Most loads and feed-ins can be connected up to 4,6kVA/230V,20A single-phase depending on technical connection conditions of the distribution grid operators. According to the current standards and process models of the system operators, a connection is acceptable only if the asymmetry (negative sequence component to positive sequence component) does not exceed 2% and if it is guaranteed that the voltage stays between 90% and 110% of its nominal voltage at the connection point.

It is common practice to evaluate the distribution grid’s capacity for loads (such as electric vehicles, heat pumps, ACs, etc.) and decentralized feed-ins (such as combined heat and power, photovoltaic, etc.) through symmetric load flow analysis. In low voltage systems, the available grid capacity is often misjudged by this simplification and reverse capacities must be included. Insecurities concerning the facilities’ grid connection locations, as well as phase choice, complicate the accurate evaluation of the grid’s capacity.

OROP uses an asymmetric load flow analysis, which allows for a more realistic modelling of the grid’s actual state. Additionally, the Monte-Carlo simulation uses a probabilistic approach to compensate insecurities in grid capacity analyses. It outputs a statistical representation of the grid’s capacity at justifiable computing time.
**Features**

- Underlaying GIS-based power system analysis and planning software
- Automated Monte-Carlo simulation with symmetrical and asymmetrical power flow analysis
- Capacity estimation of distribution grids for symmetric and asymmetric loads and feed-ins
- Fingerprinting of various grids and load situations

**Fields of application**

- R&D platform for smart grid planning
- R&D platform for grid capacity analysis
- Capacity estimation for decentralized facilities (PV, wind, combined heat and power plant and energy storages)
- Analysis of the use of grid regulations (e.g. local load management, controllable local grid transformers, U-Q-control, etc.)

**Perspective**

- Consideration of the U-Q-regulation for decentralized facilities
- Consideration of cosPhi(P) regulation of decentralized facilities
- Integration of controllable local grid transformers
- Integration of phase and line selective control
- Copy of process models for the grid expansion

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2. **modeling, configuration and analysis**

GUI in OROP