# Questions for starter kits for MUSE

How to go from installed capacity in MW to PJ/y? Do we convert using capacity factor?

*Normally you would not include the capacity factor but the plain unit conversion passing from the equivalent MWh generated in a year assuming full time continuous operation, multiplying MW by 8600 hours, then from the MWh in a year you use 1 MWh = 3.6 e(-6) PJ*

How to attain “MaxCapacityAddition”, “MaxCapacityGrowth”, “TotalCapacityLimit” values for multiple different technologies?

*This is not a question with a real answer. Normally, for debuggiing purposes I tend to first run the model without capacity limits (the growth values are so high that they do not affect the solutions.*

*Practically, I would still keep the third coefficient quite high. Thus, the major game could be between the first two elements (Max capacity and Max addition). The MaxGrowth could vary between a few percent up to optimistic values. Many global models assume 20 % of growth rates for renewables per year. The MaxAddition could be estimated multiplying the max growth times the installed capacity in the base year of a technology; if there is none in the base year you could use a value for the same technology in a similar country or from a similar technology in the same country. In general, there is not a unique answer as growth rates vary depending on political will, subsidies, and many other things. CGE models rather than bottom-up models (like MUSE) can provide a better linkage across the capital flows in the economy.*

*After setting you base growth constraints, you can check against the literature published values so that you can see whether you obtain an unreasonable growth of certain technologies.*

*One interesting source for renewables is IRENA*

[*https://www.irena.org/publications/2020/Apr/Global-Renewables-Outlook-2020*](https://www.irena.org/publications/2020/Apr/Global-Renewables-Outlook-2020)

*And the WEO*

[*https://www.iea.org/reports/world-energy-outlook-2020*](https://www.iea.org/reports/world-energy-outlook-2020)

*The IEA is generally quite underestimating renewables.*

*This is another interesting reference*

[*https://www.sciencedirect.com/science/article/pii/S0301421518305901?via%3Dihub*](https://www.sciencedirect.com/science/article/pii/S0301421518305901?via%3Dihub)

Is there a way to use electricity transmission and distribution efficiencies in MUSE?

*Not a direct one I should think except adding an intermediate sector which does the distribution and the transmission. For example, you can have electricity generated which then grows into electricity distributed and it is the one used in the demand sectors for example. Another way could be to compute a generation function which includes these additional losses. Maybe the first method is more straightforward and can be better expanded to represent the distribution system.*

How can MUSE deal with multiple outputs of a technology in the Technodata file? In this work Crude Oil Refineries produce both Heavy fuel oil (HFO) and light fuel oil (LFO).

*I am not sure if I understand correctly here. In general, the model is driven by fulfilling demand of either or both. It will generate both even if there is demand for one of them only. This can generate commodity abundance in the market.*

How to create ExistingCapacity.csv without the relevant data.

*If you are lucky to know when the existing plants were built you can build a more accurate decommissioning profile saying that the capacity will disappear after the end of the lifetime. = technical life.*

*To avoid abrupt deviations, you can assume a linear decommissioning until the end of the lifetime (technical life) is reached. Essentially you assume that a certain fraction leaves the system year after year.*

*If you do not know when the plants were built you could assume their decommissioning life should start in 2020. Because you are simulating until 2050, power generation with large plants might stay in the mix for quite a while and you would not be able to see relevant changes until after 2030. This could give you some preliminary good info to see where your model goes.*

Does it make sense to have a single final electricity demand not broken down by sectors?

*Yes, depending how granular you need your demand sectors, so if it is important to have them distinguished or not.*

*You can easily model only one demand sector if you are using the preset to generate the demand for all the sectors. Multiple sectors are a standard convention. We have them in MUSE global because we use different timeslices and different drivers of the demand by sector. However, if there is no data, there is no much point.*