

Unlocking Grid Capacity by Reforming the Connection Process

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Connection Reform is implemented across the globe while Queue Management principles serve national needs

Despite the predictions among network planners that electrification would create demand pressures while renewable technologies would become more deployable, the speed and development of such drivers was not foreseen. Together with pressures from unviable connection applications, low barriers to entry and favourable business cases, grid connection requests continue to soar and clog the grid connection queue. For some countries, the volume of the connection queue is several times higher than their own system needs, leading to sensational demand for already limited grid capacity. Transmission and distribution level increases are sometimes many multiples higher in recent years as compared to the past. While the same is also seen with both in feed and demand requests across voltage levels.

Considering this limited hosting capacity, grids have not been able to accommodate all requests due to the slower pace of grid expansion and grid security challenges. The already limited available grid capacities must now be allocated with consideration. The classic 'First come, First serve' sequential connection processing approach is no longer fit for purpose and different solutions are being used to manage connection queues.

Countries are adopting new approaches to prioritize and order connection requests while continuing to take into consideration elements related to grid stability, congestion management, decarbonization policies, industry competitiveness and societal well being.

We summarize below some key connection queue management tools used as part of connection reform, their meaning within this context and case examples of applications:

Key connection queue management

Transparency

The level of information provided to potential and existing grid connection applicants can vary and acts as an important tool to provide correct signals. If presented with more information, potential applicants can build projects based on grid qualities and available capacities, partner with others at congested nodes, and better formulate their own project pipelines. In line with connection redesign, these tools have the potential to send locational signals, incentivize hybridization, promote flexibility, and drive strategic alignment.

Well-designed and developed connection platforms can help existing applicants manage complex connection redesigns, ensuring quality submissions and timely progression of milestones.

Transparency on the future outlook for connection redesign and obligations for processing connection applications from operators are also important tools to build certainty and support for connection redesign.

Examples

Grid Maps: Granular information (substation level) on available grid hosting capacity for demand, production, and storage. Elia is a best in class example of such transparency with its latest [Source](#).

Connection Platforms: Existing applicants are informed on status of processing, upcoming milestones, documentation templates, and can be in contact with the responsible representative. For operators, they can provide visibility towards milestone progression and drive higher quality of evidence submissions.

Connection Queue Information: Timely and detailed information on connection queues can help potential applicants further manage their project pipeline and expectations while keeping stakeholders informed about the impact of the connection redesign.

Predictability: Clear and comprehensive connection processing schedules can provide potential applicants with information about when to expect and build their project pipeline. This can help them prepare their evidence accordingly and future project pipelines.

Service Level Timelines: Strict timelines on application processing can help applicants understand expected response deadlines and promote user-friendly practices.

Key connection queue management

Transition Regime

Most connection redesigns are triggered by large volumes of connection requests which are already in the queue for connection assessment. While designing connection reform, clear and transparent transition tools are needed to fairly treat applicants that have submitted applications under legacy connection process and need to now transition to the reformed connection process. These applicants are typically termed existing applications and should be treated fairly considering the time of transition.

Examples

Fast Track: Allowing priority processing for existing applications that meet certain criteria.

Time Stamp: Allowing priority processing for applications with an earlier time stamp. Such applicants would then be 'first inline' for available capacity.

Terminations: Provisions (either regulatory or financial) allowing projects to exit current applications if they do not meet new requirements without incurring further costs.

Key connection queue management

Operational Support

Grid operators, parties responsible for the implementation of the connection reform, can also benefit from a variety of tools at their disposal. All options suggested should be implemented in tandem to the connection reform and assessed according to individual operator resource availabilities.

Examples

Non-Firm Contracts: Allow network operators to provide a connection to grid users for part of the requested capacity instead of the full requested capacity. A time-limited offer until the grid is re-inforced. This tool can be used to manage grid congestion in addition to allowing grid access. Operators can dynamically adjust energy flow and distribution in response to network congestion.

Cluster Studies: An Operational process for system impact assessments is done for all grid applications submitted during a specific window (batch) to evaluate the applications together and in tandem with the connection reform process. There could be one or two annual reviews for which operators can prepare and plan to perform engineering studies in line with network planning.

Cable Pooling: From a system impact perspective, operators could help prioritize cable pooling or switchbay sharing among applicants, for substations with limited capacity. This can better utilize available capacity and ensure that the amounts are fully committed by viable projects.

Harmonization: Operators have to evaluate tools for use across both distribution and transmission voltage levels and should harmonize practices across their respective control areas in order to capture efficiencies and make the process simpler for potential applicants. Harmonization efforts would also benefit for coordinated impact assessment evaluations.

Key connection queue management

Prioritization Criteria

Creating an order and selection process to evaluate connection requests based on criteria that can help with the following policy objectives:

- remove speculative projects
- improve connection timelines
- optimize resource allocation
- meet decarbonization targets
- meet grid following
- promote switchbay sharing
- promote industry groups

Examples

Readiness criteria: Prioritizing projects that meet certain maturity checks (ex. financial accreditation, land ownership, supply contacts) can help remove speculative projects and ensure that only those projects that are furthest along in their development receive a connection contract. This is also termed 'First Ready First Served' QM approach.

Strategic Criteria: Prioritizing projects that align with specific strategic categories identified (in alignment with grid expansion plans, decarbonization goals, grid stability signals, specific technology promotion, hybridization or cable pooling, or economic policy).

Open Tender: Organizing competitive actions for specifically congested grid nodes. Allows for award of limited available grid capacities by selecting projects according to best bid. This practice can also favour strategic categories for prioritization.

Key connection queue management

Consultations

Similar to transparency, the level of consultations and stakeholder involvement can vary significantly for different countries implementing connection reform. Longer reform development timelines can signal broader stakeholder involvement through public consultations and in-step collaboration. While shorter development timelines, oftentimes, involve close collaboration with the regulators and closed group consultations. Consultations can take a multi disciplinary bottoms up approach, gathering feedback from a wider spectrum of viewpoints or they can be led by regulators or ministry bodies which take into account specific policy objectives. Transparent and clear consultation activities, along with transparency, are important tools in building support for connection reform.

Examples

Stakeholder consultation: Transparent and collaborative sessions designed to both share and collect feedback from different viewpoints can already consider unforeseen challenges and opportunities that can be refined prior to finalizing a reformed connection approach.

These consultations can involve the broader public or target specific groups such as industry associations, academics, or smaller communities. Task forces can be initiated to assess possible solutions with close or distanced feedback from network operators

How EGI's Electricity Markets and Regulations Creates Value

Value Proposition

At EGI, we have helped clients innovate these connection practices by demonstrating various tools for managing connection queues (Queue Management Tools), which have been proven and considered across the globe. These demonstrations of international benchmarks have been instrumental in spearheading the process of connection redesign and decision making among stakeholders.

What Sets Us Apart

- **Transmission DNA:** Backed by Elia Group TSOs in Belgium and Germany, EGI brings first-in understanding and operating complex grid systems across various voltage levels.
- **Proven Track Record:** Our experts have supported strategic connection reform for grid systems in Europe by benchmarking international practices and helping extract valuable insights and customizing the connection reform process from design to implementation stage.
- **Policy and Regulatory Expertise:** Connection reforms cannot be implemented in isolation and require strong regulatory and public support in order to continue to provide non discriminatory grid access, remove redundancies across sectors, and promote competitiveness by creating hospitable grid hosting policies for industrials and other technologies or loads (ex. batteries and data centers).



ABOUT ELIA GRID INTERNATIONAL

The earlier we join your project, the greater the impact. From concept to boardroom and policy discussions, our multidisciplinary experts help you navigate complex power system challenges, anticipate risks, and turn uncertainties into confident decisions.

With successful projects in 20+ countries and 7 offices worldwide, EGI combines hands-on experience with innovative thinking. As part of Elia Group, a European leader in transmission and renewable energy integration, we bring proven expertise to de-risk your project from the start.

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