INTERPLAN

INTEgrated opeRation PLANning tool towards the pan-European network

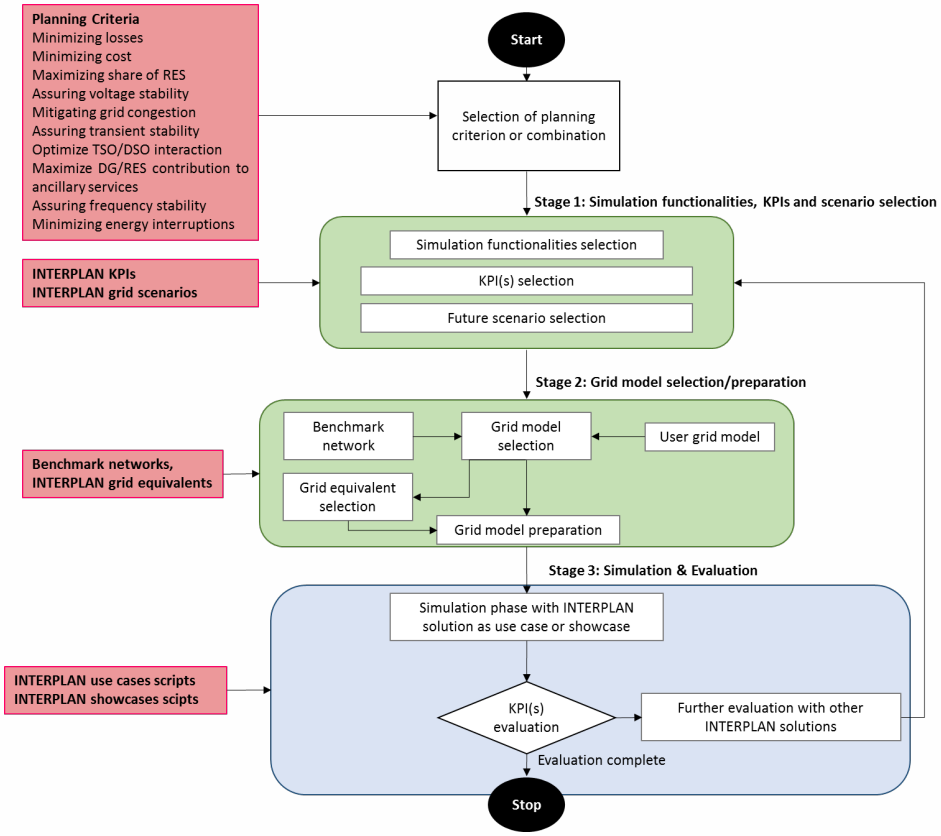
Transforming Grid Operation Planning

INTERPLAN Integrated Operation Planning Tool for the Pan-European Network

The INTERPLAN methodology provides **a set of tools (grid equivalents, control functions) for the operation planning of the pan-European network.** The tool allows system operators to address a significant number of system operation planning challenges of the current and the future 2030+ EU power grid, from both the perspective of the transmission system and the distribution system, with a particular focus on the transmission-distribution interface.

The main goal of the tool is to achieve the operation planning of an integrated grid from the perspective of a TSO or a DSO, through handling efficiently and effectively intermittent RES as well as the emerging technologies such as storage, demand response and electric vehicles (EVs). In fact, the tool supports utilising flexibility potential coming from RES, demand side management, storage and electric mobility for system services in all network control levels.

The figure below represents the INTERPLAN tool overview, including the various stages that the user (TSO or DSO) can perform for the operation planning of the network under consideration.



INTERPLAN tool overview

As shown in the figure, the user identified as a TSO or a DSO selects the planning criteria he/she wants to consider for the network operation planning. This selection is based on the list of planning criteria identified in the project.

After the planning criteria selection, the following three stages are performed by the user:

- **Stage 1**: Simulation functionalities, Key Performance Indicators (KPIs) and scenario selection
- **Stage 2**: Grid model selection/preparation
- **Stage 3**: Simulation & Evaluation

Project duration

1 November 2017 - 31 January 2021

Contact

interplan-project.eu

Giorgio Graditi (Project Coordinator)
giorgio.graditi@enea.it

contact@interplan-project.eu

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 773708

Contact person: Dr. Marialaura Di Somma (marialaura.disomma@enea.it)

Assuming the user knows from the beginning the operational challenge that requires investigation, the tool will guide them towards the most suitable INTERPLAN solution (use case and showcase-related control functions). Indeed, **the three stages have been structured to guide the user selecting the most proper INTERPLAN solution in function of the operation challenge the user wants to investigate in a specific network as part of the distribution system, the transmission system or the transmission-distribution system.** According to this approach, all the possible selections enabled will be known to the user in advance through the INTERPLAN user manual.

What are the strengths of the INTERPLAN tool?

- **An integrated approach.** It allows dealing with the operation planning of the Pan-European network through an integrated approach. By providing the possibility to investigate all network voltage levels for operational planning purposes, the tool enables integrating the actions made by different stakeholders such as TSOs and DSOs, which are considered as the primary users for the tool. In addition, this integrated approach allows building a bridge between static, long-term planning and considering operational issues by introducing proper control functions in the day-ahead operation planning phase.

- **Simplification**. With the current network operation planning approaches, it is not possible to consider all existing networks (including full models) in an integrated planning tool due to computational limitations, lack of detailed models, etc. Through the intrinsic grid equivalenting methodology and the related grid equivalents library, the tool allows simplifying certain parts of a grid while keeping the relevant characteristics. This grid equivalenting methodology which is applicable to both transmission and distribution levels, can be used to address operational challenges occurring in all network levels.

From the practical point of view:
The INTERPLAN tool can be transformed into a Python-based toolbox interfacing with PowerFactory (under the simulation phase in stage 3), consisting of a library of grid equivalents and control functions for use cases and showcases for addressing the related operational challenges under the selected scenario and operation planning criteria.

- **Specific and general operational challenges from both TSO and DSO perspective**. Through the control functions embedded within INTERPLAN use cases and showcases, the tool addresses a number of operational challenges of the current and future 2030+ power networks from the perspective of both TSOs and DSOs. On one hand, INTERPLAN use cases address very specific operational challenges that grid operators may face in the presence of high penetration of RES, storage, DR and EVs. On the other hand, INTERPLAN showcases address more general operational challenges that grid operators may typically face for grid operation planning purposes.

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 773708

Contact person: Dr. Marialaura Di Somma (marialaura.disomma@enea.it)