

Introduction to CLEWs

Hands-on lecture 4: Technology parameters

V2.0

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Disclaimer: These worksheets have been adapted from work kindly provided by the United Nations Department of Economic and Social Affairs (UNDESA) and KTH Royal Institute of Technology.

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Tags: CLEWs; Climate; Land; Energy; Water; Systems Modelling; Integrated; Policy Coherence; Installation; Hands-on; Climate Compatible Growth; Open Source; Teaching Kit.

Useful links:

- Energy Modelling Community (EMC) <u>Discourse Forum</u> please use this for any CLEWs-related discussions, especially troubleshooting queries!
- 2) EMC LinkedIn.
- 3) CCG YouTube.
- 4) Hands-On Results here

Pre-requisites:



1) Successful completion of Hands-on lecture 3.

Learning outcomes

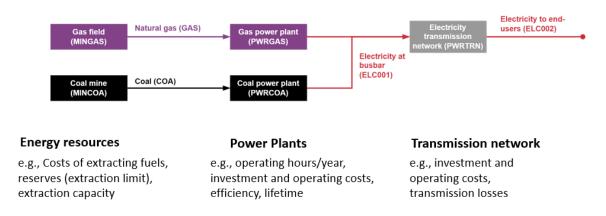
By the end of this exercise, you will be able to:

- 1) Define key techno-economic parameters playing a role in the analysis of an energy system
- 2) Use several techno-economic parameters in an energy system model
- 3) Understand the role of techno-economic parameters of various technologies in the least-cost planning of the energy system

Activity 1 – Introduce technoeconomic parameters

Before starting this activity, we strongly suggest you copy the model you worked on in the previous exercise. In this way, if something goes wrong with this exercise, you can go back to the model you worked on before. We recommend you do this **before any exercise where you introduce new elements in the model**. We will be reminding you to copy your model through all hands-on sessions.

Having learned about the main techno-economic parameters linked to technologies, you will now introduce them into the model you initiated in hands-on exercise 3. The structure of the model will not change this time: you will work with the technologies and commodities you defined in HO3 and will not add more, yet. You will only introduce numerical values for the parameters related to them. Below is a brief description of the parameters you will use.





Techno-economic data refers to performance and costs data that characterise the investment in and operation of the technologies.

1. Enter data for the parameters listed in the table below by clicking on "Data Entry" in the left-hand side menu and enter the respective parameter names in the "search field" to navigate to the appropriate input tables.

You need to enter the data for all years of the modelling period, i.e., 2020-2035, except for the "Operational Life", "Capacity To Activity Unit", and "Discount Rate" (for which you only enter one value, valid for the whole modelling period).

Parameter	Units	MINCOA	MINGAS	PWRCOA	PWRGAS	PWRTRN
Availability Factor	Fraction	1*	1*	1*	1*	1*
Capital Cost	M\$/GW (\$/kW)	0.0001*	0.0001*	2599	957	2354
Fixed Cost	M\$/GW (\$/kW)	0.0001*	0.0001*	72	27	24
Variable Cost	M\$/PJ (\$/GJ)	1.52	6.00	2.2	0.5	0.0001*
Operational Life	Years	30	30	30	30	50

Discount Rate	5% *
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^{*} Default value

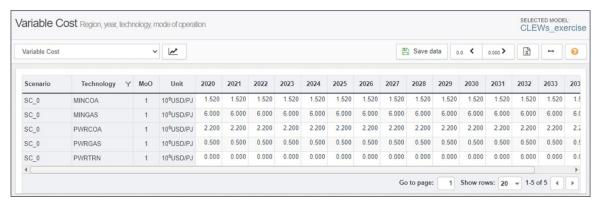
You can also find the above data available in the Excel sheet you should have already downloaded!

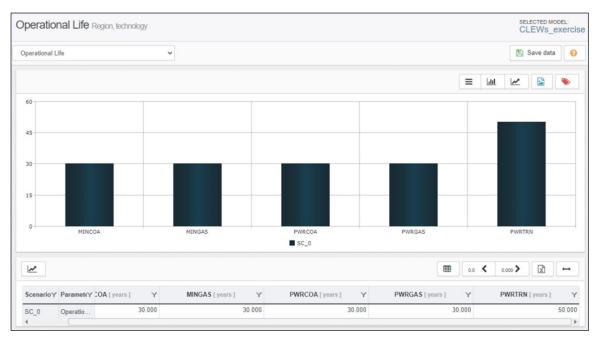
Below is how the tables of the various parameters listed in the table above should look like, after you have introduced the values.













NOW RUN THE MODEL:

- 2. Create new case and name it as "HO4_A1" and write a similar description to what you did before. Once the case is created and is listed under "Cases", select the case by clicking on it and then click on "Data File" in the "Case Data" window. This will compile the data file to be run.
- 3. Run the model clicking on "RUN MODEL".
- 4. Go to the "Results" view and visualise results for "Production by Technology by Mode". Since now we have two cases (HO3_A1 and HO4_A1) in the default setting, results view should be displayed side-by-side to compare the two cases.
- 5. Visualize results for power plants only (i.e., PWRCOA and PWRGAS), you can do this using the saved view created in the previous exercise.

Note: Please be advised to always back up your model.

To back up a model, go to the Home screen and click on the download icon to the right of its name. This will download the model itself, as a zipped folder. **Do not unzip the folder and do not change its name**. Store it safely in a place of your choice.