GRID EDGE SUITE

PSS®DE
Product sheet

PSS®DE is a cloud-based techno-economic simulation software that enables users with algorithms and vendor agnostic models to quantify the benefits of optimization and Distributed Energy Resources (DER) to decarbonize onsite energy projects.

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PSS®DE Product Sheet
(Specification Document)

General

Value Proposition	Siemens PSS®DE is supports you in three main areas:

- **Clarity** with quantified financial and decarbonization KPIs for the integration of DERs, local generation and storage, and hydrogen
- **Speed** and flexibility to make in-depth analysis and quickly identify financially and technically viable solutions for on-site energy generation systems
- **Confidence** in results from reality near simulations based on realistic optimization algorithms and technology models and the interactions between key assets

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Prerequisites & Specific Terms

Operating systems and web browsers	Siemens PSS®DE is a web-based software for use on desktop computers or notebooks. Siemens PSS®DE requires a recent version of an HTML5 capable Internet browser, e.g. Google Chrome.

Use Restriction	You acknowledge that simulations in Siemens PSS®DE are limited to mathematical simulation PSS®DE has been created by Siemens based on experience and the Asset Data or other information provided by the Customer and results may not fully correspond to the real-world behavior. 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.
	Siemens PSS®DE data storage is restricted for use of techno-economic simulation and must exclude any personal data. If misuse is detected the account will be blocked and the user admin will be informed.

Territory	Refers to the geographic area of:

• Australia	• Finland	• Portugal
• Austria	• France	• Qatar
• Belgium	• Germany	• Romania
• Brazil	• India	• Spain
• Canada	• Italy	• Sweden
• Chile	• Luxembourg	• Switzerland
• China	• Netherlands	• Thailand
• Czech Republic	• Norway	• UK
• Denmark	• Poland	• Vietnam

Additional countries may be included by Siemens upon request. For avoidance of doubt, Siemens PSS®DE may not be used in the Unites States of America and by US customers.

Description & Functionalities	
Decarbonization study	PSS®DE automatically identifies investment scenarios of decreasing CO_2 emissions for on-site energy generation systems. It shows the relationship between investment and operation cost in relation to CO_2 emissions. Sizing optimization is ideal for early phases of project development. Simplified technology models are used. These general models are manufacturer independent, leading to unbiased results. An ideal foresight over 1 year is used to identify what technologies are relevant and their optimal sizes.
Dispatch optimization	Dispatch optimization provides reality near dispatch algorithms with either short-term (i.e. ≤24 hours) or no foresight to realistically model systems and provide detailed analysis. Detailed models for assets are used, and these can be parameterized to specific products and manufacturers. A cost-based optimization determines what assets are utilized at each timestep, and the cumulative results are then used for technical and financial analysis.

Multiyear effects can be simulated when relevant. These are defined by annual multipliers for timeseries and fuels, delayed installation for any asset, and user defined replacement schemes for an asset.

The dispatch optimization is useful to quantify differences in scenarios with different technologies, asset sizes or asset parameters. It allows detailed analysis, and it is typically used during the Sales and Bid phases, and for system verification during the operation phase.

Resource timeseries and fuels	Project specific timeseries can be added for: • Electrical and thermal power • Energy prices and currency • Weather (wind speed, irradiation, temperature, and pressure) • Flow (e.g. for H2) • Percentage and unitless timeseries Fuels can be assigned to technologies and assets from a dropdown list for the fuel input. Fuels are defined by density, Lower Heating Value (LHV), carbon content and price. The price is shown according to the unit selected, this can be either a constant value or a timeseries.
Predefined technologies and assets	Predefined technology models and library models for the dispatch optimization are provided. These are grouped as the following: **I. Electrical** • Electrical loads • External grid connection • Wind and photovoltaic (PV) • Electrical Energy Storage Systems (ESS) • EV chargers • Reciprocating engines (RICE) – gensets **II. Thermal** • Heating (steam and hot water) and cooling loads • District heating (steam and hot water) and cooling • Reciprocating engines (RICE) – Combined Heat and Power (CHP) • Gas turbines • Steam turbines (full condensing and back pressure) • Steam and hot water systems (fuel-based boilers, electric boilers, heat pumps storage, vents, valves,) • Cooling systems (cooling loads, district cooling, absorption and compression chillers, storage, valves, and vents)

III. Hydrogen

- Hydrogen loads
- Hydrogen grid connection
- Hydrogen systems (electrolyzers, fuel cells, gas turbines with hydrogen capability, storage, compressors)
  - Process plants (e.g. for ammonia, methanol)

Topology	The project topology can be defined for both Sizing and Dispatch Optimization. Topologies allow multiple buses for an energy type, which can be useful to represent different buildings or geographical locations, or different energy qualities e.g. high and low pressure steam or hydrogen.

Dispatchers	The Dispatch Optimization provides several optimization algorithms that reflect different opportunities for dispatch systems. This includes a sophisticated optimization algorithm with day-ahead planning, an optimization algorithm without planning, and a rule based (heuristic) algorithm. The user can define whether a single year with linear extrapolation of results, or multiple years with consideration of long-term changes, are simulated.

Result tables	Tabular result tables show key system and equipment KPIs. Values are given for total project costs as well as on a monthly or yearly basis. Financial KPIs (CAPEX, OPEX, replacement, fuel costs, import and export costs, incentives and taxes, etc.) and technical KPIs (energy consumed and produced, fuel consumed, operating hours, number of starts, etc.) are shown on separate tabs. Results can be easily filtered and copied into Excel for further use.

Result visualization	Results are visualized in energy flow (Sankey) diagrams and an integrated trending tool. Predefined groupings are provided for quick analysis, or the user can create specific trends.

Financial evaluation	A stakeholder based financial evaluation shows the key aspects for different parties based on a Power Purchase Agreement (PPA) setup. Parameters for equity and debt, as well as tariff structure and escalation rates can be defined for each stakeholder. Comparisons for generation, cashflow, financial and environmental KPIs are provided, as well as a detailed view for each configuration on a yearly basis.

Report generation	A preconfigured report in MSWord and PowerPoint can be generated. The content of the reports can be selected from a defined list before creation, and the reports are editable for final adaption.

Pricing Model

Service structure	The Services comprise of two parts:

- "**PSS®DE trial period**" where free access is provided for a period of 4 weeks to allow evaluation. Demonstration recordings and documentation are provided to support initial use.

- "**PSS®DE SaaS**" is the continuous service of PSS®DE during the subscription period. Users are grouped by the organization that purchases their SaaS to receive the volume discount. The billing period for an organization extends over 12 months, after which it is automatically renewed. New users within a organization will be synchronized with their organization billing period.

PSS®DE Trail Period (PSSDE_TRIAL)	A free 4-week trial period can be used once by any user. This trial period gives access to PSS®D_L (large), allowing full evaluation of the software.

The following are provided for effective use:
1. Online help
2. Demonstration recordings how to setup projects

Note: Typical examples of wind timeseries are available, downloads of wind timeseries from new locations are not provided in the trial period.

User Training (PSSDE_TRAINING)	Scope: Training to configure new projects, including creation, simulation, and evaluation.

Duration and location: Either multiple virtual sessions for a total of 16 hours, or in Milano, Italy as a 2-day training course (8 hours a day)

Participants: up to 5 participants are included.

User Support (PSSDE_SUPPORT)	Scope: A maximum of eight hours support is available to each user annually within the SaaS fee. Additional simulation support can be purchased in 10-hour blocks.

For contact details please see the Specific Terms of the Grid Edge Services.

Location specific wind timeseries (PSSDE_WIND)	PSS®DE provides an API for location specific wind timeseries. Two free location specific wind timeseries are included within the annual SaaS fee, these are reset for each user at the beginning of their organization's billing period. Therefore, for users whose SaaS starts during their organization's billing period, their first reset will occur after a shorter period than 12 months.

Additional groups of 5 location specific wind timeseries can be purchased for an organization. These may be accessed by any user that belongs to the organization if they have already used the two location specific wind timeseries provided in their annual SaaS fee.

Additionally purchased location specific wind timeseries are not limited by the organization's billing period, unused wind timeseries downloads will carry over to the next billing period. |

PSS®DE SaaS

| Packages | The equipment for SaaS packages is defined in the "Description & Functionalities", section "Predefined technologies and assets". |

For each user, an upgrade (from Small to Medium or Lage, or Medium to Large), is possible at any time.

Changes between package sizes are defined in the Specific Terms of the Grid Edge Services; Change between application sizes (Upgrade / Downgrade).

Package	Description	Order Code
Small	All equipment defined in: Electrical.	PSSDE_S
Medium	All equipment defined in: Electrical; and Thermal.	PSSDE_M
Large	All equipment defined in: Electrical; and Thermal; and Hydrogen.	PSSDE_L

Volume discounts

A tiered discount structure is given to companies that pay for multiple PSS®DE SaaS users on a single contract. These discounts are considered separately for each package size (i.e. PSSDE_S, PSSDE_M and PSSDE_L are counted separately, not additively). The discount will be updated according to the number of users when a new user is added, and at each invoicing period.

Tier	Number of users on invoice	Discount for users in this tier
1	1-3	0%
2	4-9	25%
3	10+	50%

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