



INTERPLAN project and the integrated network operation planning tool

A support for the operators to efficiently manage a network with high share of RES and other emerging technologies

INTERPLAN Virtual Workshop
MedPower 2020
11th November 2020

Ata Khavari – INTERPLAN WP Leader



Agenda

- Introduction of INTERPLAN project
- An overview of the integrated network operation planning tool
- A showcase of INTERPLAN tool

Moving towards a pan-European electricity network introduces **new requirements** for grid operation planning

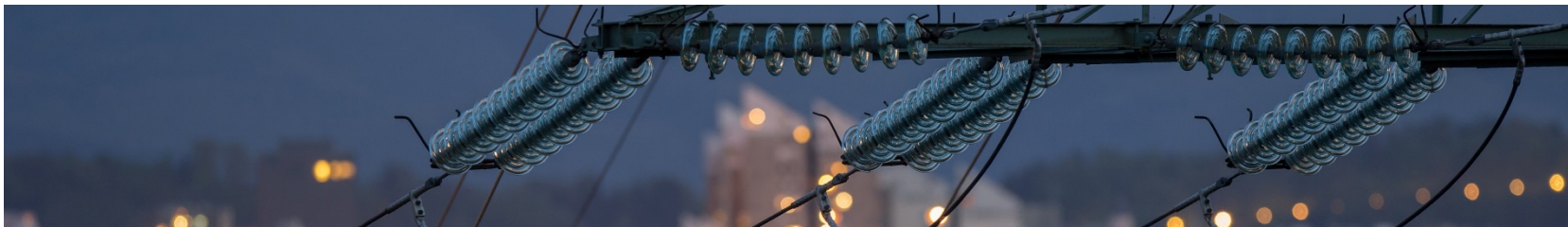
- **Stability, security and efficiency** must be ensured at a higher hierarchical level than at national one, managing the local grids as part of a wider interconnected network.
- **Novel solutions** become necessary to integrate **emerging technologies** to support the EU in reaching the **expected low-carbon targets**
- TSOs will have to evolve progressively from a “business as usual approach” to a “**proactive approach**”.
- DSOs will need to actively manage and operate a **smarter grid** through appropriate system control logics, by using the grid’s and consumers’ flexibility potential.
- A closer **cooperation between TSOs and DSOs** is needed
- **Strong simulation tools** (models and controllers) to allow operational planning under the integrated grid approach that includes all emerging technologies.



Our mission

Develop a prototype of proof-of-concept of a **tool set** for **grid operation planning** considering all **network levels** (transmission, distribution, TSO-DSO interface)

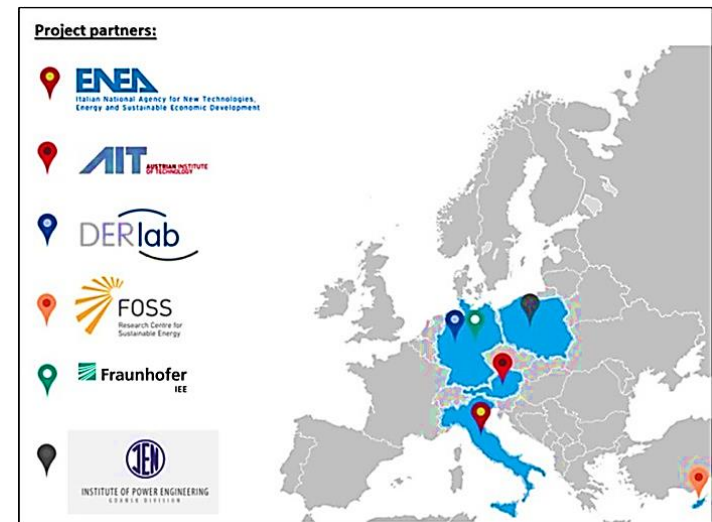
- Developing **control system logics** which suit the complexity of the integrated grid
- Managing **all relevant flexibility resources** as “**local active elements**” in the best manner
- On the **policy front**, identifying **possible amendments** to the **existing grid codes**, reflecting the work developed



INTERPLAN Project

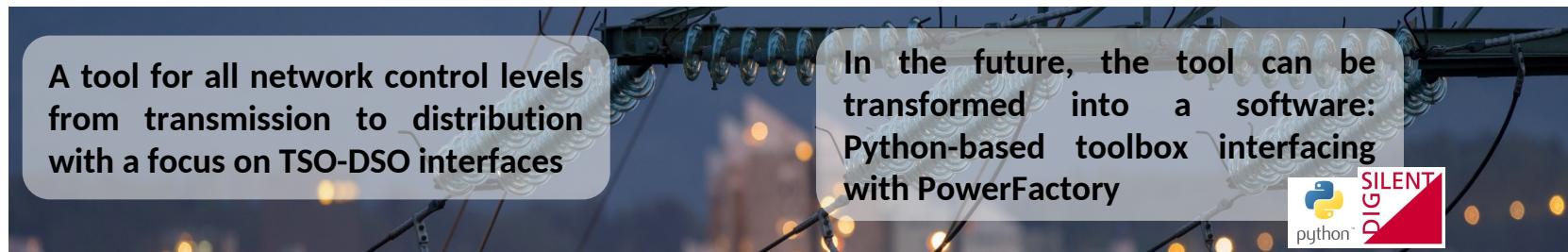
- **Call:** H2020 – LCE – 05 -2017
- **Type of Action:** RIA
- **Number:** 773708
- **Duration:** Nov. 2017 to Jan. 2021
- **Total Budget:** € 2,964,362.50
- **Partners:** 6 from 5 European countries: Italy, Austria, Cyprus, Germany, and Poland
- **interplan-project.eu**

INTERPLAN



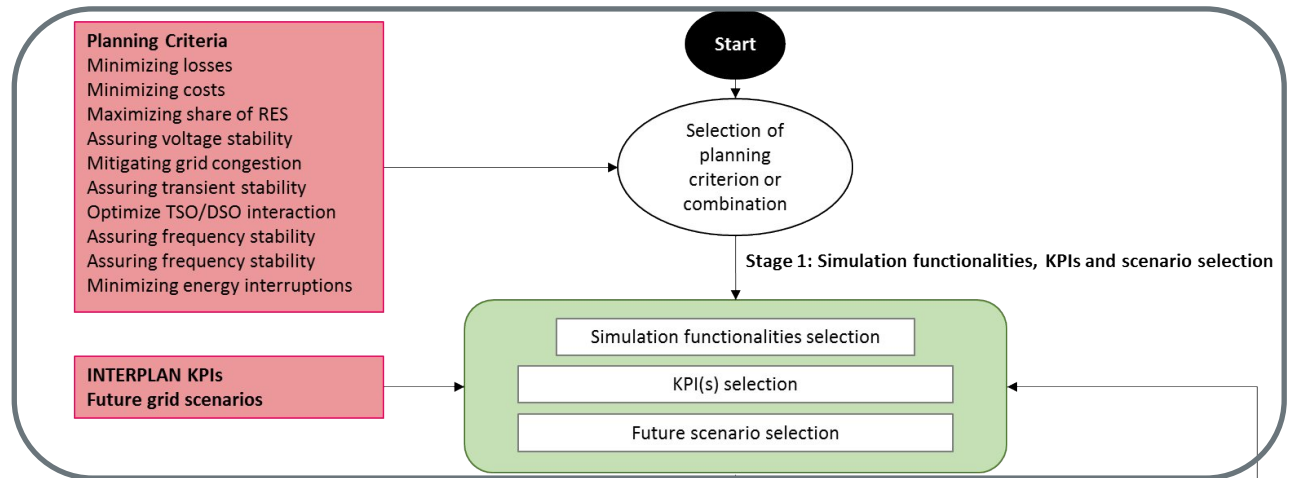
The INTERPLAN tool

The tool is: A methodology consisting of a **set of tools (grid equivalents, control functions)** for the operation planning of the Pan-European network by addressing a number of **system operation planning challenges** of the current and the future 2030+ EU power grid, from the perspective of the **transmission system**, the **distribution system**, and with a particular focus on the **transmission-distribution interface**.

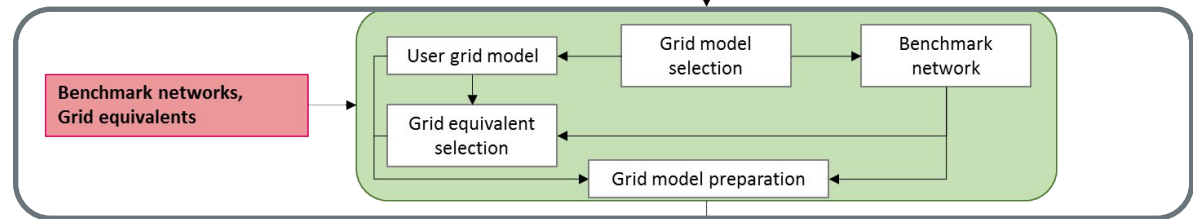


An overview of the tool

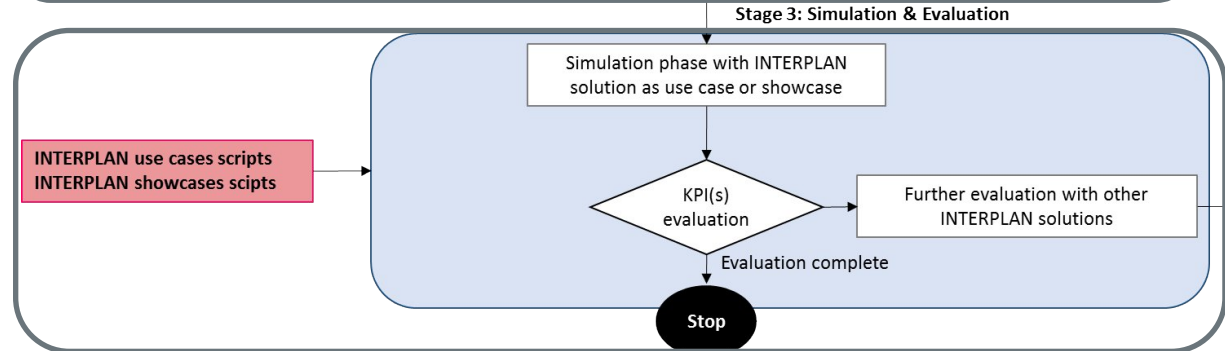
Stage 1: the user (TSO/DSO) selects the **planning criteria and KPIs**, as well as the **simulation functionality and the operating scenario**



Stage 2: the user selects and prepares the **grid model**



Stage 3: the user performs **simulation and makes evaluation** for suggested **use cases/showcases and related control functions**



INTERPLAN solutions to address the operation challenges of grid operators

INTERPLAN use cases

UC1: Coordinated voltage/reactive power control

UC2: Grid congestion management

UC3: Frequency tertiary control based on optimal power flow calculations

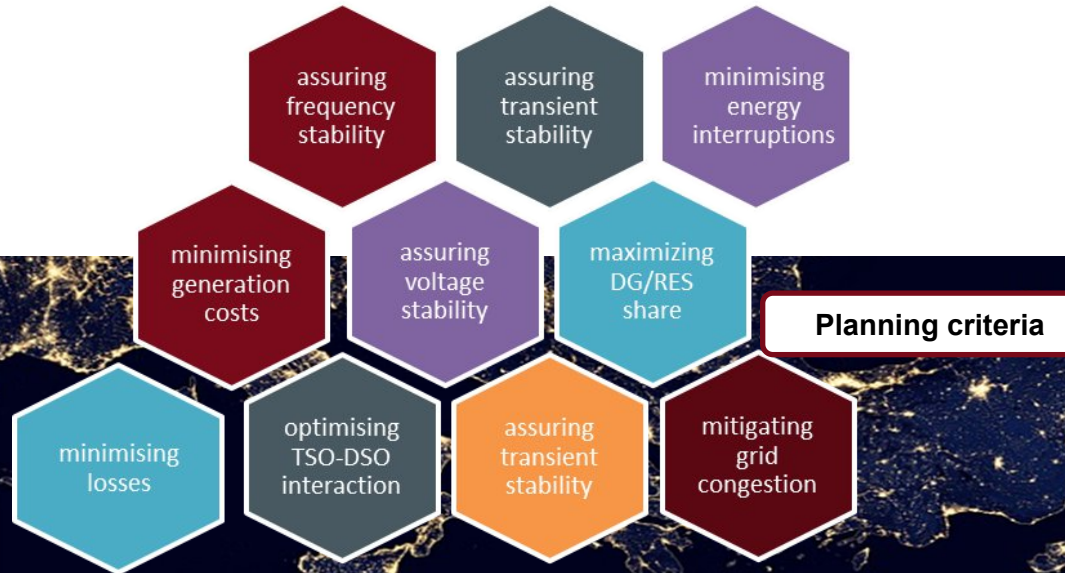
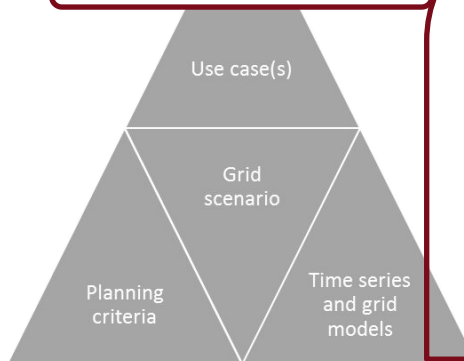
UC4: Fast Frequency Restoration Control

UC5: Power balancing at DSO level

UC6: Inertia management

UC7: Optimal generation scheduling and sizing of DER for energy interruption management

INTERPLAN showcase



Planning criteria

- **SC1:** Low inertia systems
- **SC2:** Effective DER operation planning through active and reactive power control
- **SC3:** TSO-DSO power flow optimization
- **SC4:** Active and reactive power flow optimization at transmission and distribution networks
- **SC5:** Optimal energy interruption management



Thank you for your attention!

Ata Khavari
Project Manager and researcher
DERlab e.V.
ata.Khavari@der-lab.net

