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This document describes the content of the repository.

1. **Co-simulation:**

Co-simulation files for the base, first and second case (that are explained in "Caner_s_MSc_Thesis_Report - Section 2.5.3) are given in Co-simulation folder. Each sub-folder consists of:

- Energysim co-simulation script (*case.py*)
- Pandapower grid model (*grid_case.py, gridmodel_case.p*)
- Data csv file (*data.csv*)
- Power-to-Gas & Power-to-Heat Modelica FMU's (*Hydrogen.ptg.fmu, P2H.pth.fmu*)

2. **Modelica:**

Developed and open-source OMEdit libraries are given in this folder.

- Power-to-Gas and Power-to-Heat models (that are exported as FMU's for co-simulation cases above) are given in "*Hydrogen and P2H libraries*" respectively.

  Hydrogen Library:
  - "*P2G_basecase.mo*" is the base for all developed models. Main models considered in simulation cases can be derived from "*P2G_basecase.mo*".
  - Flexibility switch is used in "*Controller_P2G3.mo*" for case 2. When it is 0, P_{max} strictly follows P_{min}, when it is 1 P_{max} is decided depending on storage level. It should be constant "0" if the effect of this switch needs to be removed.

  P2H Library:
  - "*P2H_basecase.mo*" is the base for all developed models. Main models considered in simulation cases can be derived from "*P2H_basecase.mo*".
  - Adjustable power level controller without flexibility switch is given in "*controller_p2h.mo*". This can be adopted for power-to-gas.

- Different wind farm and PV farm modelling practices are shared in "*PV & Wind libraries*". Those are based on various open-source modelica libraries. Also,

implementation of Weibull and Beta probabilistic density functions for wind and PV, respectively, is explained in "*Caner_s_MSc_Thesis_Report – Appendix A*".

- Some open source modelica libraries examined for this study are shared in "*Open Libraries*".

- Historical data is given as text files:

    - *Flexibility.txt* (flexibility service on/off switch for adjustable power level controller)
    - *gas_demand, heat_demand.txt* (energy demand profiles)
    - *PV, WF.txt* (hourly active power generation)
    - *Tambient.txt* (local ambient temperature)

3. Result Plots:

Figures and plot scripts is given in this folder. Outputs of OpenModelica (OM) models are exported as .csv files and plotted in script "python_plot_from_OM.py".