Setting the scene: opportunities in energy system planning

Aron Zuiker (ENTSO-E), Benedict Englisch (ENTSO-E)

Introduction to ENTSO-E

40 TSOs from **36** countries

500.000 km of transmission lines

520 million citizens

RESPONSIBILITIES

- Security of **power system**
- Optimal functioning and development of **electricity markets**

ENTSO-E's planning studies cover a time horizon of 30 years

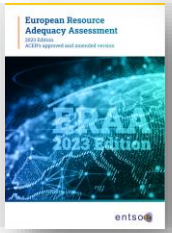
Uncertainty

Purpose: Support long-term investment decisions.

Scenarios/Inputs: Builds on national estimates under various long-term assumptions/scenarios.

Uncertainty: High/Very high.

10 to 30 years



Purpose: Guide policy-makers' decisions on investments and regulatory interventions.

Scenarios/Inputs: National best estimates for demand and energy mix with robustness check.

Uncertainty: Moderate until 5th year & higher beyond 5 years.

2 to 10 years

Purpose: Flag short-term risks for system adequacy so that involved stakeholders at national, regional and pan-European level coordinate to ensure security of supply.

Scenarios/Inputs: TSOs' estimates based on contextual factors.

Uncertainty: Low.

Weeks to months ahead

Time

PECD4 | Pan European Climate Database

Climate Change Service
climate.copernicus.eu

- **PECD4** is a coherent climate and energy dataset developed and maintained by the Copernicus Climate Change Service (C3S)
- Developed in collaboration with ENTSO-E and tailored for energy system development studies and adopted across all ENTSO-E studies as a **key reference dataset** (e.g. ERAA, TYNDP)
- Combines **historical data** with **future climate projections**, covering a range of possible emission scenarios
- Enables, for the first time, consistent modelling of **multiple climate change pathways** for power system development
- Forms a **critical backbone** for modelling future electricity demand and renewable generation
- Built on **state-of-the-art energy conversion models** developed by a consortium of climate and energy experts, led by Inside Climate Service (ICS)

PECD4 | Pan European Climate Database

Historical data from 1950 to present and climate projections from 2015 to 2100

Validated and calibrated based on national TSO data

Climate projections for 6 CMIP6 climate models and 4 SSP emission scenarios

Hourly timeseries data and daily or weekly for hydro inflows

Contains both climate variables and energy indicators for wind, solar and hydro production

Both gridded data as for different aggregation zones such as countries, bidding zones and PECD climate zones

DestinE UserXChange | Open discussion

Opportunities for Destination Earth

Interactive tools enabling sensitivity analysis of changing weather and climate variables.

Modelling local phenomena and regional specific weather conditions, important for smaller member states

Developing a community-based encyclopaedia of European weather scenarios, clustering climate events.

Guiding questions for the group discussions

Which set of climate variables significantly impacts power energy system operations?

Which regional weather conditions significantly impacts power system operations?

How could weather scenarios be classified by e.g. Regional extreme events?

CONNECTING EUROPE,
ELECTRIFYING THE FUTURE