Powering System flexibility in the Future through Renewable, H2020 POSYTYF project

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Overview of the POSYTYF project & DVPP concept

POSYTYF Project: POwering SYstem flexibiliTY in the Future through RES

H2020 Call: LC-SC3-RES-16-2019- Development of solutions based on renewable sources that provide flexibility to the energy system

Duration: June 2020 – November 2023

Budget: 4,7 M€

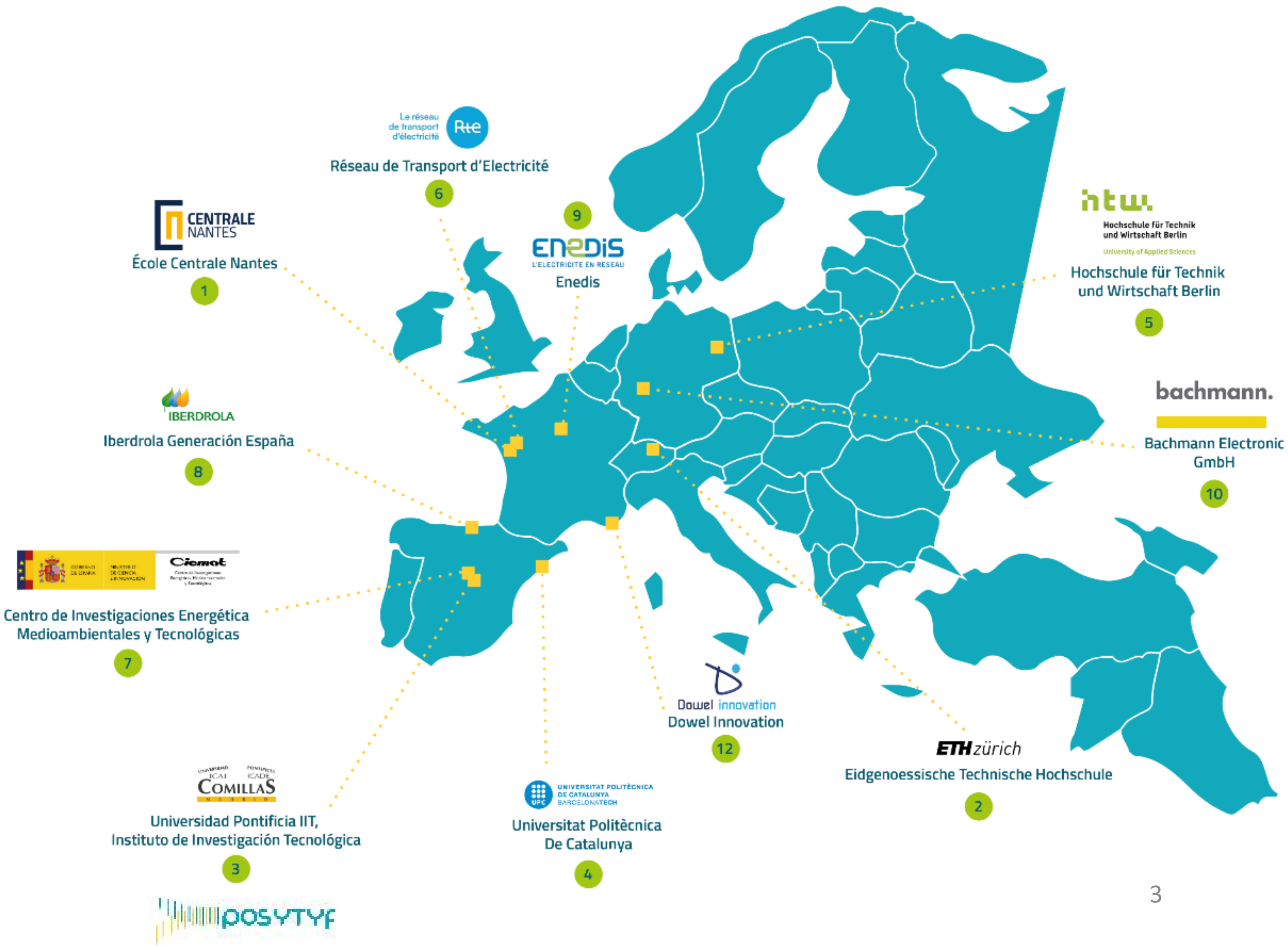
Coordinator: Ecole Centrale Nantes, France

Context:

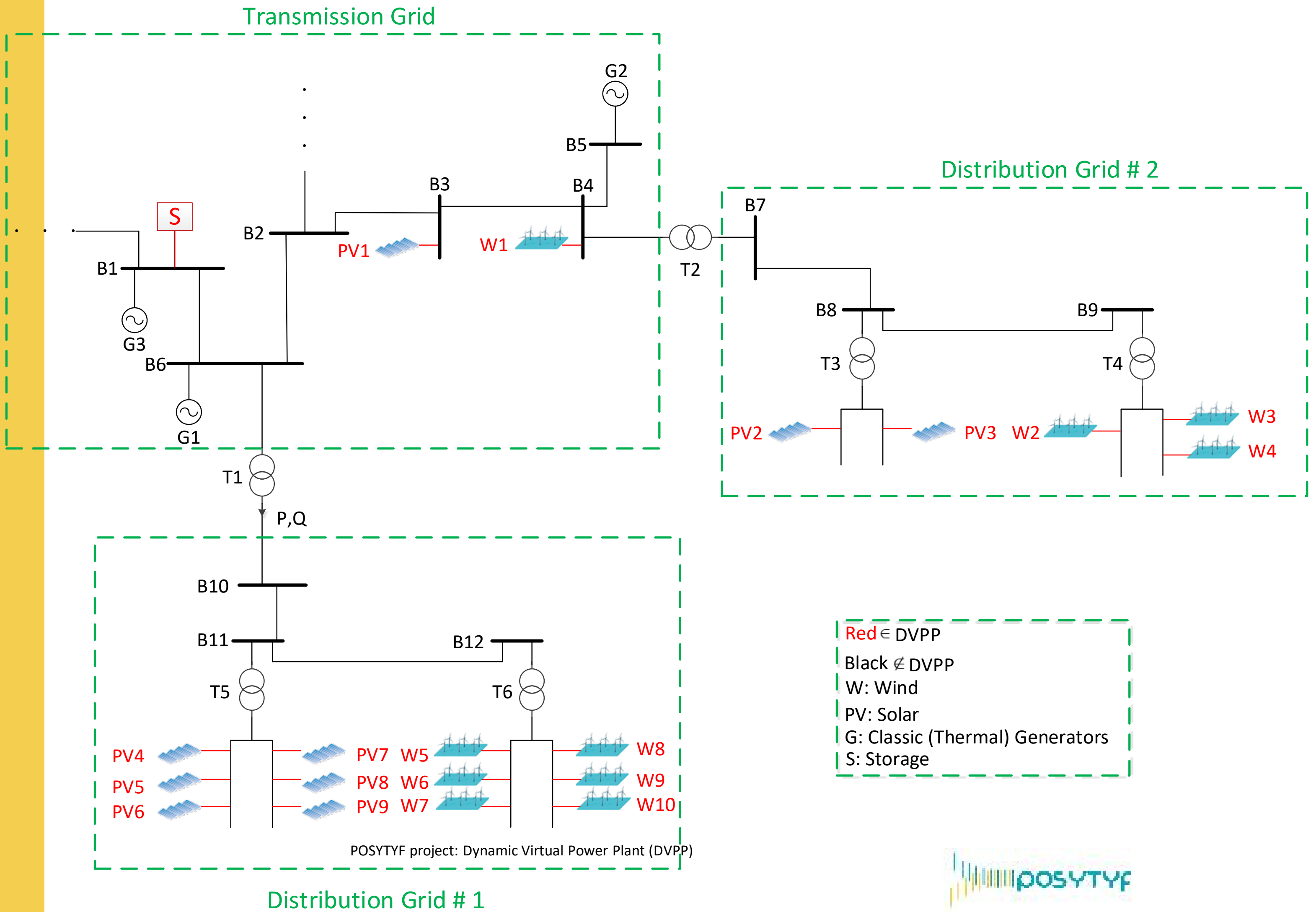
- System stability is the main bottleneck to the further integration of Renewable Energy Sources (RES) into the power system.
- Distributed RES, if aggregated and technically/economically optimized, have the potential to provide flexibility to the grid and contribute to system stability.
- *Dispatchable* RES can beneficially complement *non-dispatchable* RES for such optimization ; alternative to electrochemical storage

Consortium

- Combined expertise on power systems, power electronics, automatic control and RES
- Industrial partners include (Transmission System Operators) TSO, (Distribution System Operators) DSO, RES generator, software vendor
- External advisors:
  - Prof. Costas Vournas, NTUA, Athens-Greece
  - WindEurope
  - ESTELA



DVPP concept/project goal: Develop methodologies to increase the performance of an integrated portfolio of **dispatchable** and **non dispatchable** RES to operate together as a **Dynamic Virtual Power Plant (DVPP)**, capable of providing flexibility and ancillary services to the energy system.



DVPP specificities:

- Multiple grid connections
- Transmission & distribution grids
- Imbricated structure (participating & non participating generators)
- Dynamic interactions
  - Between DVPP RES generators
  - With the neighbor dynamic elements
- Resilience/plug&play capabilities
- Full participation to secondary regulations
- Actual & future scenarios
  - Intégration in actual operation schemes
  - 100% power electronics

Differences with existing Virtual Power Plants (VPP)

*Address both **static** & **dynamic** optimal control at **all** levels: device / network/ economic standpoint*

In more specific technical terms:

- Enable participation of distributed RES to ancillary services
- Manage specificities of decreasing global inertia of the system
- Deal with geographical spread of RES (also imbricated with non-participating entities)
  - Coordination/ centralization/ decentralization
  - Robustness/ disturbance rejection
  - Resilience (variable VPP perimeter)
- Aggregate RES at both transmission and distribution levels

POSYTYF impact:

- Key in hands solutions for renewables control & operation in both situations:

  Scenario A: integration in existing grids and control schemes

  Scenario B: power systems of future with high (100%) power electronics rate

- New methods for stability assessement in Scenario B

- Proposals for new regulatory rules for renewables grid connection & operation (ancillary services)