

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



**JSC EMS**

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# 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.

# Power sector planning

- ▶ 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