessments Luciana Marques, Open Energy Transition
11:45	Adequacy 2050: Security of supply in the power system Lorenz Häfele, TransnetBW
12:05	Scenarios for EU-wide infrastructure planning and adequacy assessments Paul Brière, Artelys
12:25	Adequacy and flexibility study for Belgium 2026-2036 Rafael Feito-Kiczak, Elia
12:40	Discussion: Session 2
13:00	Lunch Break
<b>Session 3: From potential to practice: flexibility capabilities and enablers</b>	
14:00	Unlocking Flexibility Through Cross-Sector Links: experience from the BeFlexible project Marco Rossi, Ricerca sul Sistema Energetico/BeFlexible project
14:20	Flexibility, oversight and automation for lower consumer bills Bram Claeys, Regulatory Assistance Project
14:40	RES generation and storage-as-a-service for system value Catarina Augusto, SolarPower Europe
14:55	Discussion: Session 3
15:15	Conclusion and Next Steps

## Organisational participants

In-person
ACER
Agora Think Tanks
Amprion
Artelys
Elia
Energy Storage Europe
ENTSO-E
EU DSO Entity
European Commission
Fingrid
Florence School of Regulation
Octopus Energy
Open Energy Transition (OET)
Regulatory Assistance Project
Ricerca sul Sistema Energetico (RSE)
RTE
Siemens Norway
SolarPower Europe
TenneT
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