

greenius User Day

31. October 2014

Power block files

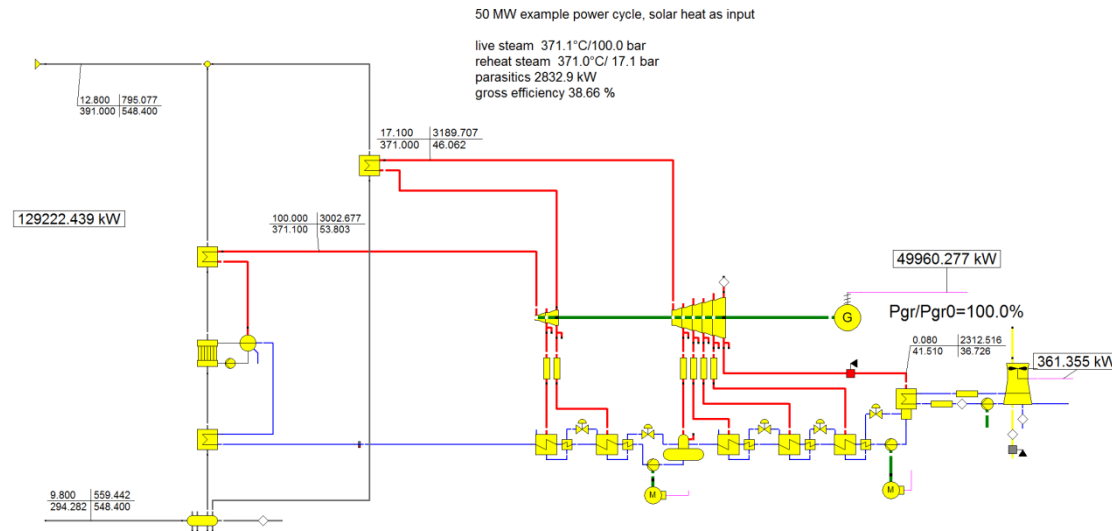
- manipulation and creation of own data sets



Knowledge for Tomorrow

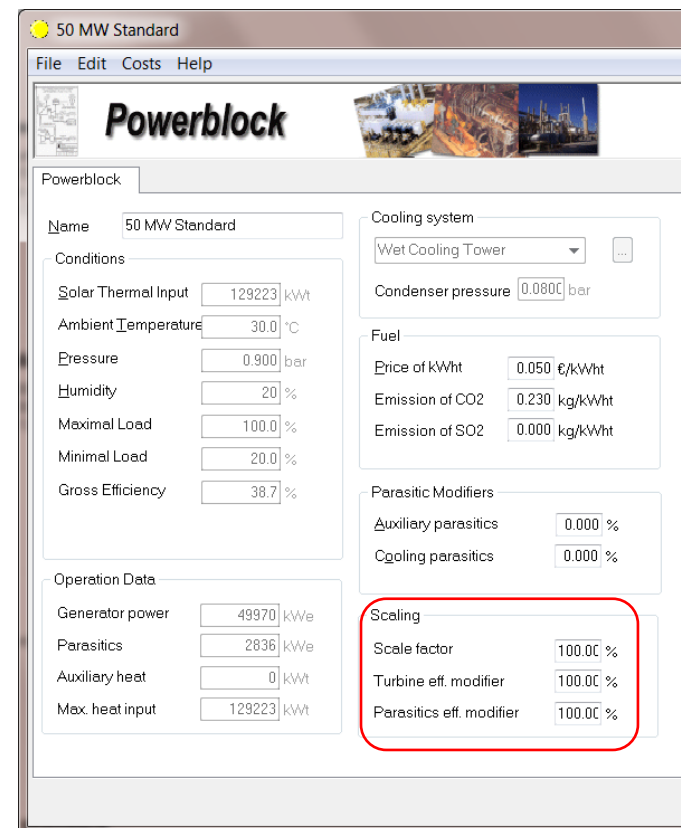
Power block data sets in greenius

- Power block performance in greenius is modelled by using data from lookup tables
- greenius comes with some power block files which can be loaded by users
- Since these files are lookup tables, each of them is valid for a specific configuration. E.g. the 50MW_Standard.gpa is based on:



Manipulation of existing power block files 1

- Choose an existing power block file with appropriate cooling type
- Use the scaling parameters
 - Scale factor: scales thermal input and all operation data and leaves the efficiency as it is
 - Turbine efficiency modifier: scales the generator output
 - Parasitics eff. modifier scales the power block parasitics



Example: Creating a 100 MW power block file

- Start with the existing 50 MW Standard power block file
- We will assume an increased efficiency of 39.5%
- The existing data set has an efficiency of 38.7%
(49.97 MW/129.22 MW)
- The correct turbine eff. modifier would be 102.07%
- Using this value, we will get a generator power of 51.004 MW
- Thus the scale factor should be 196.06% ($100/51.004$)
to get 100 MW generator output
- After saving this dataset with a new filename you may
use it for all following simulations



Creation of own power block files 1

- The manipulation shown before does not modify the relative part load efficiency
- Instead the curve is just shifted in parallel
- For completely other power blocks users need to create their own lookup tables



Creation of own power block files 2

➤ The recommendation is:

- Load an existing power block file to MS Excel and manipulate the values
(You will find them in *Your greenius Folder\data\Technology\Power Block*)
- Add necessary leading columns to ease the editing
- After the manipulation: erase the leading columns and save it as *.txt file (with tab stop separators)
- Change the file extension to *.gpa (since this extension is reserved for *greenius* ASCII datafiles)



Content of power block files

Keywords

name	50 MW Standard														
source	DLR														
contact	greenius Team														
cooling_type	2														
scaling	100														
eff_mod_turbine	100														
eff_mod_parasitics	100														
aux_parasitics	0														
cooling_parasitics	0														
CO2_emmissions	0.23														
SO2_emmissions	0														
baseyear	2014														
landuse	10000														
specific_investment_costs	800														
specific_OM_costs	3														
specific_replacement_costs	0.002														
specific_insurance_costs	0.01														
guaranteetime	0														
maximal_load	1														
minimal_load	0.2														
thermal_input_range	0	25764	25765	39114.1	53676.3	66549.9	78130.5	88639.4	98226.1	107034.7	115117.3	122577.2	129222.5	133215.9	138017
inlet_temperature_range	391														
amb_temperature_range	0	15	30	45											
amb_pressure_range	0.9														
amb_humidity_range	0	20	40	60	80	100									
condenser_pressure_range	0.08														
load_range	-1														
design_conditions	129222.5	391	30	0.9	20	0.08	-1								
generator_output															
	0	0	6957.7	11363.5	16659.6	22001.3	27198	31983.7	36533.9	40965.6	44989.5	48637.2	51816	53117	54554.6
	0	0	6957.7	11363.5	16659.6	22001.3	27198	31983.7	36471	40615.7	44323.6	47823.2	51086.1	52356.7	53793.3
	0	0	6957.7	11363.5	16659.6	22001.3	27145.5	31671.6	35916	40017.8	43695.4	47167.3	50491.4	51738	53171.2
	0	0	6957.7	11363.5	16659.6	21820.3	26734.6	31243.1	35439	39501.8	43148.9	46592.4	49970	51196.5	52625.4
	0	0	6957.7	11363.5	16659.6	22001.3	27198	31983.7	36533.9	40965.6	44987.5	48511.6	51703.5	52999.4	54436.9
	0	0	6957.7	11363.5	16659.6	22001.3	27198	31968.6	36244.3	40370.9	44067.3	47552.9	50841.7	52101.8	53536.7
	0	0	6957.7	11363.5	16659.6	21827.9	26741.5	31248.6	35443.6	39505.2	43151.1	46593.3	49969.8	51195.5	52623.5
	0	0	6913.2	11163.8	16199	21165.3	25981.4	30445.6	34565	38525.3	42107.4	45490.3	48545.5	50143.2	51557.2
	0	0	6957.7	11363.5	16659.6	22001.3	27198	31983.7	36533.9	40965.6	44870.3	48389.4	51593.8	52885	54322.3
	0	0	6957.7	11363.5	16659.6	22001.3	27198	31775.6	36029.7	40138.8	43821.7	47296	50608.7	51859.1	53292.1
	0	0	6957.7	11363.5	16468.3	21514.1	26381.9	30869.3	35027.2	39043.6	42659.2	46073.6	49249.9	50699.8	52121.2

Thermal input to PB (x-axis of the lookup tables)

Ambient temperatures nodes

Ambient humidity nodes

Lookup tables

