

ANNEX 1

Data/information required by Amprion for the connection of a power plant

I. General information on the feed-in prospect

- Name, legal form and address of the company
- Information on the purpose of the company
- Designation of a contact person
 - Name
 - Address
 - Telephone number
 - Telefax number
 - E-mail address

II. Information on the connection intention

1. Plant concept and intended operating mode

- Situation/layout diagram of the planned power plant (in particular, the locations of the machinery transformers, the routing of the high-voltage energy discharge and further high-voltage connections on the power plant premises must be recognisable)
- Description of the power plant concept (number of generators, machinery transformers, preferably desired grid connection points, etc.)
- Routing plan of the planned connection line route from the power plant location to the desired grid connection point
- Intended framework schedule for the approval, construction and commissioning of the power plant
- In the case of combined heat and power generation plants: Electricity- or heat-powered operation
- Intended operating mode: Base, medium or peak load
- Planned, special power plant features (insular operating capability in a customer/plant grid, self-contained starting capability, etc.)
- Intended participation in the balancing power market

2. Intended connection concept to the Amprion grid

- Single-pole equivalent feed-in connection circuit with depiction of the operating equipment on the power plant premises: Generators, machinery transformers, bus bars, circuit breakers, isolating switches, earthing switches, overvoltage arresters, voltage and current converters, etc.
- Single-pole equivalent internal requirement and reserve grid connection circuit with depiction of the operating equipment on the power plant premises up to the internal requirement supply's main distribution system: Transformers, bus bars, circuit breakers, isolating switches, earthing switches, overvoltage arresters, etc.

3. Technical data of the generator / the turbine set for each generation unit

- Rated voltage [kV]
- Rated apparent power at the generator terminals under standard conditions [MVA]
- Rated effective power at the generator terminals under standard conditions [MW]
- Maximum effective power of the turbine set at the generator terminals at full load [MW]
- Minimum effective power of the turbine set at the generator terminals [MW]
- Turbine set load increase rate from minimum to maximum power output [MW/min]
- Turbine set load decrease rate from maximum to minimum power output [MW/min]
- Turbine set load factor range, inductive and capacitive ($\cos \varphi$)
- Subtransient direct-axis reactance (unsaturated and saturated) x_d'' [%]
- Generator operating diagram
- *Subject to separate request¹:*
 - Generator data for dynamic simulations:
 - Reactances (unsaturated): x_d, x_q
 - Reactances (unsaturated and saturated): $x_d', x_q', x_q'', x_{a\sigma}, R_a$
 - Constants: T_d'', T_d', T_q'', T_q'
 - Acceleration constant T_A of the entire turbine set shaft linkage
 - Generator regulator block diagrams suitable for grid fault simulation calculations (turbine regulator with power and speed regulator, frequency statics, valve depiction and turbine depiction for the various pressure levels, load jump relay or acceleration protection, voltage regulator with PSS, under- and over-excitation limitation, etc.)

4. Technical data of the machinery and internal requirement transformers

- Rated transformation ratio [kV/kV]
- Rated apparent power [MVA]
- Vector group
- Relative short-circuit voltage minimum, maximum and mean step setting [%]
- Relative no-load current [%]
- Short-circuit resistive losses (copper losses) [MW]
- No-load resistive losses (iron losses) [MW]
- Tapping switch range [%]
- Tapping switch step width [%]
- Type of tapping switch (under load, under no-load)
- Zero-phase-sequence system impedances [Ω]
- Star point handling
- If necessary: Star point impedance

5. Technical data for cables/aerial lines for preferably desired feed-in, internal requirement and reserve grid connections

- Rated voltage [kV]
- Specific positive sequence system resistance, reactance and susceptance values [Ω/km]

¹ These data are additionally required, dynamic calculations, e.g. on the power plant's stability behaviour, to be carried out subject to agreement. In these cases, the data will be requested separately.

- Specific zero-phase-sequence system resistance, reactance and susceptance values [Ω/km]
- Likely length of the relevant connection lines to the preferably desired grid connection points [km]

6. Data on internal requirements

- Effective and reactive power requirements during generator operation [MW, MVar]
- Effective and reactive power requirements during plant standstill [MW, MVar]
- Effective and reactive power requirements during the start-up process [MW, MVar]
- Effective value of the power plant-side contribution to the initial short-circuit alternating current in the event of a tripolar fault at the grid connection points [kA]
- Zero-phase-sequence system impedances from the point of view of the grid connection points [Ω]