



Web Consultation – Planning tool: Features and interfaces

The FlexPlan project aims at creating an innovative grid-planning tool considering the opportunity to introduce new storage and flexibility resources in electricity transmission and distribution grids as an alternative to network reinforcement.

The following features will be considered and implemented in the new planning tool:

- **integrated T&D planning** : the idea is to consider both transmission and distribution (Medium Voltage level) grid planning and how they impact each other.
- inclusion of **environmental impacts**: carbon footprint, pollutants emission, landscape impact
- **probabilistic reliability methods** (as an alternative to N-1 criterion), considering the probabilities (and costs) of failures.
- **dynamic planning** : multiple time horizons for the investments are considered and linked together (i.e. investments at various time horizons will be considered as well as their impact on decisions in subsequent time horizons).
- **modelling of storage** and **flexibility** from demand response as alternative to network reinforcement (see also Web Consultation - Technology: flexibility resources)
- **Monte Carlo simulations** to tackle the **uncertainty** and reduction techniques to limit the number of scenarios. The uncertainty may be about **investments parameters** (e.g. storage technology cost in 2050, discount rate), or also about **operational uncertainties**: weather (temperature), RES production, load, fuel costs, network element failures probabilities).

Questions: Your current planning tool and process

- Please describe the current planning tool which you are using
 - Frequency of use (daily, weekly, yearly)
 - Planning horizon considered for the planning (e.g. 5 years, 10 years)
 - Main user of the tool (e.g. analyst of grid planning department)
 - Graphical user interface (Yes/no)
 - Integrated with other systems (e.g. SCADA, AMI)
 - Vendor or in-house development
 - Types of analysis performed (Load Flow, Probabilistic Load Flow, OPF, etc.)
- In your current planning tool/methodology, what are the features that you lack (the most)?
- Which other (modelling) features should be considered in the planning tool in your opinion?

Many input data are needed to "feed" the planning model (i.e. values for the parameters of the model), according to a data model structure. Data intrinsically come from scenarios since the planning tool considers the future (for FlexPlan: 2030, 2040 and 2050 are the investment time horizons which are considered in the regional cases). While the scenario aspect is discussed in another Consultation (see Web Consultation - 2050 Scenario Data), we want to consider data models which would make easy/possible to test it on real instances after the end of the project:



Question: Data models

- Do you have a preference on the input/output data model/format?
- Might a different data model be a barrier for you to test the planning tool?
- Which standard should it comply to?

The planning tool software developed in FlexPlan will have a graphical user interface (GUI) implemented. The design of this GUI will start in the coming months and your feedback would be very useful:

Questions: Graphical user Interface and interaction

- What must-have elements in the GUI would you need in the ideal planning tool?
- In terms of input (scenarios) data, what are the most important features to have in a GUI according to you?
- How would you like to parametrize/specify input scenarios in the GUI?
- Would you consider the possibility to perform what-if scenarios or sensitivity analyses as a must-have or nice-to-have?
- In terms of outputs, are dashboards useful to develop? If yes, what are the key elements you would like to see as an output to the ideal planning tool?
- In terms of interfaces, should the planning tool ideally be integrated with other tools you are/will be using? If yes, can you elaborate?
- Would you consider having a web-interface for interacting with the planning tool?

As mentioned above, the planning tool developed in FlexPlan aims at taking into account many new features. State-of-the-art optimization algorithms will be used to solve the planning problem on realistic problem instances. Nevertheless, trade-offs between computational power, time to solve the problem and model complexity are needed.

Questions: Tool performance

- What is a realistic time that you would allow for the planning tool to run (order of magnitude)?
- If the model needs to be simplified to make it tractable/solvable in a reasonable amount of time, which features of the planning tool model would you simplify first?