DEPSYS

Monitoring, control, and digitalization of electrical distribution grids using automated and data-driven solutions

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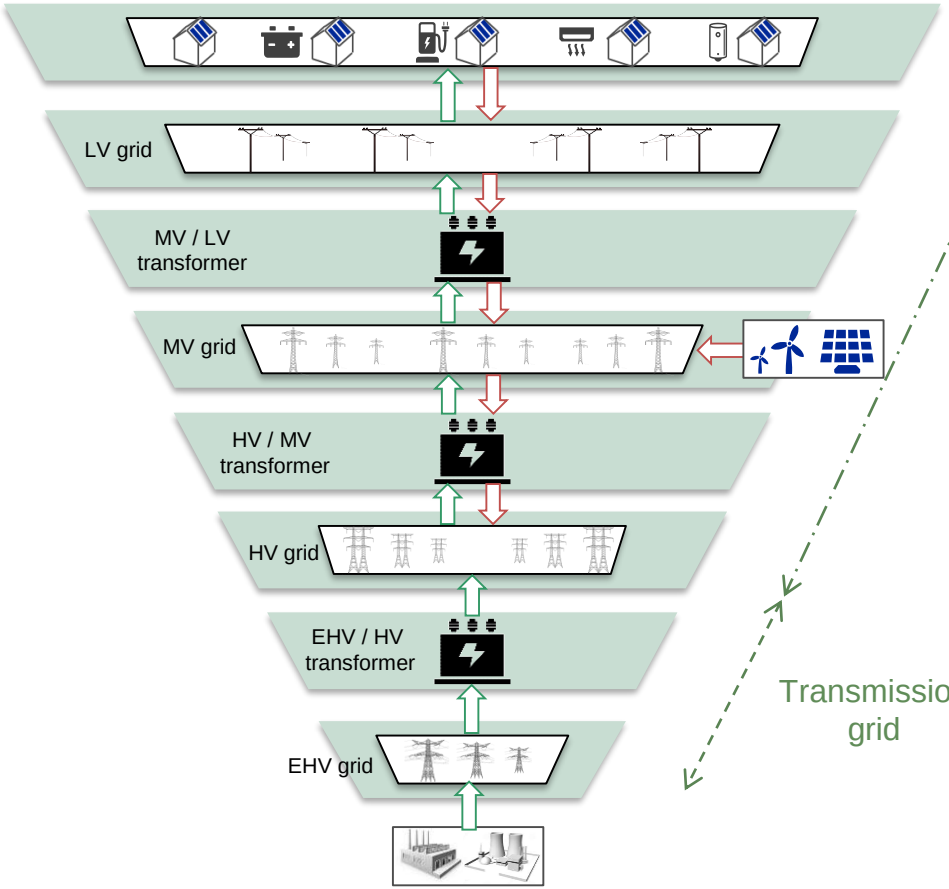
Analogy between electrical network and tree

Electrical network



End-customer

Distribution grid

Transmission grid

Tree

Leave

Branch

Trunk

Trends for utilization of distribution networks

Electrification of mobility and heating and cooling consumptions

More loads or generations

Higher pressure decreasing quality

Unacceptable load or generation resulting in breakdown

Growth of distributed renewable energies

Situation of distribution networks

Facts

- Geographically spread everywhere.
- Electricity flows according to physical laws!

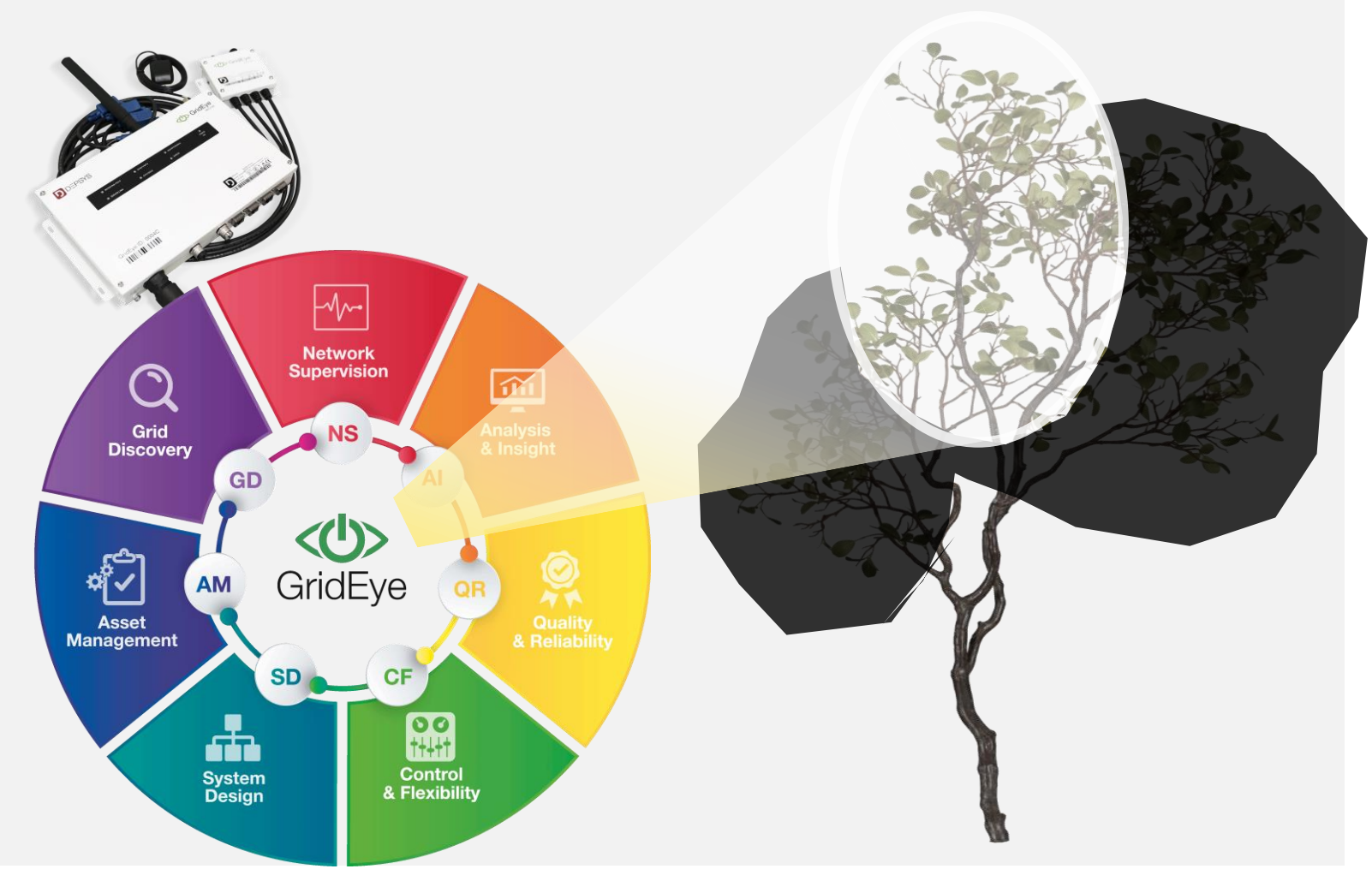
Status

- Almost NO monitoring and visibility.
- Almost NO information of network health.

Trends

- New trends in network utilization.
- MORE expectations from network!

GridEye: all-in-one solution



GridEye

- Visibility and insight
- Status and health
- Control and stability
- Discover characteristics
- Digitalization

GridEye: the digital Swiss army knife for distribution networks.

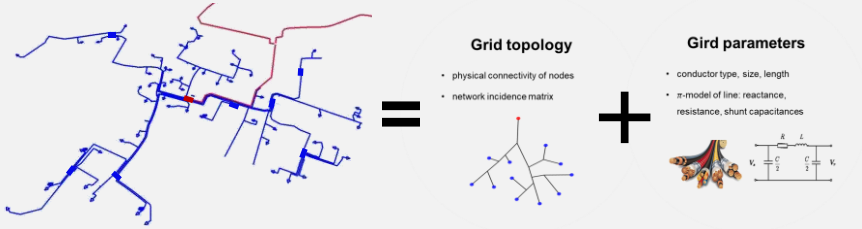
Grid analysis approaches

Usual grid analysis

Grid model and measurements data are required.

1. Measurements

2. Grid model, including topology and parameters



ModelLess approach

Only measurements data is needed.

1. Measurements

Grid analysis approaches: pros and cons

Usual grid analysis

+ Calculate grid behaviour.
- Up-to-date and accurate grid model is not always available.
- Difference between measurements and simulations using data sheet.

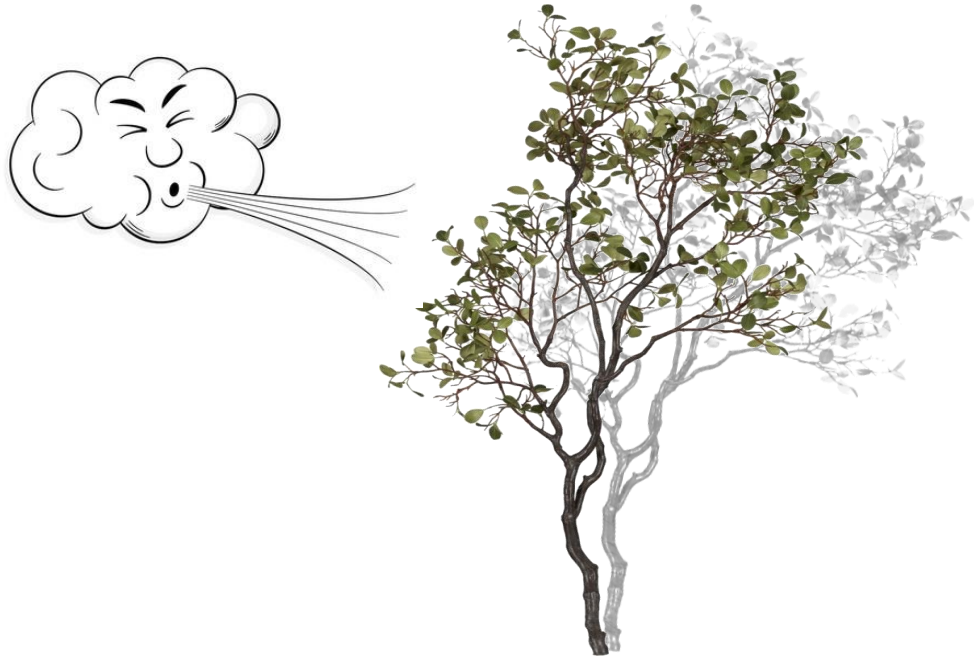
ModelLess approach

+ Accurate estimation of grid behaviour in a data-driven approach.
+ Enable plug-n-play functionalities.
+ Evaluate grid hosting capacity.
+ Consider impacts of control action on grid.
+ Integrate the intelligence whenever it is needed.

How *ModelLess* works: analogy

ModelLess approach accurately estimates important characteristics of distribution grids, such as sensitivity coefficients, grid topology, and gird asset parameters, only using measurement data.

1. Estimate strength of branches with regard to external forces (e.g. wind) only by measuring the tree movements rather than analyzing branch samples;
2. Estimate connectivity between branches only by measuring the tree movements rather than following path of all branches one by one;
3. These estimations can be used to determine how much additional load/force the tree can sustain.



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Rethink energy