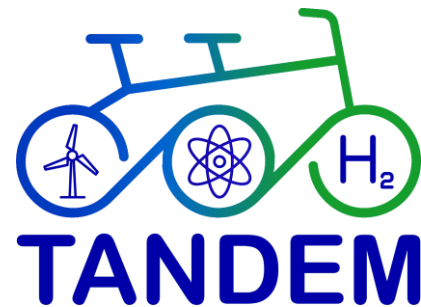


Modelica library: Electrical grid

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Modelica – Tandem library

Modelica:

Modelica : Modelica is an object-oriented language to model physical systems. It supports acausal connection of reusable components

Modelica Simulation Environments: OpenModelica, Dymola, Wolfram SystemModeler® other.

Tandem library:

The library is supported by well-established Modelica libraries:

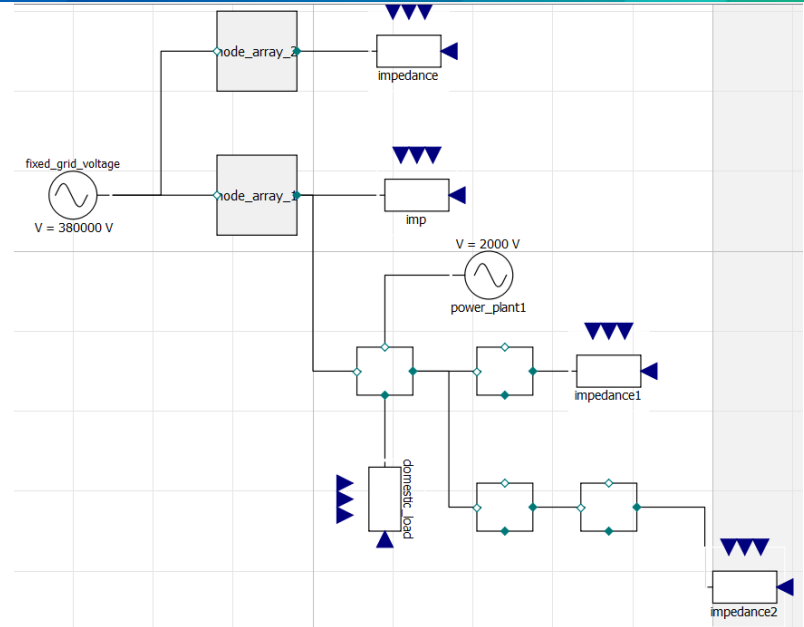
- ThermoPower (Casella & Leva, 2006) and ThermoSysPro (El Hefni & Bouskela, 2019)
- CEA_Energy_Process_Library
- Buildings (Wetter et al., 2014)
- WindPowerPlants (Eberhart et al., 2015)

Use cases:

- Perform techno-economic studies taking into account the complex and dynamic interactions between the components of the HES.
- Provide realistic physical conditions at the coupling interfaces (SMR secondary circuit) for safety studies assessing the impact of cogeneration.

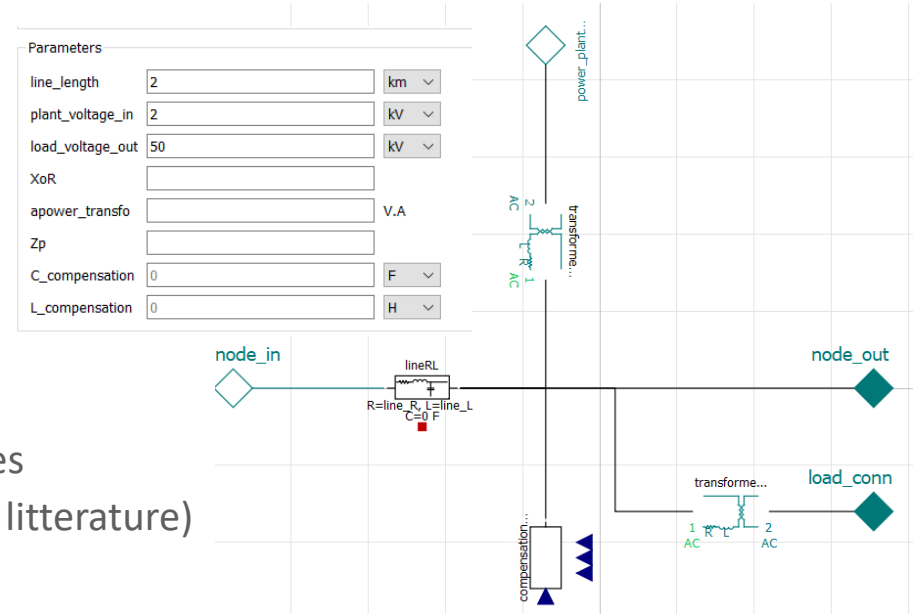
Electrical grid – overview

- User-customizable grid architecture
- Base element = grid node
- Fixed grid voltage mandatory
- Node array = automatic serialization (x nodes)
- Node connectors :
 - Left & right = connections to other nodes
 - Up = Connection to power source
 - Down = Connection to power load

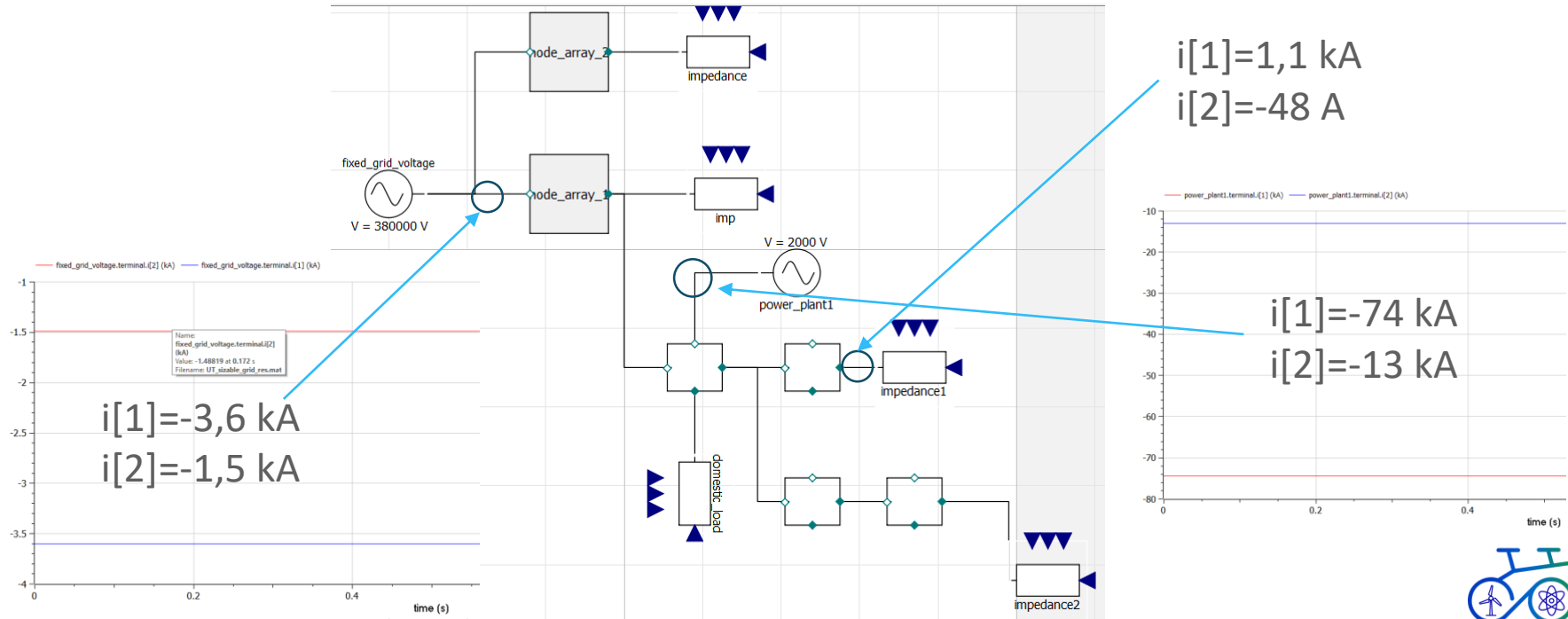


Node description

- RL model of power line
- Linear impedance values = overhead 380kV
- Variable C & L for compensation devices
- XoR, apower & Zp left blank
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- Transformers X/R, Zper & power approximated
 - Typical values tables found in litterature
 - Linear approximation between table values
 - Zper = linear function of power (based on litterature)



Tests results



Thank you for your
attention