Energy and Flexibility Modelling

Hands-on 7

Please use the following citation for:

- **This exercise**

Cannone, Carla, Allington, Lucy, & Howells, Mark. (2021, March). Hands-on 7: Energy and Flexibility Modelling (Version 2.0.). Zenodo. https://doi.org/10.5281/zenodo.4609932

- **clicSAND Software**

Cannone, C., Allington, L., De Wet, N., Shivakumar, A., Goyns, P., Valderrama, C., Howells, M. (2021). clicSAND [computer software]. http://doi.org/10.5281/zenodo.4593100

- **OSeMOSYS Google Forum**

Please sign up to the help Google forum here. If you are stuck, please ask questions here. If you get ahead, please answer questions in the same forum. Please state that you are using the 'clicSAND' Interface.

- **Step-by-step explanatory video on Youtube**

A video recording of this exercise is available on the CCG Youtube channel at: HO7

Learning outcomes

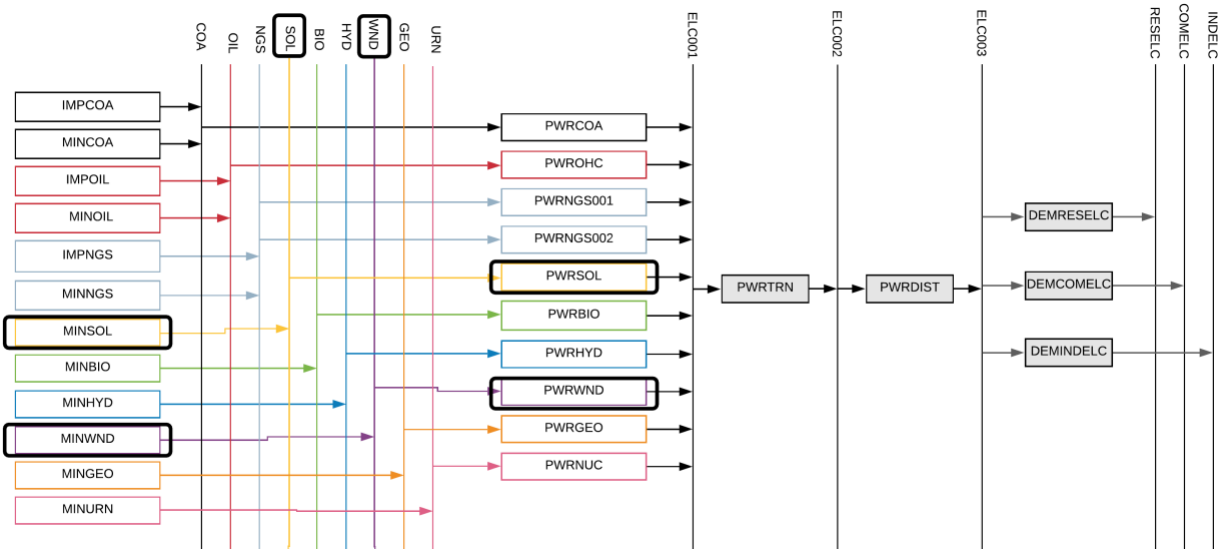
By the end of this exercise, you will be able to represent the following in OSeMOSYs:

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 (PWRSOL, PWRWND) and 4 primary supply technologies (MINSOL, MINWND). Two new fuels will be added to the model: SOL (Solar energy) and WND (Wind energy). We will build the highlighted parts of the RES:



Try it: add 4 new technologies using the Data prep file:

1. **MINSOL –** Solar Potential
2. **MINWND –** Wind Potential
3. **PWRSOL –** Solar Power Plant
4. **PWRWND –** 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 **Residual Capacity**! And of course, two new Commodities in the SETS sheet: **SOL** and **WND**!

Technologies	
Code	*Description*
BACKSTOP	Backstop technology
MINCOA	Coal domestic production
MINOIL	Oil domestic production
MINNGS	Natural gas domestic production
IMPCOA	Import of coal
IMPOIL	Import of oil
IMPNGS	Impor of Natural gas
PWRCOA	Coal power plant
PWROHC	Light Fuel Oil Power Plant
PWRNGS001	Gas Power Plant (CCGT)
PWRNGS002	Gas Power Plant (SCGT)
PWRTRN	Electricity Transmission
PWRDIST	Electricity Distribution
MINBIO	Biomass Extraction
PWRBIO	Biomass Power Plant
MINHYD	Hydro Potential
PRWHYD	Hydropower Plant
MINGEO	Geothermal Potential
PWRGEO	Geothermal Power Plant
MINURN	Uranium Potential
PWRNUC	Nuclear Power Plant
MINSOL	Solar Potential
PWRSOL	Solar Power Plant
MINWND	Wind Potential
PWRWND	Wind Power Plant
TEC025	Additional Technology
TEC026	Additional Technology
TEC027	Additional Technology
TEC028	Additional Technology

Commodities	
Code	*Description*
ELC003	Electricity after distribution
COA	Coal
OIL	Oil fuel
NGS	Natural Gas
ELC001	Electricity from power plants
ELC002	Electricity after transmission
BIO	Biomass
HYD	Hydro
GEO	Geothermal
URN	Uranium
SOL	Sun
WND	Wind
COM013	Additional Fuel
COM014	Additional Fuel
COM015	Additional Fuel
COM016	Additional Fuel
COM017	Additional Fuel
COM018	Additional Fuel
COM019	Additional Fuel
COM020	Additional Fuel
COM021	Additional Fuel
COM022	Additional Fuel
COM023	Additional Fuel
COM024	Additional Fuel
COM025	Additional Fuel
COM026	Additional Fuel
COM027	Additional Fuel
COM028	Additional Fuel
COM029	Additional Fuel

Naming | SETS | Parameters | ToDataFile

Run the model and check the results

This is the Annual Electricity Production graph you should get after running the Hands On 7 model – we can see now that Solar and Wind have a share in the energy mix.