

ISGAN Policy Brief

On Long-Term Planning and Implementation of Smart Distribution Grids



Strengthening Collaboration and Coordination for Accelerated Grid Development

Distribution grids are a critical enabler of the energy transition. They face unprecedented pressures from increasing renewable energy deployment; accelerating electrification of heating, transport and industry; and growing demands from data centres. At the same time, grid development must support broader societal priorities, including affordability, resilience, economic development, and climate objectives.

Distribution grid development, and how it affects these objectives, increasingly depends on the combined decisions of grid operators and owners, policymakers, regulators, local and regional authorities, and other stakeholders. At the same time, decisions across sectors, energy carriers, and governance levels are becoming more interconnected, making long-term grid development increasingly dependent on coordinated action.

Managing this growing complexity under conditions of uncertainty requires more than economic regulation of network operators, technical solutions and infrastructure investments. It requires stronger collaboration to build shared understanding and trust, and better coordination to align planning, investment, and action. As the ecosystem of actors expands and cross-sector interdependencies increase, this in turn requires both top-down steering to provide direction and alignment, and bottom-up collaboration to inform decisions, build ownership, and enable action.

Building on ISGAN's previous work on reducing uncertainty in long-term distribution grid planning and implementation, this policy brief identifies key systemic challenges and priority areas for policy action to strengthen system direction, governance, shared planning foundations, as well as collaboration and coordination across actors, sectors, and governance levels.

SYSTEMIC CHALLENGES

in Long-Term Planning for Distribution Grids

1. Need for clear system direction to guide grid development and prioritisation

While overarching principles and methodologies for grid development exist, clearer frameworks and multi-stakeholder approaches are needed to align distribution grid planning and investment with societal objectives such as decarbonisation, resilience, and economic development. This requires balancing competing objectives, integrating societal priorities with techno-economic criteria, and aligning international and national goals with local development needs. Without shared and operationalised prioritisation frameworks, decisions on grid development and capacity allocation risk becoming contested, short-term, and inefficient, limiting their ability to support long-term transformation goals under increasing pressure from electrification and competing demands for grid capacity.

2. Challenges in aligning incentives, mandates, and governance arrangements

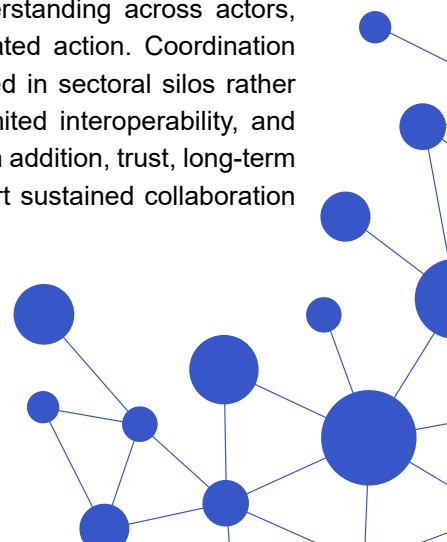
Aligning incentives, mandates, and governance across actors and decision levels, including between grid operators and users, remains a challenge to progress towards shared societal and system objectives. While regulatory frameworks and planning models increasingly recognise the role of flexibility and other innovative solutions, they still tend to favour grid reinforcement and solutions that fit established cost-recovery models and provide near- to medium-term certainty. In addition, governance arrangements are often designed for relatively stable and predictable conditions, making it difficult to support anticipatory and adaptive decision-making in the face of uncertainty and rapid system change. Roles, responsibilities, coordination processes, and approaches for allocating costs, benefits, and risks are not always clearly defined across actors and governance levels. This can discourage joint action, reinforce fragmented decision-making, and contribute to delays in grid development or misallocation of resources.

3. Weak foundations for shared long-term distribution grid planning

Long-term distribution grid planning increasingly depends on coordination across actors, sectors, and governance levels, but actors often lack a shared foundation for planning and decision-making. Shared scenarios, common planning assumptions, and aligned planning cycles are often missing, making it difficult to develop a common view of future needs and system development pathways. At the same time, data relevant for grid and system planning is often fragmented, inconsistent, difficult to share, or insufficiently interoperable to support coordinated planning and investment. In addition, technological and societal change often outpaces planning cycles, making early coordination to meaningfully influence outcomes difficult. Limited transparency and constraints on data sharing can hinder coordination and trust, while balancing information sharing with privacy and confidentiality requirements remains a challenge.

4. Fragmented collaboration infrastructure and cross-system coordination

The structures and processes to support coordination across actors and sectors are often fragmented or underdeveloped, making it difficult to turn shared understanding into joint action. Where regional and local collaboration arrangements exist, they can help build dialogue and shared understanding across actors, but often lack the mandate, structure, and continuity needed to sustain coordinated action. Coordination across sectors also remains limited, with planning, tools, and data often developed in sectoral silos rather than through integrated system perspectives. Fragmented planning practices, limited interoperability, and inadequate standardisation further hinder coordination across actors and systems. In addition, trust, long-term working relationships, and organisational resources are often insufficient to support sustained collaboration and coordinated action.



KEY MESSAGES to Policymakers

These messages primarily call on policymakers and regulators to create the framework conditions for effective long-term grid planning. Their implementation requires coordinated action by grid operators and owners, local and regional authorities, market actors, and other stakeholders across the planning ecosystem.

1 Provide clear system direction and prioritisation

- Define prioritisation frameworks for managing grid capacity and guiding grid expansion, including how competing objectives and criteria should be balanced.
- Make trade-offs explicit, transparent, and supported by clear political decisions.
- Strengthen alignment between international and national goals, local development priorities, and system reliability requirements across governance levels.
- Foster shared understanding of system constraints, trade-offs, and the societal values and priorities underpinning grid development decisions.

2 Align incentives and mandates

- Reform regulatory frameworks, incentives, and governance arrangements to better enable anticipatory investments, coordinated long-term planning, and alignment across related planning and investment decisions.
- Clarify leadership and re-align roles and responsibilities across actors and governance levels.
- Introduce effective mechanisms for cost and risk sharing.
- Ensure that collaboration is not left to voluntary engagement alone, but is supported by clear expectations, requirements, and incentives.

3 Build a shared planning foundation

- Enable joint, regularly updated reference scenarios across actors, and better align planning timelines and decision points across governance levels and sectors.
- Promote the development of shared data foundations to enable coordinated grid and system planning, including the effective use of emerging digital technologies such as AI, with clear governance and improved data quality, interoperability, and accessibility.
- Enable earlier, continuous, and more coordinated planning processes across actors.
- Promote greater transparency in data sharing while appropriately managing confidentiality and privacy requirements.

4 Institutionalise collaboration and strengthen system orchestration

- Establish and resource coordination arrangements between local and regional stakeholders, with clear mandates and appropriate geographic scope to support early, structured and continuous collaboration across actors.
- Define clear processes, standards, and frameworks for cross-sectoral and cross-operator coordination, including across electricity, natural gas, heating, transport and hydrogen, and between transmission system operators and distribution system operators.
- Establish transparent and legitimate decision-making processes that can support timely decisions when competing interests and priorities arise.
- Support intermediary roles and coordination functions with clear mandates, including the skills and resources needed to translate information, build shared understanding, coordinate processes, facilitate cross-sector collaboration, and ensure continuity.

About

About ISGAN

The International Smart Grid Action Network (ISGAN) is a joint Clean Energy Ministerial (CEM) Workstream and IEA Technology Collaboration Programme (TCP). ISGAN is dedicated to accelerating the development and deployment of advanced, sustainable, and highly adaptable electricity grids, commonly referred to as “smart grids.” ISGAN serves as a strategic platform to facilitate knowledge exchange and foster international collaboration in the field of smart energy. This work encompasses insights into industry trends, lessons learned, emerging best practices, and future strategies in line with national, regional, and global climate and clean energy objectives. ISGAN’s national experts come from 24 countries and the European Commission and include engineers, analysts, academics, industry leaders, and policymakers.

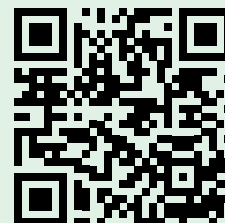
About this Policy Brief

This policy brief has been developed as part of the ISGAN Lighthouse Project on Long-Term Planning and Implementation of Smart Distribution Grids – a strategic initiative that brings together expertise from across the ISGAN community to support more effective and forward-looking distribution grid development. The project explores how grid planning can better respond to accelerating electrification, increasing uncertainty, and the growing complexity of future energy systems. This brief focuses on actor collaboration and coordination as critical enablers of effective long-term distribution grid planning and development. It builds on ISGAN’s previous work on reducing uncertainty in grid planning and highlights the governance, planning, and collaboration conditions needed to support coordinated decision-making across actors, sectors, energy carriers, and governance levels. The brief has been co-developed through a series of workshops, analytical activities, and expert exchanges conducted during 2025–2026, including dialogue with representatives from key actor groups involved in distribution grid planning.

ISGAN Wiki

Definitions of selected key terms from this policy brief are available in the ISGAN Wiki. A collaborative knowledge platform advancing shared language on smart grid transitions – bringing together technical, institutional, and actor-based perspectives in one accessible knowledge commons.

Scan the QR code to explore the Wiki.



Contact

For more details about this policy brief and the ISGAN Lighthouse Project, please visit www.iea-isgan.org or contact the ISGAN Lighthouse Project Manager, Helena Lindquist, helena@iea-isgan.org.



Disclaimer

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