



Grid connection services – Renewable generators

Getting you connected

OST offers grid connection analysis and compliance studies for renewable generators (such as PV plants or wind farms) including the following:

- Full grid connection impact studies
- Grid code compliance studies
- Availability and curtailment studies

OST can also offer design, management and independent due diligence for grid connections:

- Connection infrastructure design and design reviews
- PPA and contract review, management and negotiation studies
- Specifications and tendering
- Due diligence

A service you can rely on.

An Edif ERA company, OST is an award winning, independent global engineering consultancy, specialising in investment support and technical advisory services for the renewable energy market and offering a complete package of services to investors, lenders, IPPs and developers.

For critical industries and environments world-wide, Edif ERA provides engineering and consultancy services to reduce risk, optimise performance and enhance capability, giving our customers the confidence to build successful operations.

Edif ERA represents over 100 years of brand history and our long term customer relationships are built on an ongoing commitment to broaden services, deepen sector experience and respond quickly to needs on a local and global scale.

Depending on the country where the power plant is installed, the grid interconnection requirements can vary significantly.

Whether dealing with full grid impact studies in developing energy markets or grid code compliance studies in Europe, OST understands the needs of the project developers, owners, network operators and investors and can recommend the scope and depth of study required at various stages of the project development.

Using state of the art Simulation Software (such as DigSILENT Power Factory), OST can perform full grid integration studies and system studies in compliance with the relevant national grid codes and standards.

Our typical services include:

- Due diligence
- Technical advisory
- Construction monitoring
- Project management
- Performance optimisation
- Analysis
- Feasibility
- Technical component reviews
- Planning
- Environmental & social services
- Commercial advisory
- Asset management
- Energy management

Grid studies can be performed throughout the various project development stages.

A phased approach can be undertaken in line with project development needs, in order to reduce capital investment prior to key feasibility outcomes being known.

- **Project feasibility:** Initial desktop feasibility analysis to indicate the potential maximum generation that can be integrated into the local electricity network.
- **Project development:** Modelling of the generator and modelling and validation of the transmission / distribution network, using power flow software to determine the technical feasibility of the generator to be integrated into the local electricity network. The results can be presented to local network operators.
- **Project detailed design / grid compliance:** Detailed transient stability studies, voltage fluctuations / transformer inrush studies and total harmonic distortion analysis. The results confirm the full technical integration requirements and grid code compliance for the generator. Ideally carried out post financial close.
- **Project availability assessments:** Either as part of the operational phase or prior to energisation, the availability of the electricity network can be assessed to determine the impact on the generator.



Depending on the local electricity system operator requirements, grid integration and compliance studies may form part of a wider scope. Topics covered and assessed as part of a grid study typically include the following:

- **Load flow studies:** Performed to identify the level of loading on particular circuits together with a comparison against their respective ratings. For load flow studies, the thermal loading of elements on the network and the impact on the voltage profile will be assessed pre- and post-connection of the generation project and will be compared with national limits prescribed in the grid code.
- **Fault level studies:** Calculated based on International Standard **IEC 60909**. Fault level or short circuit studies are undertaken to compare the maximum fault level with the lowest rated item of switchgear to identify any reinforcement requirements.
- **Contingency analysis:** Carried out to assess the resilience of the system in a contingency event, such as an outage of the new generator or outage of a local transmission line.
- **Transient stability analysis:** Detailed models are obtained / developed for generators, excitation systems and governors to quantify ramping and spinning reserve / generator trip and to assess the ability of the power system to return to stable condition and maintain its synchronism following a relatively large disturbance.
- **Voltage Fluctuations (ER-P28 or IEC61000-3-7):** Assesses the magnitude of voltage fluctuation following the switching operations on the generator. For example, due to the effect of transformer in-rush currents.
- **Harmonic assessments (ER-G5/4-1 or IEC61000-3-6):** Quantifies the impact on the electricity network due to the harmonic current injection from the renewable generator. Harmonics are combined with background network harmonics and compared with national limits.
- **Grid Availability Studies:** Undertaken to assess the impact of curtailment to the generator due to known grid constraints or abnormal grid conditions. Unavailability of the electricity network can be triggered by many factors depending on the connection specifics, grid unavailability is often unforeseen during project development and can impact the projects income significantly.