

# TÜV NORD CERT – Tested grid code compliance for the national grid connection regulations (e.g. BDEW, VDE and CEI)

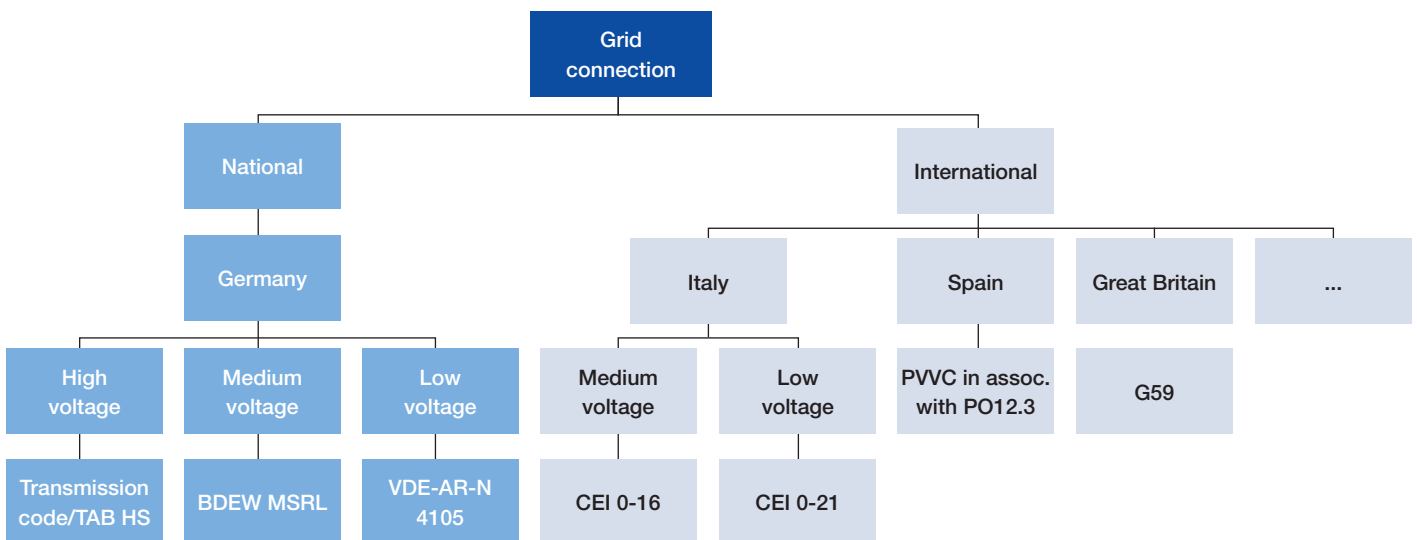
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### Target groups

When connecting renewable-energy generation systems to a low-, medium- or high-voltage grid, evidence of electrical characteristics has to be provided. The evidence can or must be provided by means of certification, depending on the voltage level. In the first step, this certification covers the generation unit (a photovoltaic inverter, a thermal

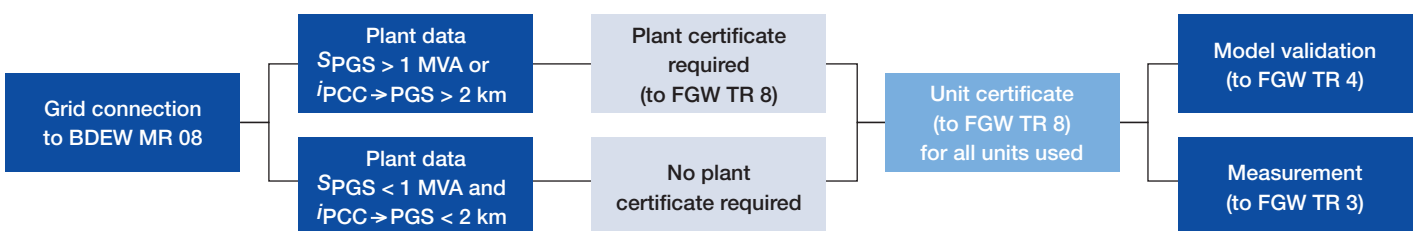
power station or an internal combustion engine), and the following step covers the generation plant itself (a photo-voltaic park or wind farm). This means that “Grid Code Compliant” certification is directed towards generation unit manufacturers and their sales operations (unit certification) and also to investors, planners, erectors and installers of generation plants (system certification).

### Certification – national and/or international?



### When is which certification required?

(Example: Connection to the medium-voltage grid in Germany)



# Fact Sheet “Grid Code Compliant”

## Which requirements are examined?

The requirements for generation units and plants are based on grid behaviour during normal operation, cases of grid disturbance and also on system services. The requirements are as follows:

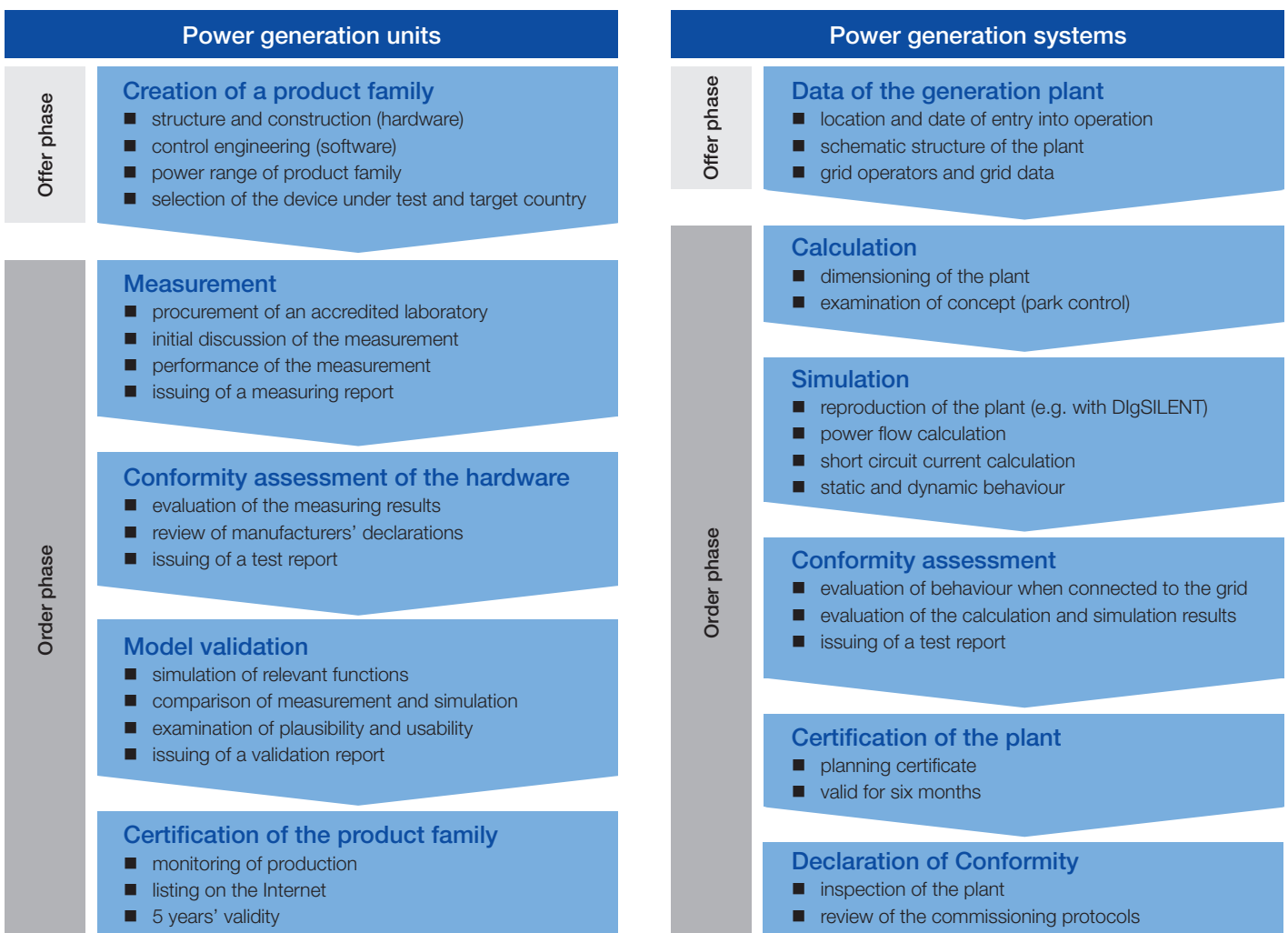
- Behaviour during normal grid operation
  - maximum active power
  - active power increase
  - maximum active and reactive power diagram
  - network interactions (harmonics, flicker)
- Behaviour in cases of grid disturbance
  - reduction of active power through frequency increase
  - monitoring of grid voltage, frequency and reactive power consumption
  - voltage dips in the grid (low voltage ride through; LVRT)

- System services for safe system operation
  - set values for active and reactive power
  - voltage or active power dependent on reactive power

In the case of plants, the requirements regarding the concept have been extended. These additional requirements are, for example:

- Dimensioning of the operating equipment within the plant (switch gear, transformers – possibly including tap changer, cables)
- Protection concept in cases of faults in the grid or in the plant
- Parametering of generation units, including of the certified software versions
- Fulfilment of the conditions from the unit certification
- Plant regulation and control concept (park control)

## Certification procedure



# Fact Sheet “Grid Code Compliant”

## At what time must the certificates be submitted to the grid operator?

In case of connection to the medium-voltage grid, the time from which the generation plants have to obey the requirements according to the amendment to the BDEW Medium Voltage Guideline depends on the primary source of energy. On this basis, there is already an obligation on all generation plants to fulfil the requirements. However, proof of fulfilment can be provided in arrears by means of a plant certificate, for example for thermal power station plants, by the end of 2014. As the unit certification precedes the plant certification, units have to be certified beforehand. This means that the deadline for unit certification is brought forward by the amount of time needed for undertaking the plant certification.

## What are the benefits of certification?

- Competitive advantage
- Fulfilment of national market regulations
- Permission to connect to the grid
- Independent, neutral inspection
- Right to use the TÜV NORD CERT “Grid Code Compliant” test mark in association with the unit and component certification



## Why TÜV NORD CERT?

- Accredited since 2009 for generation units, plants and components by the official German accreditation body (DAkkS) for – among others – Germany (BDEW MSRL; VDE-AR-N 4105; TransmissionCode), Italy (CEI 0-16; 0-21), Spain (PO 12.3; PWVC), Great Britain (G 59)
- Officially recognised by the Fördergesellschaft Windenergie und andere Erneuerbare Energien – FGW e.V. (German society for the promotion of wind energy and other renewable energies)
- More than one hundred unit and plant certifications already completed
- Participation in expert sector committees such as VDEIFNN, VDEIDKE and FGW
- Strong international network in the grid connection industry, consisting of measuring institutes, model developers and research institutions
- Organisation of expert events and forums such as the thermal power station plant (BHKW) forum

## Making use of synergies

- Recognition of measuring results for certification according to further national grid connection standards and regulations
- Recognition of factory monitoring in the context of further certifications by TÜV NORD CERT
- One-stop shop: certification according to European Community Directives (Low-voltage, EMC and Machinery Directive), quality, environmental and energy management in accordance with the ISO Standards and Functional Safety Standards, in particular fault tolerance of protective equipment
- Useful contact who can recommend suitable project partners for the measurement and development of simulation models