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Grid connection agreements/ voltage control for PV and wind farm

Westnetz GmbH · Dr. Stefan Küppers · 26. September 2017

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Grid connection agreements of PV and wind farms

Feed-in of Renewable Energies Connection Process

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Customer

… wants to inject renewable energies:
- ✓ standard form (Einspeiserportal / e-mail / letter)
- ✓ cadastral map
- ✓ data sheets

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… check
- ✓ compliance with legal regulations
- ✓ best location to connect with the grid
- ✓ necessary building activities

… send a connection commitment

Customer

… returns the signed connection commitment and an application for an electric meter (also possible online)

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… receives the electric meter and has it put into operation

… sends further documents to Westnetz (client data, operation data)

… check documents and pay the remuneration regulated by law

The customer is the focus of attention in current developments

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Queen Customer

Processes - Goal: Complete automation of processes for the majority of feeders → Autonomous driving

CUSTOMERS - Goal: Increase customer satisfaction by reducing lead time and creating transparency

Reduce costs and increase customer satisfaction by automating processes

The following contents are part of the Grid connection agreements

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Technical connection conditions:
e.g.:
- reactive power regulation
- Grid security management

Grid connection capacity
for energy purchase and energy feeding in

Voltage level and and **grid connection point**
(economically most favorable)

Type and structure of the **metering devices**

Regulation of liability

Type of renewable energy, feed in power and **plant type**

Not part of agreement:
Feed - in remuneration
→ regulated by law

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Voltage control for
PV and wind farms

Voltage control of generating plants has a big impact on the grid

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Basics:

- **Active power infeed** leads to a **voltage rise** in the grid
  → The permitted voltage range may not be hurt
- Distribution and transmission of active power needs reactive power
- In case of faults: strong grid support is needed

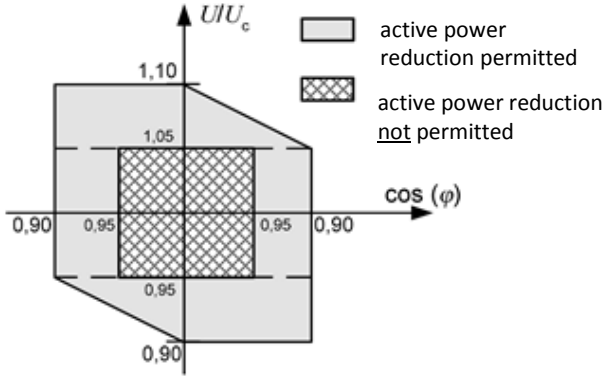
Solution:

Generating plants are required to feed in **reactive power.**
National and European standards define the relevant capabilities and controlling methods.

It is distinguished between a

- **static voltage control** to stabilize the voltage during normal operation and
- **fast fault current infeed** to support the grid stability

Grids **voltage** limitation **is** most likely the **restricting value** (in LV + MV networks)



Details will develop in the next months, since National and European standards are in revision or under development.

Implementation @ Westnetz

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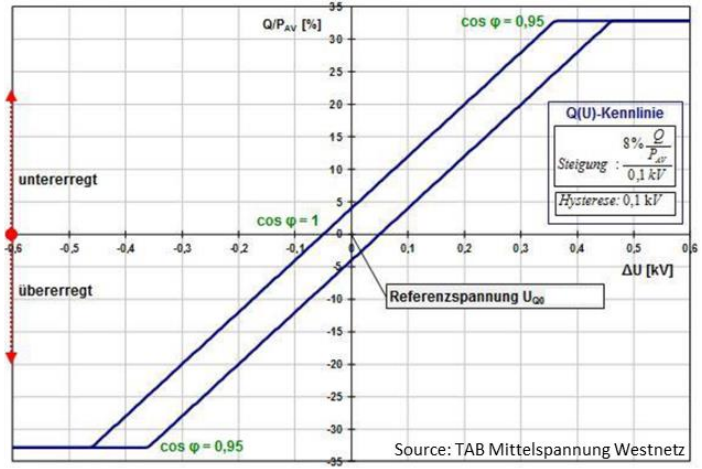
Parameters of the reactive power control are **given by the DSO**. They **depend on** the **voltage level** and the **plant size**.

Most common is a **Q(U)-control** to stabilize the grids voltage and to limit the reactive power infeed to the necessary amount.

Other common control modes are **cosϕ(P)** or the direct control of **Q**.



The parameters of generating plants bigger than **1 MVA** or connected to the **high voltage level** are adjusted by **remote control**.
Typically a set value for the **voltage or** the **reactive power** directly is transmitted.

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Case Studies:
FNN and Westnetz

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