

Policy Brief: micro vs MEGA trends in power system development

What are influencing these trends and how do they effect the evolution of the power system?

For the electric power systems to enable very high penetration of renewable energy sources, three type of strategies are required:

- Strengthening local grids to accommodate more renewable generation
- Strengthen transmission grids to cater for increased energy transfer between renewable rich remote areas and the demand centres
- Alternative solutions for sustainable grid developments, including new technologies and markets to increase power system flexibility

This results in a paradigm shift in grid operation and network expansion with two trends emerging: the micro and MEGA perspectives.

Policy statement 1:

Significant developments and investments are required from both the micro and the MEGA perspectives to allow the full utilisation and harvest of available renewable resources.

Policy statement 2:

It should be a requirement for any type of power grid investment strategy to have a sustainable time horizon to prevent additional negative environmental impact and depletion of natural resources.

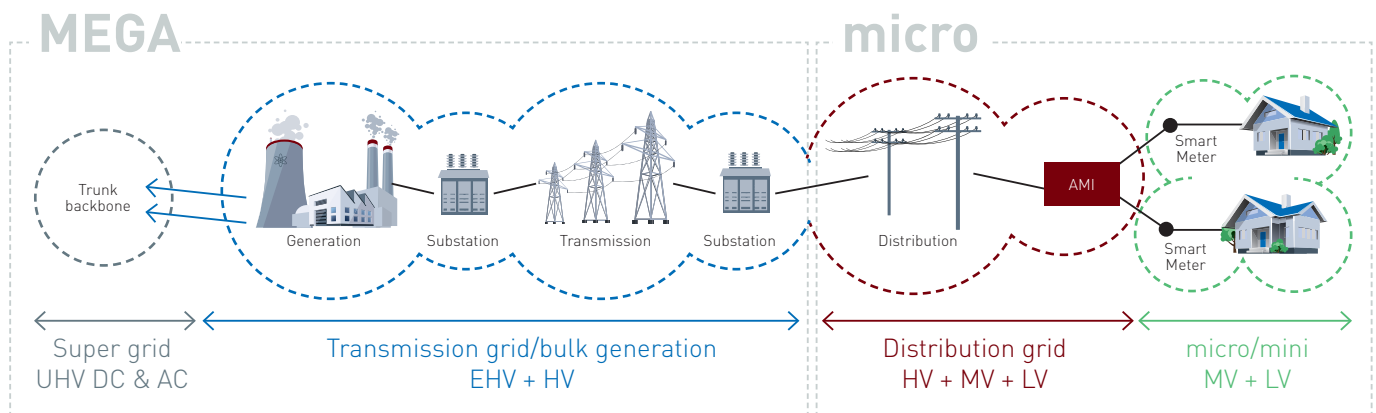
Policy statement 3:

Whole-system coordination between micro and the MEGA perspectives, together with cooperation between different system levels, are needed to provide the most value of investments.

Policy statement 4:

An optimal mix between the micro and the MEGA perspectives should be considered to identify investment strategies which provide: the most socio-economic welfare at the same time as providing an optimal use of resources.

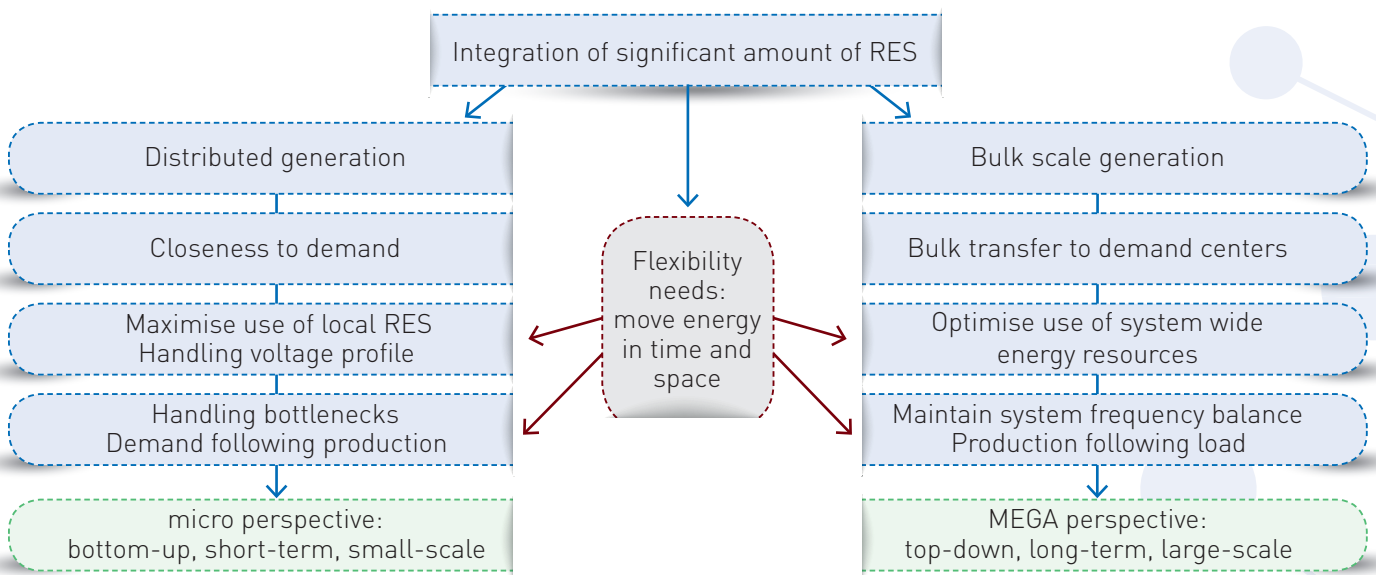
micro and MEGA perspectives



micro-perspective focuses on local solutions, with grid development taking the bottom-up standpoint, characterised by advances on local, residential and energy community level.

MEGA-perspective focuses on system or even intra-system wide solutions, with grid development taking the top-down standpoint, characterised by interconnections between regions, nations and independent systems.

The micro and the MEGA-perspectives become apparent when addressing the investment strategies in the integration of renewable energy sources. Both approaches are however significant drivers for the need for flexibility in the power system.



Final notes:

Optimal solutions for a power system in one country, may be not be optimal in another country, due to differences in base scenario, grid structure, generation mix, available natural resources, existing legislation, social acceptance, etc.

National strategies and policies have a significant influence on overall grid operation, management and development.

Fundamental physical grid requirements have to be considered for all power grid developments, including e.g. transfer capacity needs, equilibrium of energy contents, voltage and frequency support requirements.

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