**MAGNET\_COPY\_1**: This was created as a learning exercise to understand Dymola. Data (combiTimetable and combiTimetable1) was given by Scott Greenwood in his own version of MAGNET. Dynamic results for 40000 seconds.

**MAGNET\_Insulated\_pipes**: This version is updated from MAGNET\_COPY\_1 using insulated pipes and added correct pipe lengths for all the pipes. Pipe material is SS316 with insulation as fiber glass. Dynamic inputs used are given by Scott Greenwood.

**MAGNET\_PID\_3**: This was created to calculate the new UA values for the recuperator and the heat exchanger in MAGNET with updated insulated pipes and lengths.

**MAGNET\_Insulated\_pipes\_SS**: Steady state results of MAGNET with insulated pipes and pipe lengths added.

**MAGNET\_TEDS\_Boundaries\_1**: MAGNET-TEDS integration with a simple heat exchanger, MAGNET side. Boundaries are used to represent the TEDS side with input of mass flow and inlet and outlet Temperature.

Using a constant input (Q\_vc and m\_flow) for MANGET as well as TEDS (m\_flow and T\_in and T\_out) to calculate UA values for the MAGNET\_TEDS\_simpleHX using a PID controller.

**TEDS\_MAGNET\_1**: MAGNET-TEDS integration with a simple heat exchanger, TEDS side. Boundaries are used to represent the MAGNET side with input of mass flow and inlet and outlet Temperature. Using the UA value calculated in MAGNET\_TEDS\_Boundaries\_1, a PID controller is used to control the mass flow from MAGNET to the heat exchanger, with a temperature set point on the TEDS side set to equal the nominal value of charging temperature (325 oC).

TEDS side: the BOP demand as well as the heat demand is set to change, creating a dynamic simulation of the system.

**MAGNET\_TEDS\_1**: MAGNET-TEDS integration with a simple heat exchanger, MAGNET side. Boundaries are used to represent the TEDS side with input of mass flow and inlet and outlet Temperature. UA value calculated in MAGNET\_TEDS\_Boundaries\_1, a PID controller is used to control the mass flow from TEDS into the heat exchanger, with an outlet temperature set point on the TEDS side set to equal the nominal value of charging temperature (325 oC).

MAGNET side: the heat input of the vacuum chamber as well as the mass flow of the MAGNET system are set to be constant, making this a steady state simulation.

**MAGNET\_TEDS\_2**: MAGNET-TEDS integration with a simple heat exchanger, MAGNET side. Boundaries are used to represent the TEDS side with input of mass flow and inlet and outlet Temperature. UA value calculated in MAGNET\_TEDS\_Boundaries\_1, a PID controller is used to control the mass flow from TEDS into the heat exchanger, with an outlet temperature set point on the TEDS side set to equal the nominal value of charging temperature (325 oC).

MAGNET side: the mass flow of the MAGNET system is set to be constant, while the heat input of the vacuum chamber is a step function, making this a dynamic simulation. The mass flow from TEDS into the heat exchanger is changed to keep the outlet temperature constant as the heat input is changed.

**MAGNET\_TEDS\_3**: MAGNET-TEDS integration with a simple heat exchanger, MAGNET side. Boundaries are used to represent the TEDS side with input of mass flow and inlet and outlet Temperature. UA value calculated in MAGNET\_TEDS\_Boundaries\_1, a PID controller is used to control the mass flow from TEDS into the heat exchanger, with an outlet temperature set point on the TEDS side set to equal the nominal value of charging temperature (325 oC).

MAGNET side: the heat input of the vacuum chamber is set to be constant, while the mass flow of the MAGNET system is a step function, making this a dynamic simulation. The mass flow from TEDS into the heat exchanger is changed to keep the outlet temperature constant as the MAGNET flow is changed.

**TEDS\_MAGNET\_Q\_vc\_1:** MAGNET-TEDS integration with a simple heat exchanger, both sides connected. UA values used is calculated from MAGNET\_TEDS\_Boundaries\_1, a PID controller is used to control the heat rate from the vacuum chamber with an upper limit of 400 kW.

**TEDS\_MAGNET\_Q\_vc\_2:** MAGNET-TEDS integration with a simple heat exchanger, both sides connected. UA values used is calculated from MAGNET\_TEDS\_Boundaries\_1, a PID controller is used to control the heat rate from the vacuum chamber with an upper limit of 250 kW.

**TEDS\_MAGNET\_Q\_vc\_SS:** MAGNET-TEDS integration with a simple heat exchanger, both sides connected. UA values used is calculated from MAGNET\_TEDS\_Boundaries\_1, a PID controller is used to control the heat rate from the vacuum chamber with an upper limit of 400 kW. The TEDS control hub is Control\_System\_Therminal\_4\_element\_SS, with the BOP\_total\_demand and the Heater\_total\_demand set to 100% (which is equal to each other)