

Energy System Modelling Using OSeMOSYS

Hands-on 7

Please use the following citation for:

- **This exercise**

Plazas-Niño, F., Alexander, K. (2026, August). Hands-on 7: Energy System Modelling Using OSeMOSYS (Version 2.0.). Climate Compatible Growth. DOI: 10.5281/zenodo.14871306

- **OSeMOSYS UI software**

Climate Compatible Growth. (2026). MUIO (Version v5.6.0). GitHub.
<https://github.com/OSeMOSYS/MUIO/releases>

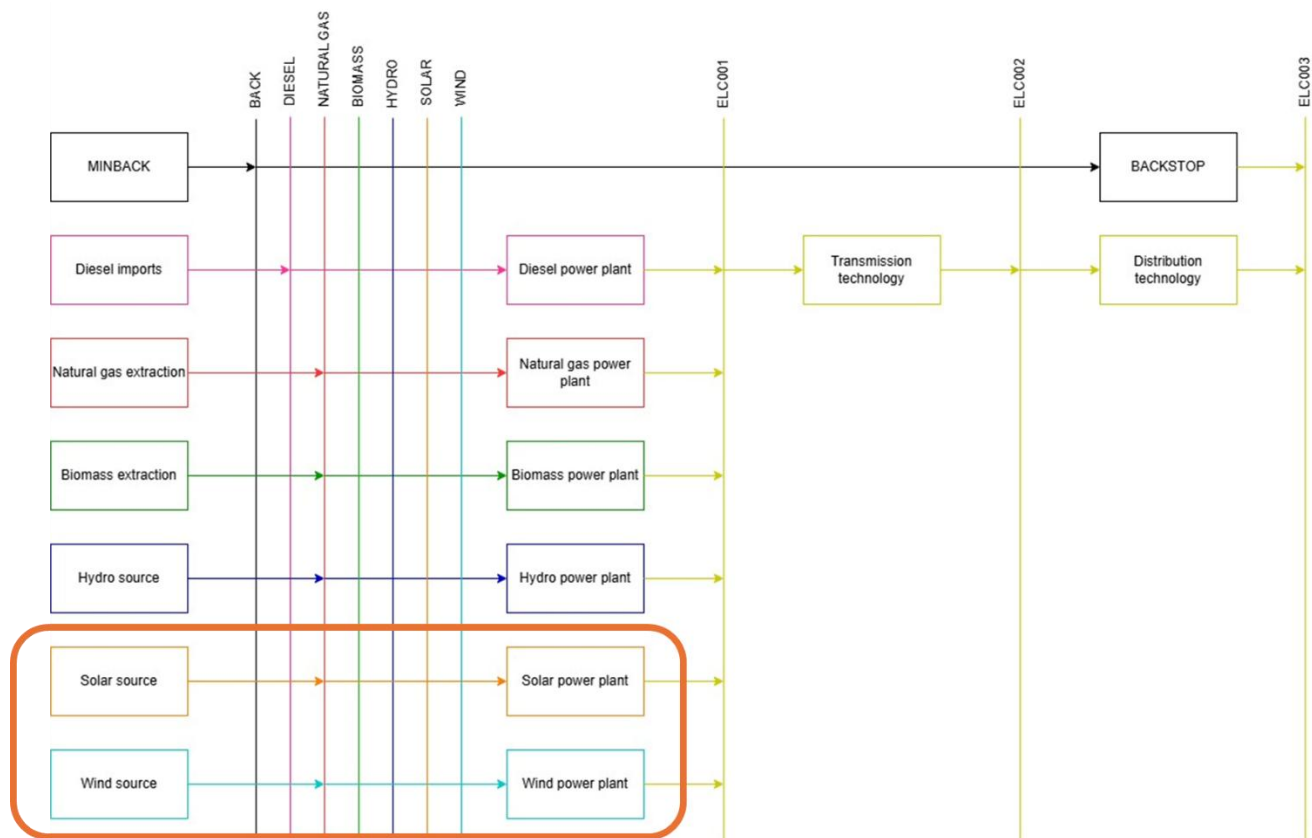
Learning outcomes

By the end of this exercise, you will be able to represent the following in OSeMOSYS:

- 1) Solar power plants and the solar primary supply technology
- 2) Wind power plants and the wind primary supply technology

Add Solar and Wind Technologies

In this Hands-on we will add **4 technologies** in total: 2 power plants (PWSOL, PWRWND) and 2 primary supply technologies (MINSOL, MINWND). **Two** new fuels (**commodities**) will be added to the model: SOL (Solar energy) and WND (Wind energy). We will build the highlighted parts of the RES below. **Note:** Update your RES in diagrams.net.



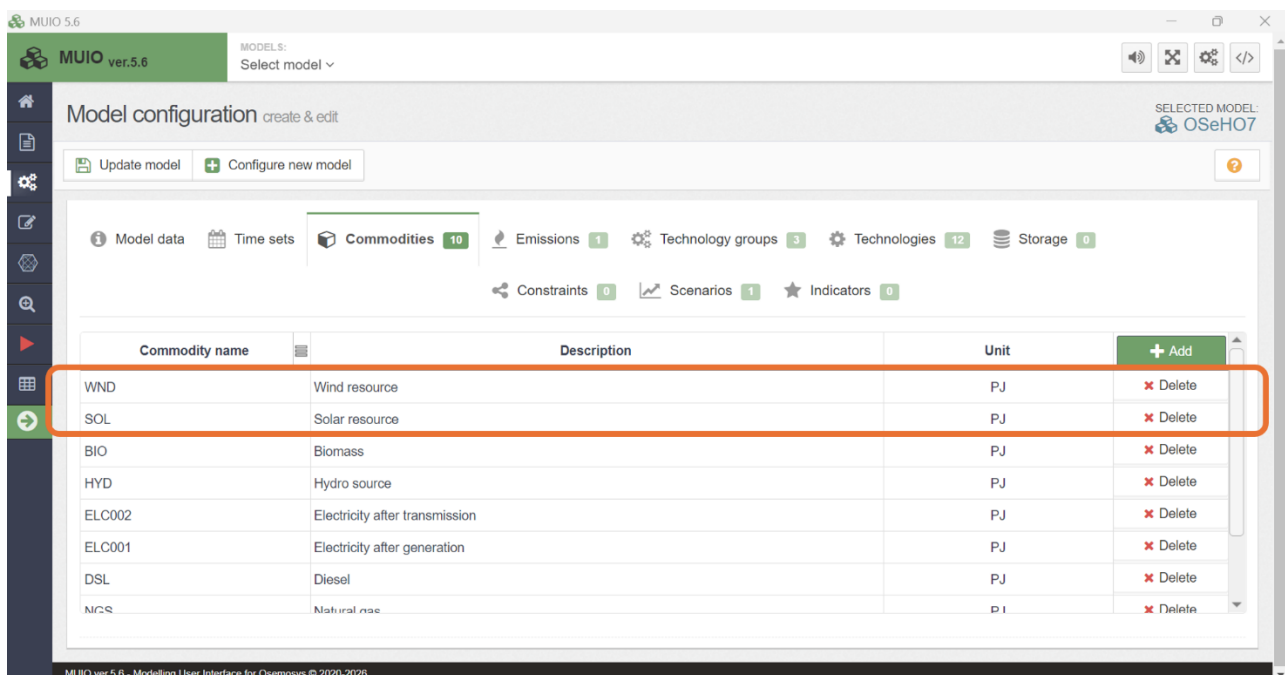
IMPORTANT: Before you can do anything else, you must copy the model and rename it in the same way you have before (OSeHO7 this time).

We will add the new technologies and commodities using the same steps covered in hands-on exercises 5 and 6.

Try it: Add 4 new technologies using the [Data Preparation File OSeHO7](#).

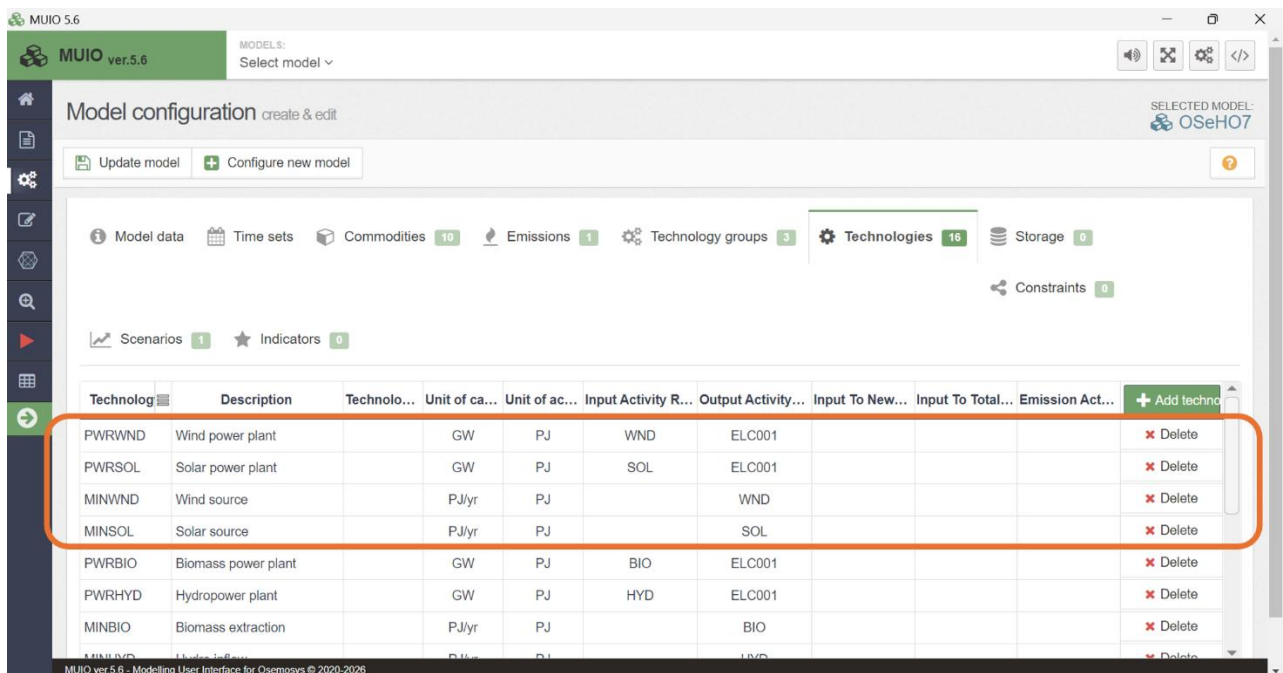
1. **MINSOL** – Solar Source
2. **MINWND** – Wind Source
3. **PWRSOL** – Solar PV Power Plant
4. **PWRWND** – Onshore Wind Power Plant

Repeat the same steps shown for Primary Supply Technology and Power Plants in **Hands-on 6**. **Don't forget to add Capacity Factors!** And of course, two new Commodities into the model config page: **SOL** and **WND**!



The screenshot shows the MUJO 5.6 Model configuration interface. The 'Commodities' tab is selected, showing a table of commodities. The table has columns for Commodity name, Description, and Unit. The 'WND' and 'SOL' rows are highlighted with an orange box. The 'WND' row has a description of 'Wind resource' and a unit of 'PJ'. The 'SOL' row has a description of 'Solar resource' and a unit of 'PJ'. Both rows have a 'Delete' button in the rightmost column.

Commodity name	Description	Unit	
WND	Wind resource	PJ	Delete
SOL	Solar resource	PJ	Delete
BIO	Biomass	PJ	Delete
HYD	Hydro source	PJ	Delete
ELC002	Electricity after transmission	PJ	Delete
ELC001	Electricity after generation	PJ	Delete
DSL	Diesel	PJ	Delete
NCS	Natural gas	PJ	Delete

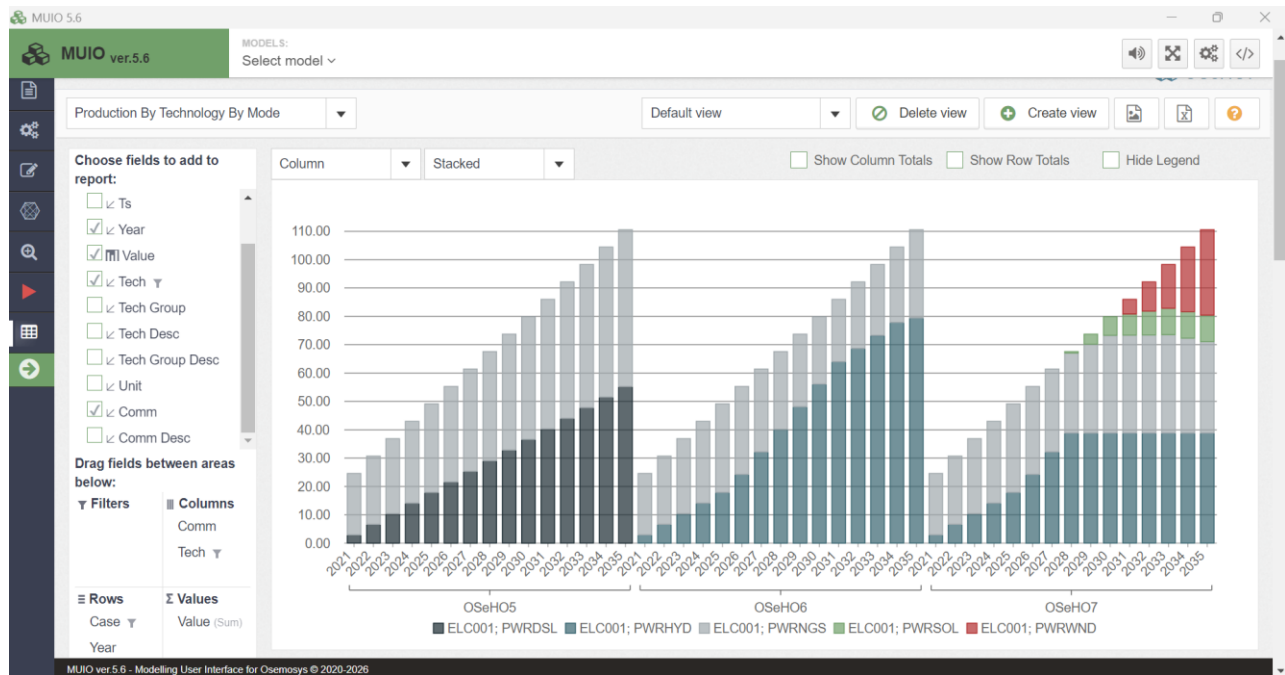


Technology	Description	Technolo...	Unit of ca...	Unit of ac...	Input Activity R...	Output Activity...	Input To New...	Input To Total...	Emission Act...	+ Add techn...
PWRWND	Wind power plant		GW	PJ	WND	ELC001				✖ Delete
PWR SOL	Solar power plant		GW	PJ	SOL	ELC001				✖ Delete
MINWND	Wind source		PJ/yr	PJ		WND				✖ Delete
MINSOL	Solar source		PJ/yr	PJ		SOL				✖ Delete
PWRBIO	Biomass power plant		GW	PJ	BIO	ELC001				✖ Delete
PWRHYD	Hydropower plant		GW	PJ	HYD	ELC001				✖ Delete
MINBIO	Biomass extraction		PJ/yr	PJ		BIO				✖ Delete

Run the model and check the results

Run the model in the user interface as demonstrated in hands-on 3 to obtain the results. The **Production by Technology by Mode (PJ)** graph you should get after running the hands-on 7 model is shown below.

In this case, wind and solar power plants are initially not competitive with hydropower. However, starting in 2028, solar power plants begin contributing to the energy mix, with wind power making significant contributions from 2031 onward. These new renewable energy sources also reduce the reliance on natural gas for electricity production.



Question to consider: If hydropower were not available, which technology do you think would become the main power supplier? How can we model this situation?