

Features of Akkuyu NPP turbogenerators and factory test results

Rotating Electrical Machines A1

PS3 + Question 3.3: As a theme from the papers, higher renewable penetration has been highlighted. What do designers of machines and operators need to consider at the design stage to ensure long-term reliability of the machine for the expected plant life given higher renewable penetration in grid networks?

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AAEM

Akkuyu NPP feature and paper content

- The goal and content of paper are not intended to investigation of influence of renewable penetration on power units.
- In frame of Akkuyu Project the renewable penetration was not considered in details because by feature of grid connected to Akkuyu units and Customer decision not use secondary regulation of the unit.
- Unit Capability during Akkuyu NPP operation with dedicated grid network has been simulated by TUBITAK (Grid Project Institute).

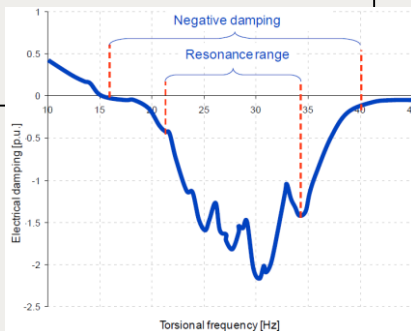
In case of higher renewable penetration

In case of higher renewable penetration there are some aspects shall be investigated such as balance of power in the grid and behavior of equipment in case of subsynchronous oscillations. The subsynchronous is the main issue because resonance ranges set restrictions with respect to subsynchronous oscillation frequencies of complete turbine-generator set.

Scope of possible actions:

Stage of grid investigation:

The range of subsynchronous oscillations shall be defined by simulation of grid network and considered



Stage of machine design:

The designers of machines (turbine, generators) shall investigate behavior of parts to estimate availability of resonance issues. To manage the negative damping outside the resonance range, different countermeasures shall be considered depending on the structure of turbine-generator unit

During operation:

Use of SSO monitoring and protection equipment and extensive on-site testing of torsional characteristics

