Wind power plant support for weather-dependent active distribution networks

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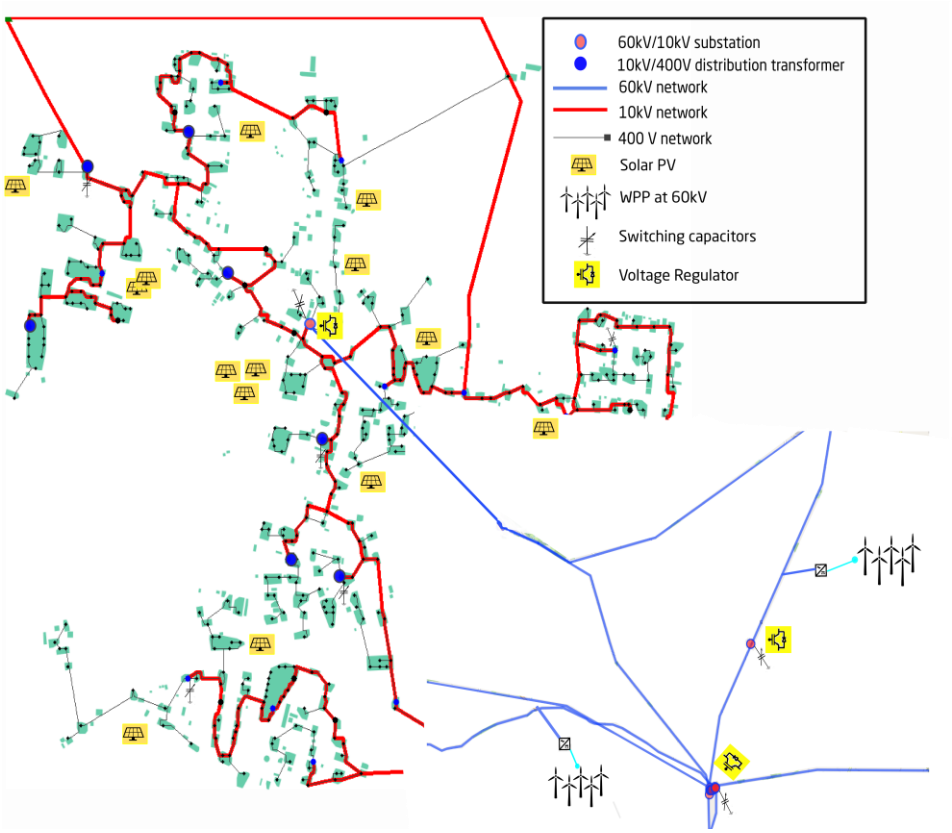

Fig. Active distribution network with a large share of weather-dependent generation

The primary objective of this research is to utilize the capabilities of wind power plants (WPPs) to support the distribution grid. The figure above illustrates a distribution network with several generation sources connected at 60kV as well as at 10kV and 400V level. The addition of weather-dependent generation units at the distribution level challenges the conventional distribution network operation by altering the operating conditions and demanding additional operational measures from the distribution system operators. The present un-observability and weather-dependent nature of the generation connected at lower voltage levels add another level of uncertainty in the network. However, WPPs can offer additional support to the distribution network by optimizing WPPs' operating points along with available network assets (on-load tap changers, voltage regulators, switching capacitors, etc.). This additional operational flexibility can be employed to enhance co-ordination between distribution and transmission networks.

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