Gridscale X™ DER Insights
Product Sheet

Gridscale X DER Insights is a SaaS application that provides grid visibility by uncovering the location of behind-the-meter DERs, their behavior, and their impact on the infrastructure. Utilities can make data-driven decisions that will help prevent unexpected issues, protect critical infrastructure, and increase grid capacity by prioritizing equipment upgrades and fully leveraging the potential of DER flexibility.

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Gridscale X™ DER Insights Product Sheet (Documentation)

General	
Overview	Gridscale X™ DER Insights supports distribution utilities in three main areas: 1. **Improved Planning / Engineering**: Identification of critical grid areas down to the distribution transformer level and aggregated up based on topology, utilizing existing metering devices and data analytics to make the most of existing equipment and make better investment decisions. 2. **Increased Operational Efficiency:** Visibility into historical smart meter measurements, along with location, sizing, and behavior of DERs (solar PV, EV, BESS) uncovering DER-masked load utilizing artificial intelligence, weather, and smart meter data, for to support faster troubleshooting of operational issues such as those related to power quality. 3. **Enhanced Customer Programs and Rate Design:** Insights into available DER flexibility (location, sizing, and historical average behavior), along with grid impact on feeder loading and voltage, without the need for DER telemetry or prior knowledge of a DER installation, helping to improve design, efficiency and targeting of customer programs and rate designs, and helping to increase the number of DERs providing grid services where it matters most.

Prerequisites & Specific Terms	
Operating Systems and Web Browsers for Users	DER Insights is a SaaS with a web-based browser frontend for use on desktop computers or notebooks. DER Insights requires a recent version of an HTML5 capable Internet Browser, e.g. Google Chrome, Microsoft Edge etc.
Use Restriction	You acknowledge that insights provided by DER Insights are limited to the grid model based on the grid asset and connectivity information, mapping of entities and telemetry provided by the Customer and results may not fully correspond to the real-world situation. The interpretation, implementation and utilization of reports, concepts and results is the sole responsibility of the Customer. Siemens

	does not assume any liability, warranty, or guarantee for the feasibility or usability of reports, concepts, and results, nor for actions or omissions based on the reports, concepts, proposals or recommendations.
Description & Functionalities	
Grid Model Building	The Grid Model Building module of DER Insights provides the ability to visually build grid models for DER Insights by leveraging relevant data sources (e.g. GIS, CIS), processing the data and directly verifying results using a geographical user interface. The required data from relevant sources is combined and integrated in one grid model that is flexible and extendable to meet changing needs of DER Insights X over time. The electrical domain of data is leveraged to logically split the grid model in circuits, facilitating the user navigation and data analysis step. A robust and flexible grid model validation engine ensures data is validated before it reaches operations. Users can directly relate to erroneous grid segments on the same geographic interface highlighted according to severity. Selected examples of validation rules include: • Completeness of electrical model (e.g. connectivity, electrical properties) • Domain consistency of electrical model • Topological consistency (e.g. islands, meshed structures) • Containment relationships Validation panel in Grid Model Builder provides holistic view of all validation results throughout modeling phases. A report can be downloaded for each validation to enable tracking and correction in source systems. Once all DER Insights data model prerequisites are fulfilled and validated, the datasets are serialized according to the application's needs and structure, whilst still ensuring consistency on unique IDs, and therefore guaranteeing interoperability. Since grid models are subject to constant change, the grid model building module subscribes to and receives model changes from master systems, thus updates and re-validates the grid model automatically, and subsequently sends updates to DER Insights.
Grid Geospatial Visualization	DER Insights leverages the grid model building module to provide an accurate visual representation of the distribution network down to the service delivery point (SDP) level.

	The combination of a geographical view and software-inherent understanding of the electrical circuit enables users to navigate within the grid and drill down into details, when necessary, based on smart topology highlighting. Equipment search functionality is available, either by address, geocoordinates, or equipment ID. Distribution substations, feeders, and distribution transformers are some of the high-level elements in DER Insights under which equipment are automatically aggregated to reduce cognitive load of users. The following levels of data and visual aggregation are supported: • Distribution transformers aggregate multiple Service Delivery Points (defined as the point of delivery at which a utility service, in this case electricity, is supplied); • Feeders aggregate distribution transformers; • Distribution substations aggregate feeders. Visual representation and details depend on the available grid model for certain grid areas, including equipment and connectivity information down to service delivery points.
Telemetry Data	Telemetry data from the field at the feeder and/or distribution substation level coming through a SCADA system or data lake (optional), or telemetry data at the SDP level coming through an MDMS, or other system (optional e.g. grid-edge management, DRMS, VPP) can be ingested in DER Insights and mapped to the available equipment. Relevant attributes and IDs are mapped in the grid model builder module ensuring consistency and compatibility. Telemetry data can be visualized at the equipment and feeder level, including upper and lower limits where available. Based on these limits, overloading and voltage violations are identified and can be visualized as Events. Up to 12 months of historical data can be accessed for data analysis.
DER location and behavior profiles	DER location and sizing can be imported from an existing interconnection registry and mapped to the available equipment, wherever available (for BTM PV, Batteries). DER Insights can detect the presence of behind-the-meter DERs (such as EV, Batteries that store excess premise PV) at the distribution transformer level and estimate their generation/consumption profiles or behavior, using load disaggregation algorithms.

	These algorithms estimate 15-min historical power profiles for BTM PV, Battery and EV (i.e. charging, discharging, idle), as well as peak and average values. Load disaggregation algorithms require a minimum resolution of 15-minutes for interval measurements collected from smart meters for a historical period of at least six months. Algorithms are trained for behind the meter and residential loads and may show more variability in results in cases similar charging (EV, Batteries) assets exist within the same premise. DER data is accessible and visualized at the available equipment level. Up to 12 months of historical data can be accessed for data analysis.
Grid Impact	DER Insights can identify equipment and areas of the grid which are already impacted by adoption of DERs, or which are close to their operational / predefined limits, by analyzing the number, frequency, and duration of capacity and voltage near-violations and violations over time from historical telemetry data, and then calculating a Grid Impact Score. The Grid Impact Score is calculated at the distribution transformer, feeder, and distribution substation level. Based on the score, equipment on the grid can be visually assessed for impact severity and criticality.

Administration, and data access

Authentication and Access	Authentication and authorization is managed on the User level and based on the authentication method supported by the customer's identity and access provider (IDP) supporting openIDConnect.
Administrator	Permissions to administrate users of DER Insights and access the Administrative Interface.
DER Insights Standard User	Permissions to access the geospatial data visualization. Typical user of DER Insights with full access to all functionality besides administrative tasks.
Grid Model Building User / Grid Model Engineer	Permission to import, configure and adapt grid models using the grid model building feature of DER Insights.
Administrative Interface	The administrative interface allows managing users, roles, groups, and the integration with identity providers. For every user, an individual login is required. Users are also permitted to access and utilize the user management.

	The administrative interface provides the ability to issue and manage client credentials that can be used to access data programmatically.
DER Registry Interface	The DER Registry interface can be used to import, add, delete, and update DER nameplate data from an interconnection registry.
Telemetry Interface	All measurements (analogs, smart meters readings) coming from the field, or another system are treated as telemetry data. The telemetry interface is responsible for ingesting any type of telemetry data from various headend systems. The interface has the following characteristics: • Data format is based on IEC 61968 (CIM) • Event-based interface It is Customers responsibility to comply with the Telemetry Interface characteristics stated above.
Client Credentials	The client credentials are used by clients to obtain an access token outside of the context of a user to utilize the provided interfaces.
SaaS Operational Environment and Services	
Security	Siemens implements and maintains a cyber security framework based on ISO/IEC 27001. Siemens will • Handle security related incident identification, monitoring and remediation according to ISO/IEC 27001 ISMS policy framework of 'Detect; Respond; Remediate; Recover' by the operational team with highest priority • Perform regular penetration testing of DER Insights • Assure that data in transit and at rest are encrypted • Optionally enable multifactor authentication for User Interface (UI) access via customer's IDP • Optionally provide the technical requirements for the Customer to set up access over site-to-site VPN. The access is very restricted by firewall (security groups), Virtual Private Cloud (VPC) private links and IP whitelisting.
Updates	Siemens makes reasonable efforts to keep all customers on the latest available product release. Siemens will • Apply operating system and other third-party security patches and updates as appropriate.

	• Apply application software patches as necessary and perform periodic upgrades with latest application software releases (usually two upgrade releases a year). • Maintain and troubleshoot third party software issues required for ongoing operations, work with third party provides to troubleshoot as required. • Notify its customers of release schedule and availability of new upgrades, patches and service releases in a regular fashion. The schedule for installation will be mutually agreed upon. Customer has the obligation to approve and enable updates for the latest supported version as soon as they are released by Siemens, but latest within 6 months after release of the new version or until a mutually agreed date. Otherwise, Siemens may suspend product support and operations.
Monitoring and Maintenance	Siemens will • Administer and monitor environments including utilization of Central Processing Unit (CPU), memory, Input/Output Operations (IOPs) and disk space • Administer and maintain associated operating systems • Manage and troubleshoot the infrastructure components and processes, software licenses and maintenance • Develop, maintain and utilize standard operations procedures and daily checklists for Siemens operators and administrators
Data Retention	Siemens will retain and the product will provide access to the grid model and the associated historical time series data such as Power, Voltage profiles aggregated at grid equipment such as transformers. • Up to one (1) year of total accessible historical data for retrieval through the product • Upon termination, data archival of data for up to three (3) months to permit transfer to customer
Training	Siemens will provide • DER Insights SaaS User Guides and onboarding material • Instructor-led training (additional costs)
Onboarding	Siemens offers services for onboarding of DER Insights into the Customer's IT/OT landscape, for additional fees on time and

material basis and under separately agreed terms and conditions.

Packages

Service Delivery Points	Service delivery point (SDP) is defined as the point of delivery at which a utility service, in this case electricity, is supplied.
Packages	The packages in the table below have limits that apply for the entire Subscription Term, unless expressly indicated as "monthly" limit.

Package	**Tier 1**	**Tier 2**
Included SDPs	200.000	600.000
Upgrade Packages		
Additional SDPs	50.000	N/A

True-up	Siemens has the right to monitor the number of SDPs and users in use by Customer. Should the number of SDPs or users exceed the licensed scope, Siemens can invoice the exceeding license count for that period.
API Limits	Overview of services and limits levels included in the DER Insights Packages listed below

Package	**Tier 1**	**Tier 2**
Telemetry Average Rate	3 MB/s	8 MB/s
Telemetry Batch Rate (10% of the time in 12 h)	22,5 MB/s	70 MB/s
Token Management	20 requests per minute	40 requests per minute

All services are protected against Denial of Services attacks that may result in temporary limiting overall requests per client.

Concurrent user Limits	The number of concurrent users is limited as follows:

Package	**Tier 1**	**Tier 2**
Concurrent User	25	50