

*“Simplicity and Transparency
in Power Systems Planning”*

September, 2020

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openTEPES version 1.7.16

Modeling overview

- Built according to a **bottom-up** paradigm.
- It applies **optimization** to find the best generation and transmission expansion plan.
- Uses **Mixed-Integer Programming** (runs on **GUROBI** or **GLPK**) to solve the problem.

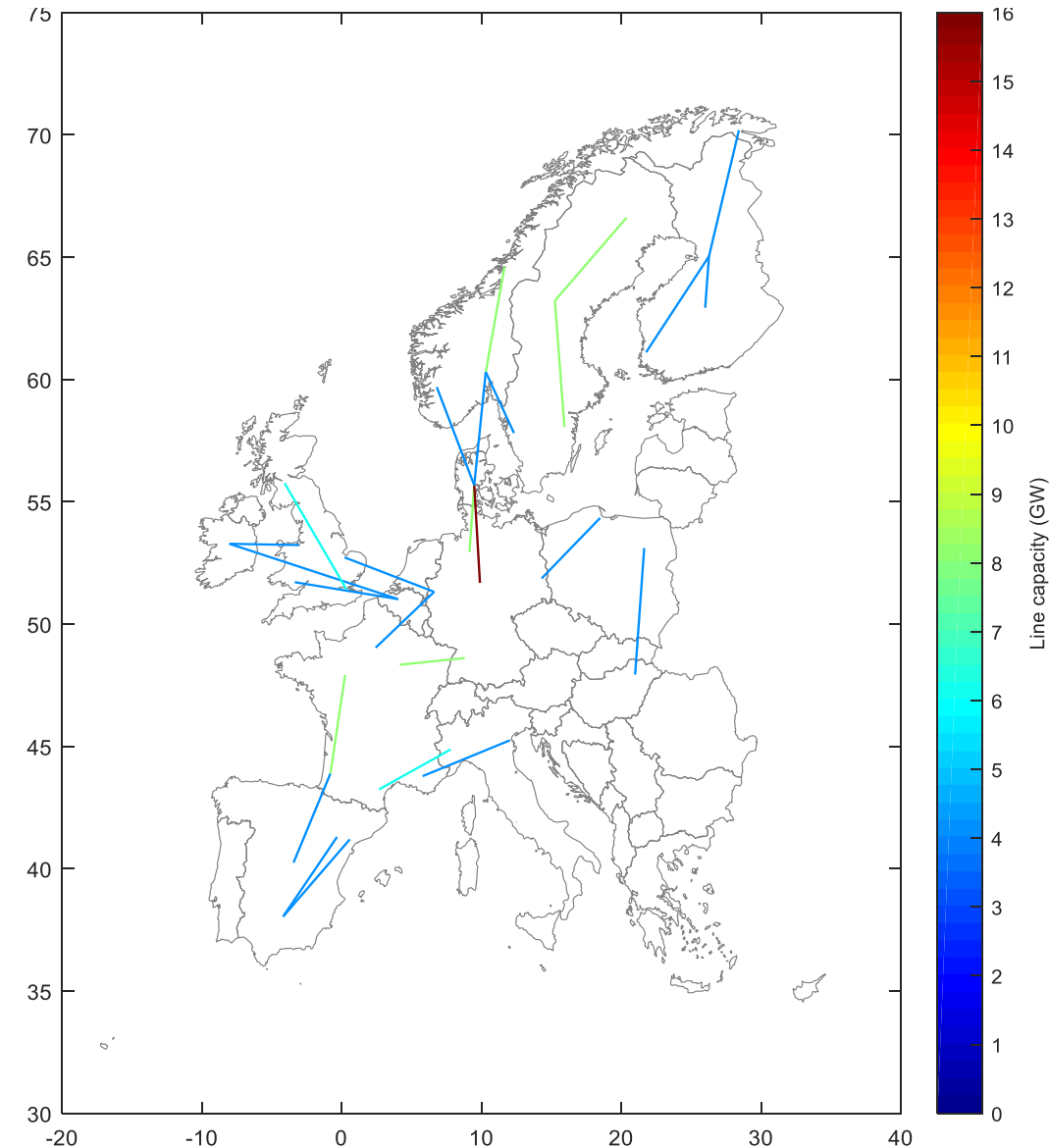
Outputs

- Determines the **investment plans** of new facilities for supplying the forecasted demand at minimum cost.
- The **candidate generator and lines** are pre-defined by the user. Candidate lines can be HVDC or HVAC circuits.
- Provides an **investment plan** while considering detailed system operation. It incorporates a **Unit Commitment** and **schedules the operation of medium and short-term storage** (i.e., pumped-storage hydro, batteries).

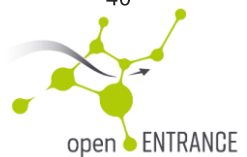
openTEPES: Use cases and a glimpse of results

- Assessment of the impact of planning, policy, and technology options on the transmission network development
 - Deployment of centralized (hydro) vs. decentralized (batteries) storage
 - Addressed within openENTRANCE
 - Centralized vs. decentralized planning, or promotion, of the development of generation
 - Addressed within SETNav¹
 - Development of a Supergrid vs. incremental changes to the currently existing network
 - Desertec¹, MedGrid¹, and eHighway2050¹

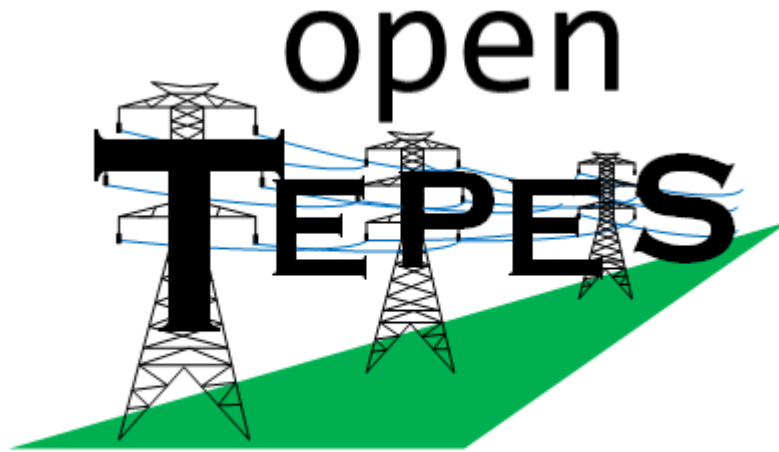
¹ Use cases and results corresponding to the former TEPES model



SETNav Project - Centralized scenario –
Incremental Transmission Capacity



Thank you for your attention



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openTEPES

Questions?



<https://pascua.iit.comillas.edu/aramos/openTEPES/index.htm>



[GitHub - IIT-EnergySystemModels/openTEPES:](https://github.com/IIT-EnergySystemModels/openTEPES)
[Open Generation and Transmission Operation and Expansion Planning Model with RES and ESS \(openTEPES\)](#)

