South East Europe workshop on grid integration of variable renewable energy sources

JSC EMS
7 November 2018, Vienna
General energy planning framework

- Ten-Year Network Development Plan is developed under the following national regulatory framework:
  - Law on Energy, Law on Planning and Construction (primary legislation)
  - National Grid Code
  - Energy Development Strategy of the Republic of Serbia until 2025 with projections until 2030
  - National Renewable Energy Action Plan (NREAP) 2013
- International framework for National Plan includes Europe-wide TYNDP2018, Regional Investment Plan
- The ultimate goal is secure, reliable, economical and efficient transmission system
- The outputs of TYNDP are developing options. Where possible, EMS first considers the option that will accomplish several developmental needs simultaneously. If this is not possible, then a special option is developed for each of the developmental needs.
- Development needs are determined by performances of all parts of the system and economic indices taking into account costs and benefits of all developing options.
- Planning criteria include voltage profiles, thermal loading of the system elements, security, dynamic stability, short circuit currents.
- Special care is taken related to environmental protection.
- Public acceptance is of essential importance.
Energy demand forecast is based on expected economic development of the country and historical demand data.

Internally developed SW WSDLFM (Weather sensitive daily load forecast model) for short term load forecast is used.

Package SW with Areva and IMP SCADA

For the future generation dispatch scenarios, Antares software is used. Antares is based on sequential Monte Carlo simulations.
Generation scheduling with high share of variable renewable energy

- VRE connected to transmission system in Serbia in early stage
- First wind plant connected to transmission grid in August 2018.
- VRE producer will deliver to EMS set of data used for forecast (meteorological data, wind data...)
- Public tenders for procurement and purchase of tools for VRE forecast
- Currently forecast is done with internally developed tools.
- Plan to have several forecast tools used with weight factors.
Network analysis

- Main concerns regarding integration of renewable energy are linked with the needed transmission capacity (mainly on 110 kV voltage level) for the evacuation of energy
- Specific network studies are performed in PSS®E software