EBS & MAED

Hands-on 5: Setting Up the Structure Part II

Learning outcomes

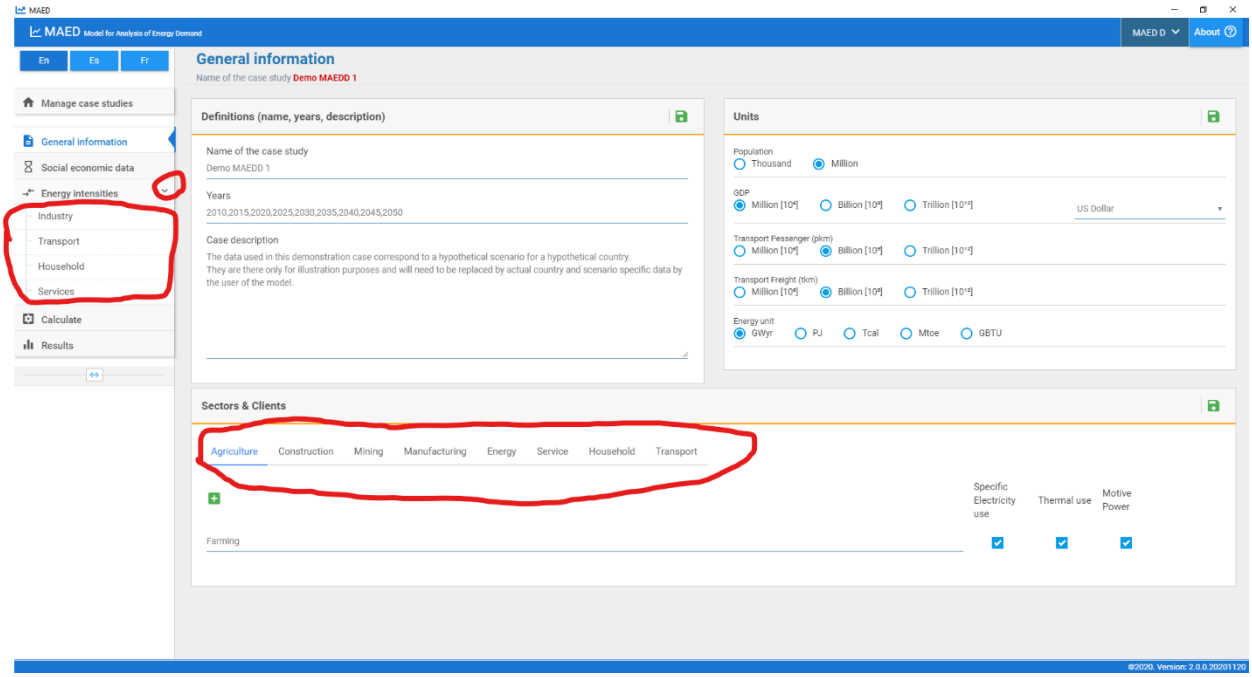
By the end of this exercise, you will be able to:

1. Navigate subsectors
2. Add and delete subsectors
3. Define the structure of the household sector
4. Define the structure of the transport sector
5. Configure the end-use categories

Activity 1: Navigating Subsectors

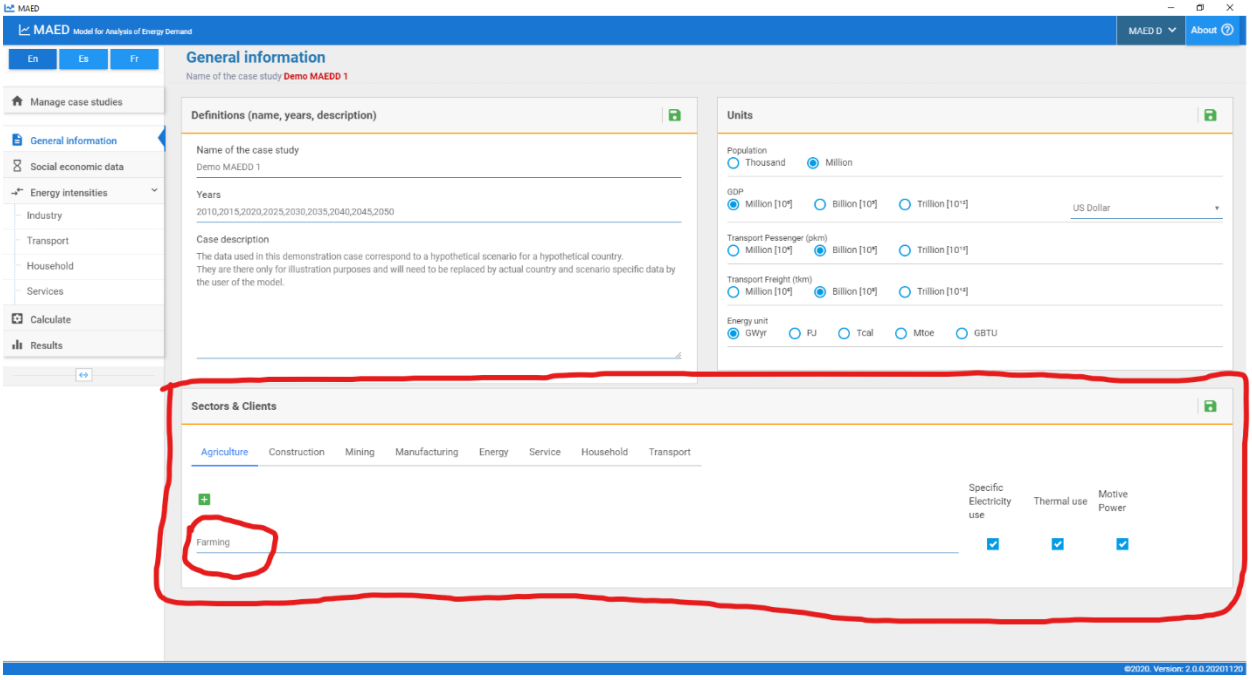
In the previous hands-on we learnt how to manage case studies and declare the case definitions. The next step in establishing the model structure is the defining of the subsectors of the economy.

Let us open the Demo MAEDD 1 case study that we created in hands-on 4. The economic sectors are predefined and are shown in the main menu under Energy Intensities. You will have to click the drop-down menu to view them. In MAED-D, the industry sector is further divided into the Agriculture, Construction, Mining, and Manufacturing sectors. From now on we shall refer to all of tabs in the Sectors & Clients block as sectors.

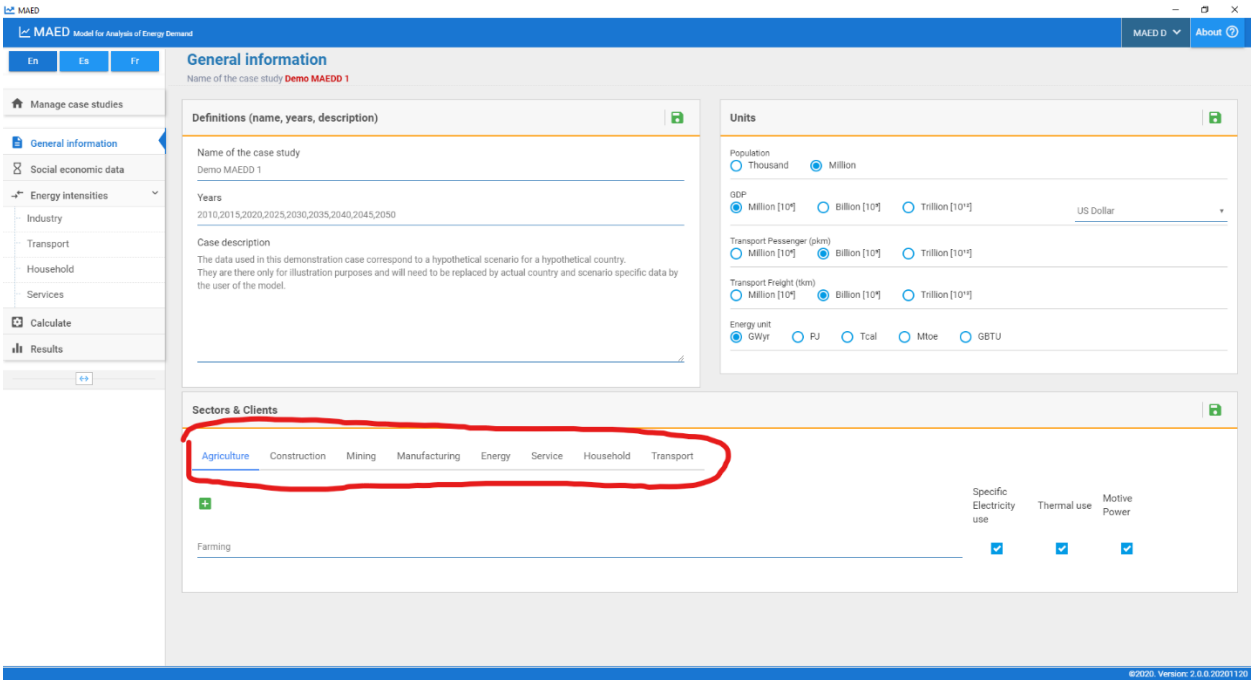


However, even though sectors are predefined and fixed in MAED-D, users can define the subsectors that they want to study. The number of subsectors to be defined by the user depends on the information available regarding both the economy and the energy consumption, which will be discussed in upcoming lectures.

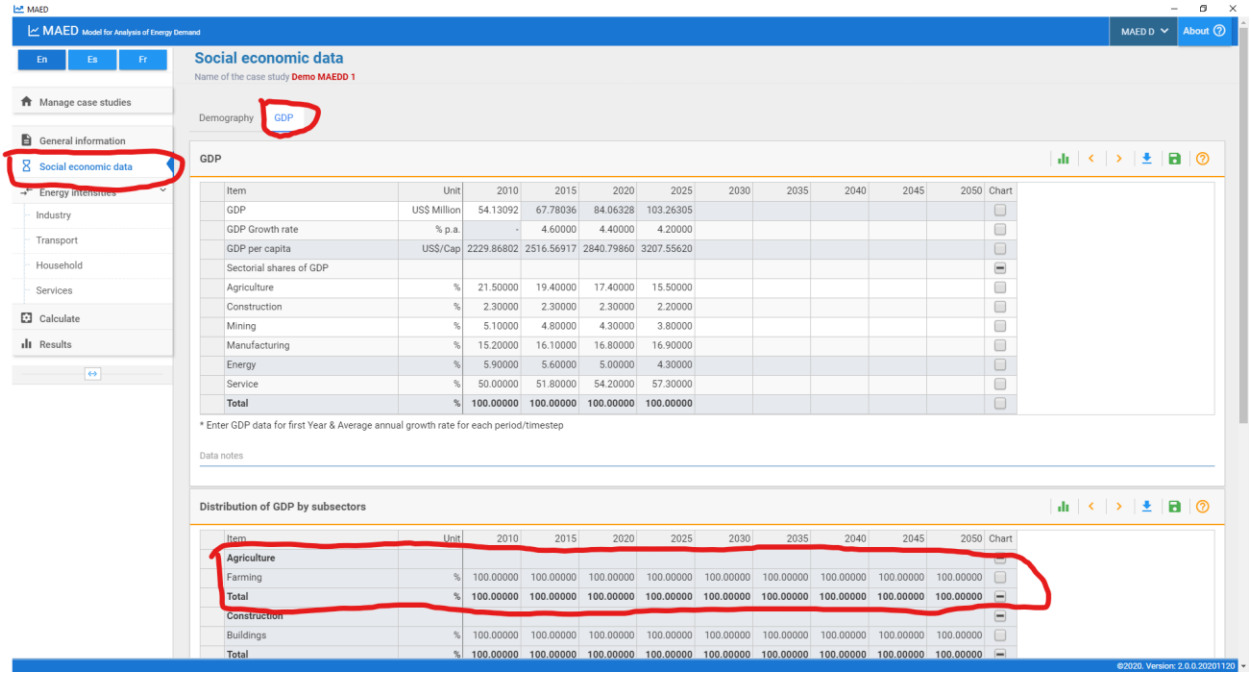
For now, let us see how the model was structured for the Demo MAEDD 1 case study. This can be seen in the bottom half of the general information page in the Sectors & Clients block. The agriculture sector only has one subsector defined: Farming. Each sector needs to have at least one subsector, that is why the first subsector cannot be deleted.



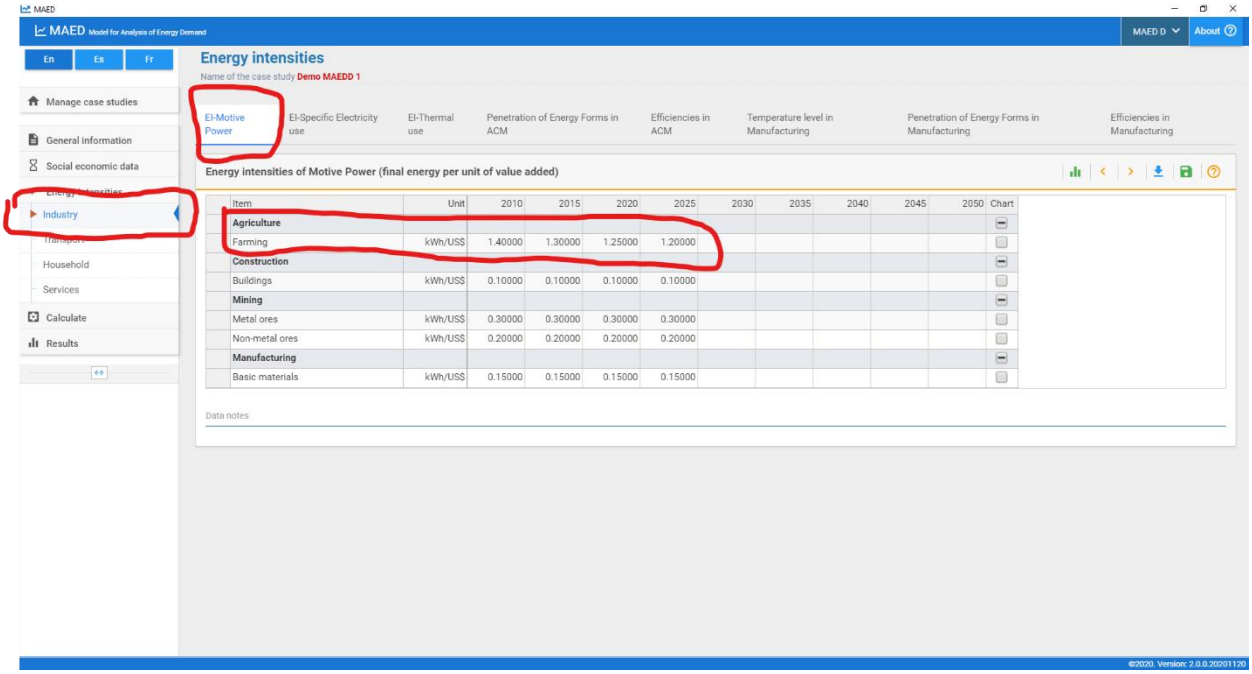
The subsectors for other sectors can be accessed by clicking on their names. Please pause and explore the subsectors defined in other sectors of Demo MAEDD 1 case study.



Click on the Agriculture sector to look at the subsectors that are defined inside. We currently only have one subsector defined: Farming. All tables in MAED-D should have this subsector. Let us check, for example, the table of the GDP structure

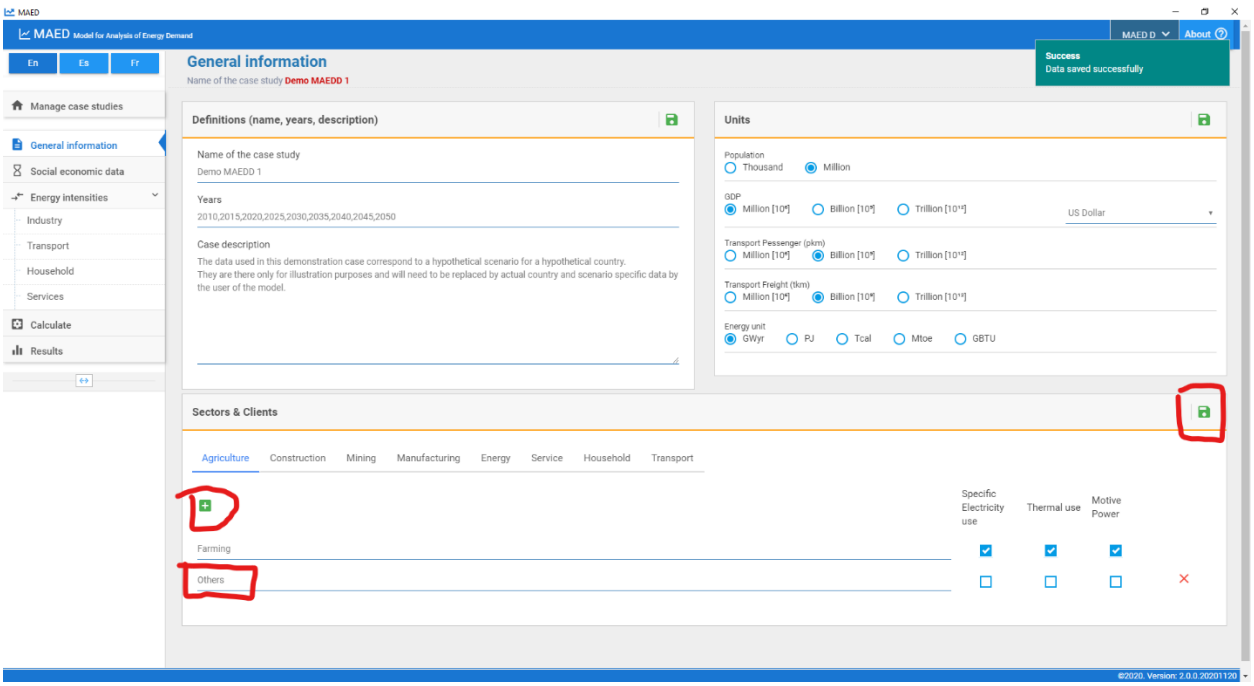


Let us also check the energy intensity of motive power.

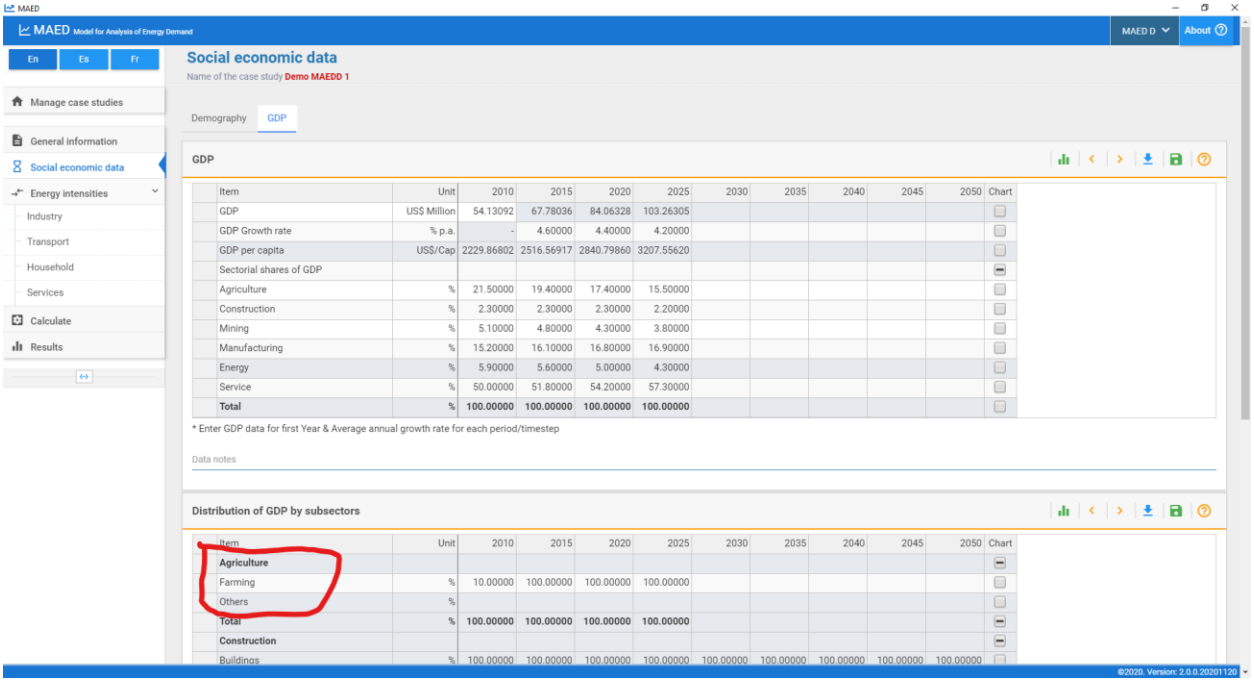


Activity 2: Adding and Deleting Subsectors

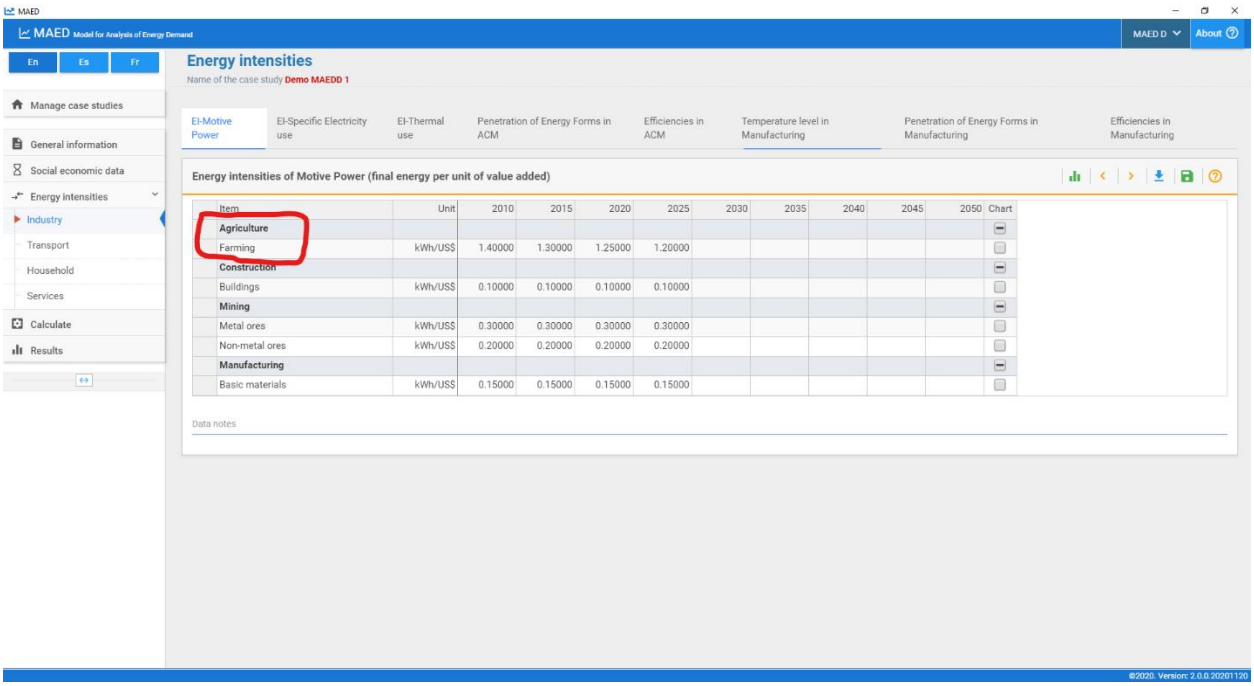
Let us now see how to add and delete subsectors in a sector. Return to the general information page and select the agriculture tab in the Sectors & Clients block. We can add a subsector to the agriculture sector by clicking the plus button. This should create a new subsector called Agr_2. To change the name simply type it in the field. Change the name of the new subsector to Others. Remember to click save to save the changes.



Let us examine the same tables that we saw a moment ago. Go to the GDP page. We can now see the Others subsector under the Agriculture Sector.

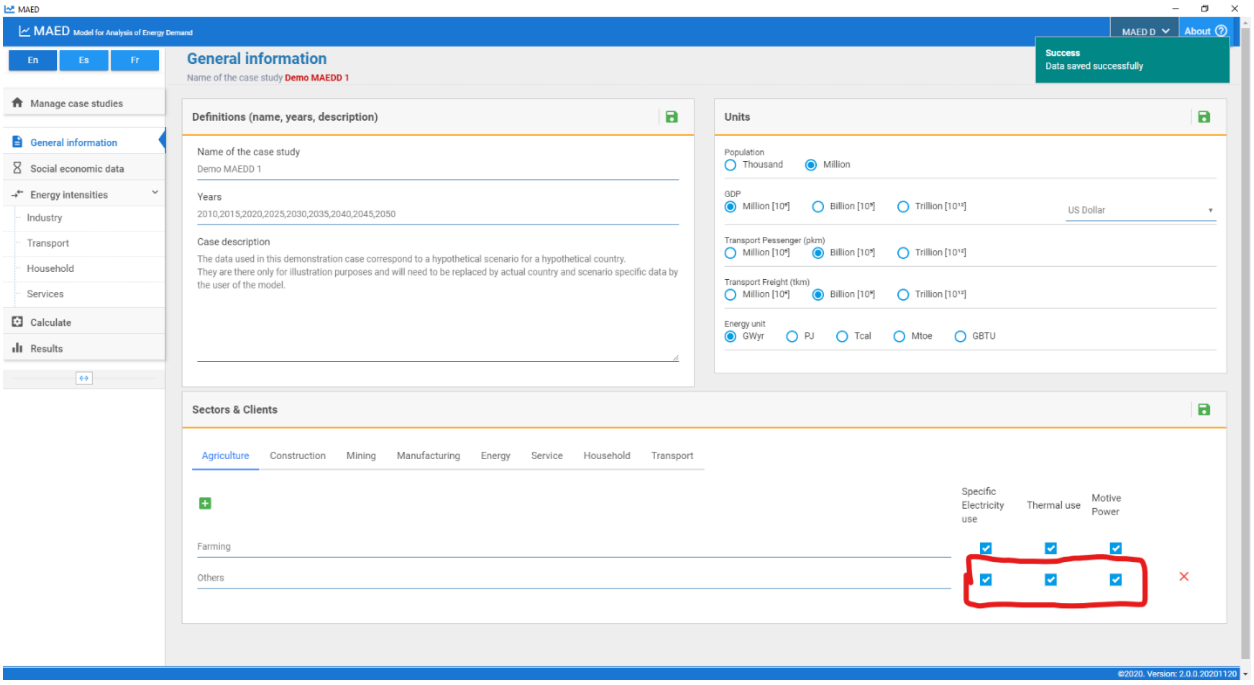


Let us now go to the Energy Intensities of Motive Power. We note that the Others subsector does not appear under the Agriculture Sector.

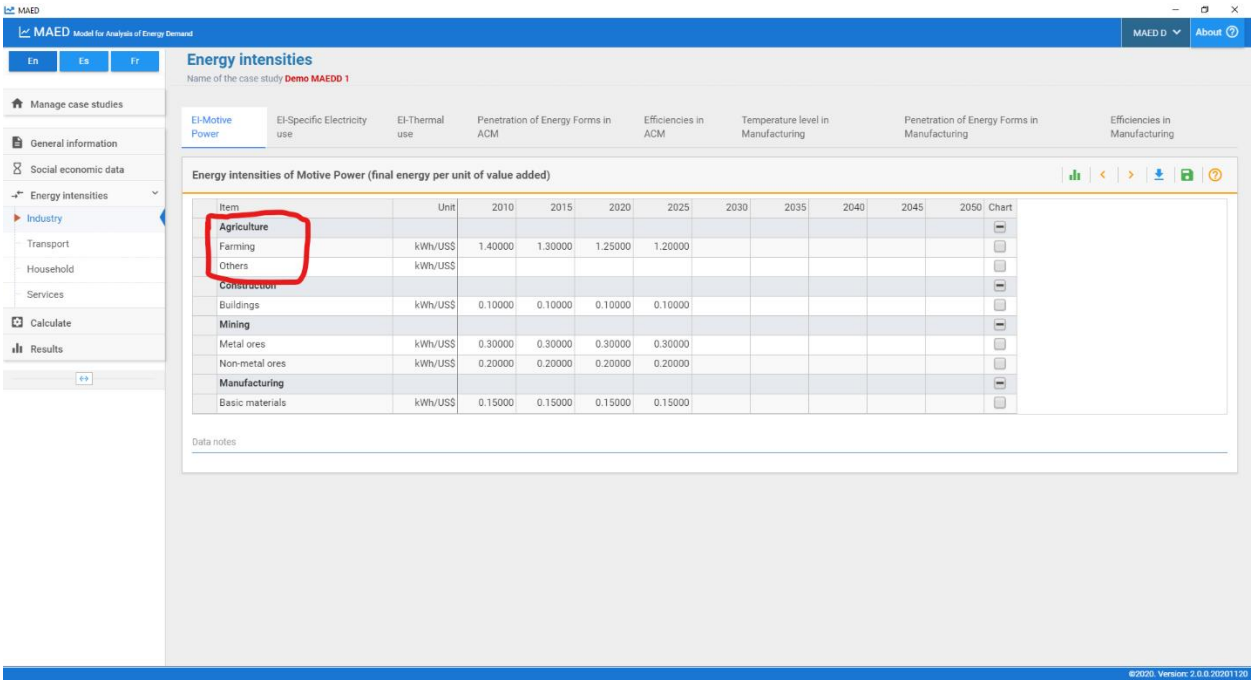


This is because the programme has not been informed about the end-use categories to be studied in the Others subsector. We must go to the general information page and select the End-Use categories for the

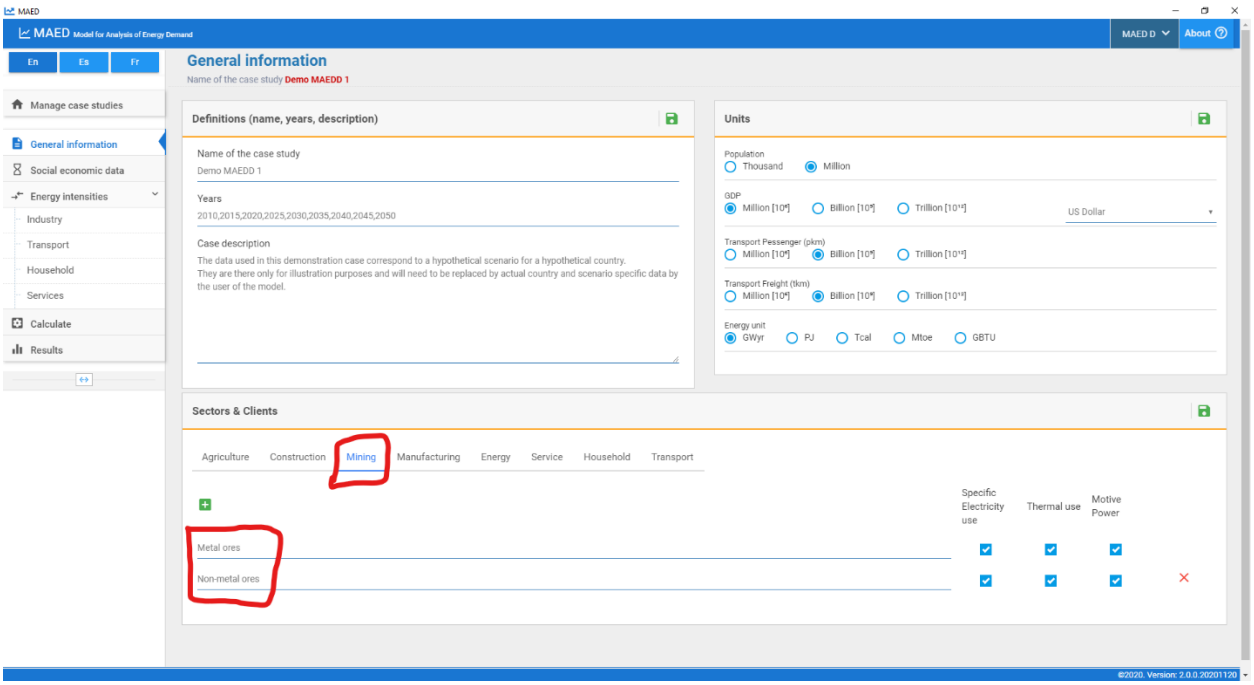
Others subsector. Check all three end-use categories for the Others Subsector to include them as end-uses. Remember to save the changes.



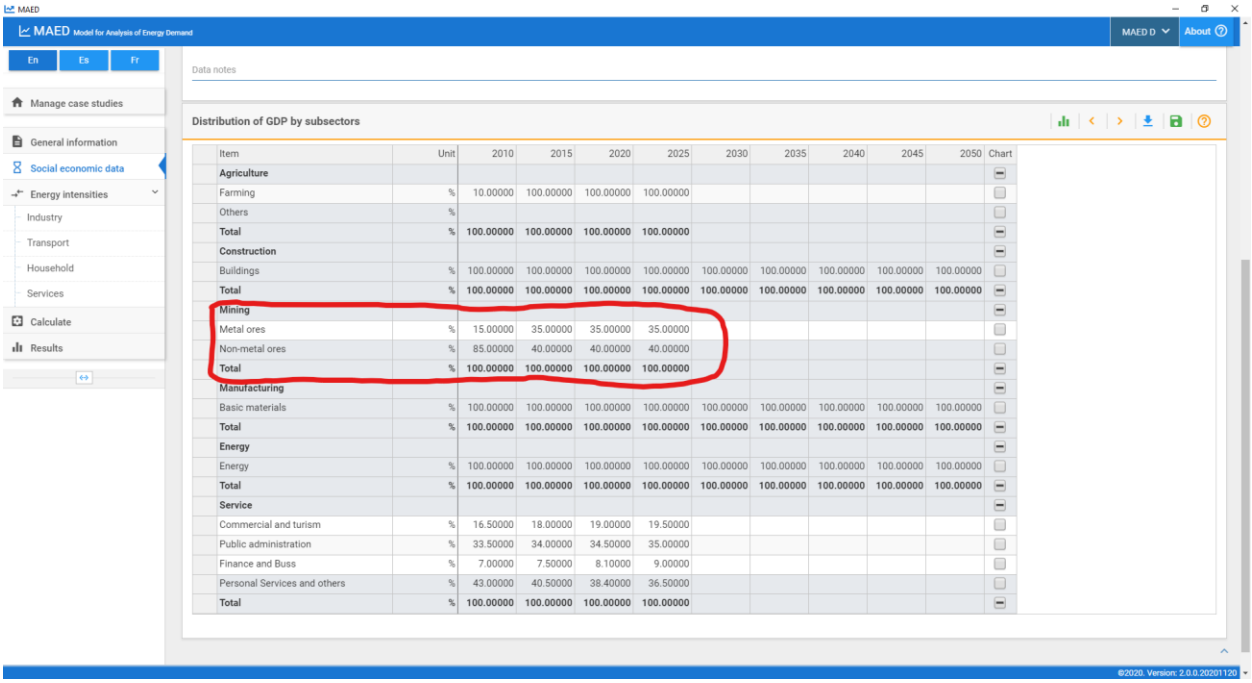
The programme will now build tables for input data in the energy intensities of Specific Electricity use, Thermal use, and Motive Power. Let us look at the energy intensities of motive power to confirm this.



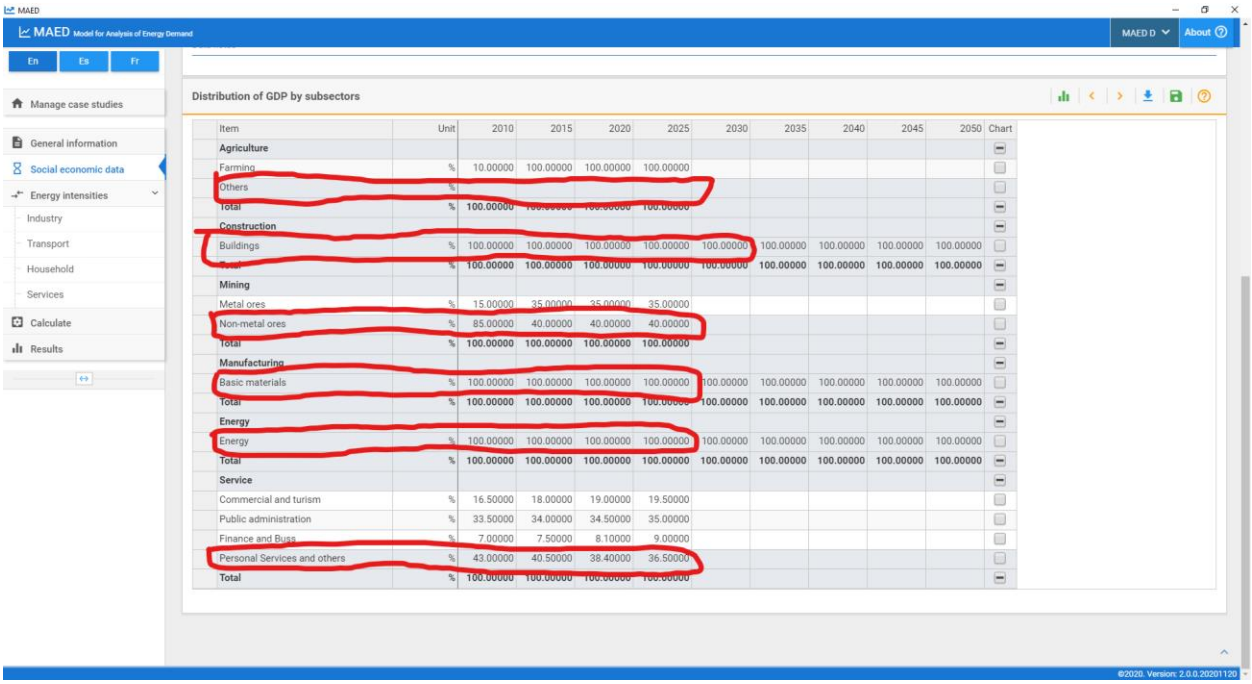
Let us now look at the mining sector. There are 2 subsectors defined.



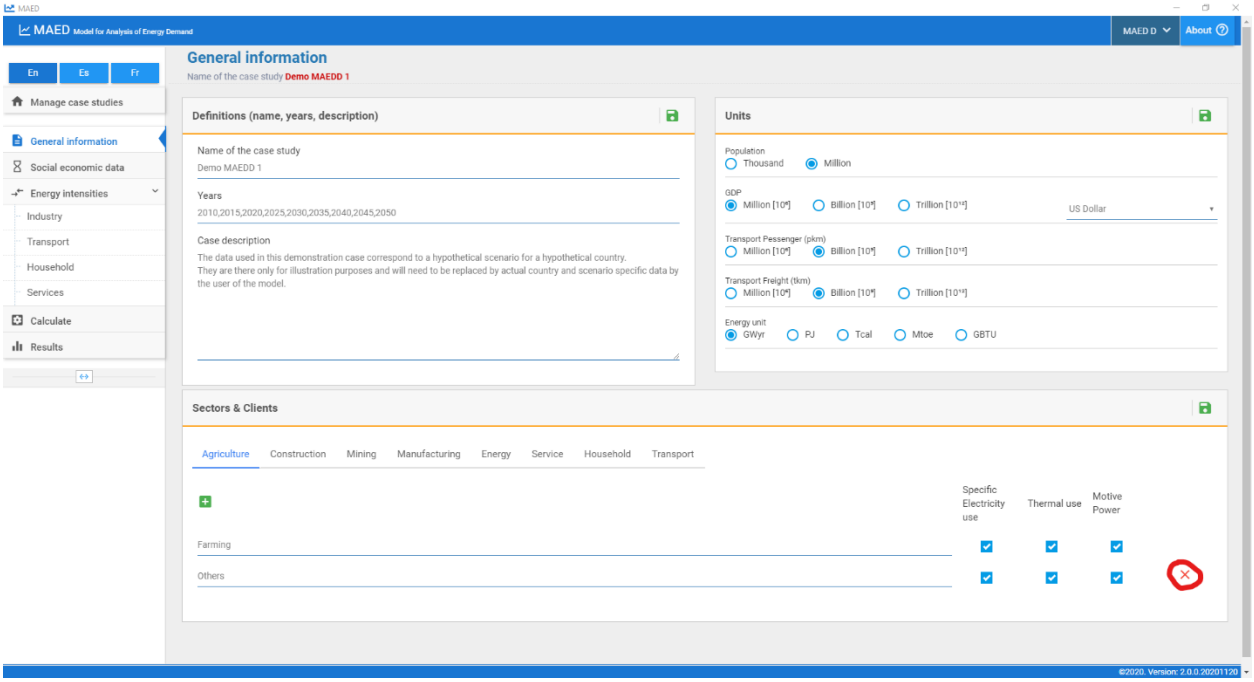
And we confirm this by looking at its corresponding GDP table.



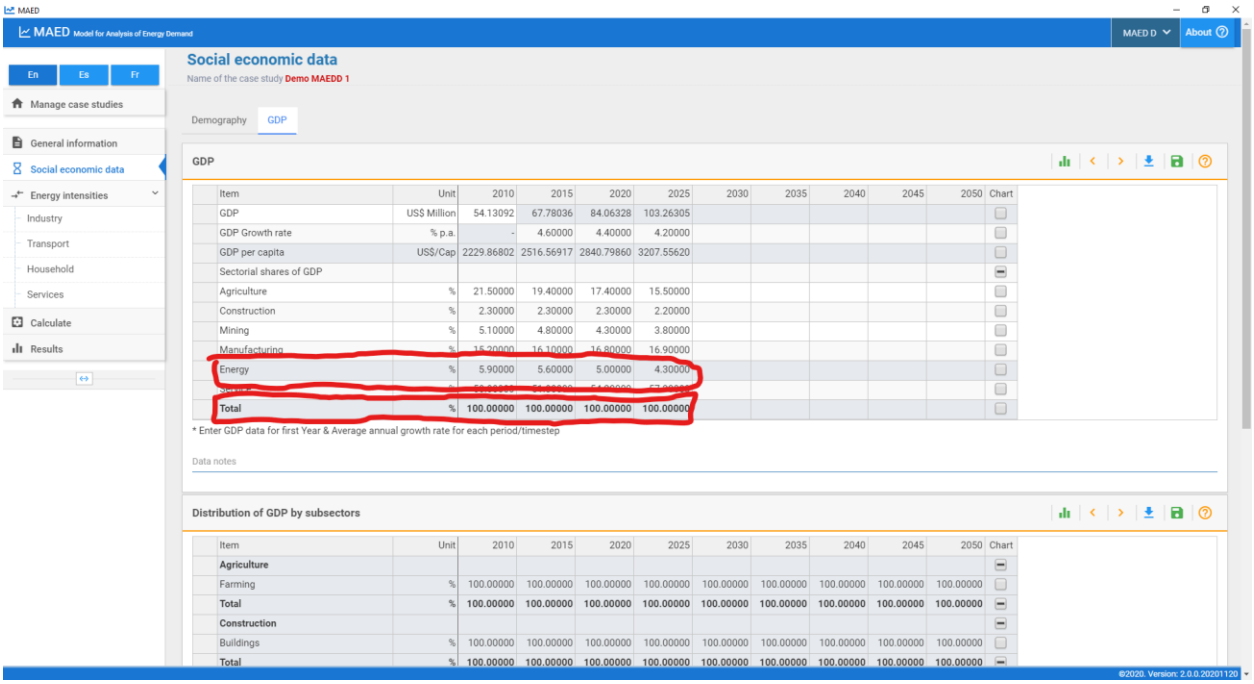
Note that, in each sector the rows of the last subsectors are shaded. This means that those rows are results of calculations performed by the programme, and the cells are locked from user editing. MAED-D is calculating the last subsector so that the sum of the participation of all subsectors is 100.



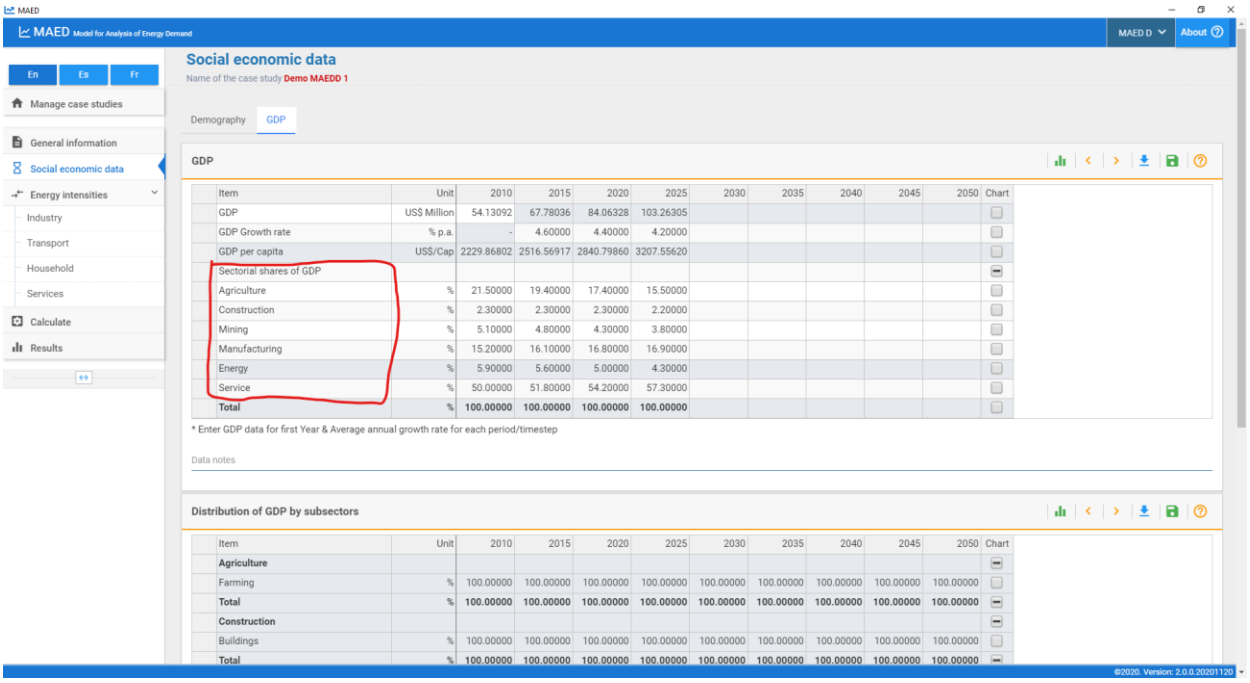
Let us try deleting a subsector. We can delete the same one that we added earlier. We must go to the structure of the agriculture sector in the general information page. Click the delete button (red cross next to the subsector name) on the subsector, Others. The subsector disappears from this menu. And, after clicking the Save; proceed, button, this subsector disappears from all tables in MAED.



Let us return to the GDP table. Note that the Energy Sector appears shaded in the GDP table. This is because MAED calculates the share of this sector of the economy so that the sum of all sectors is set to 100.

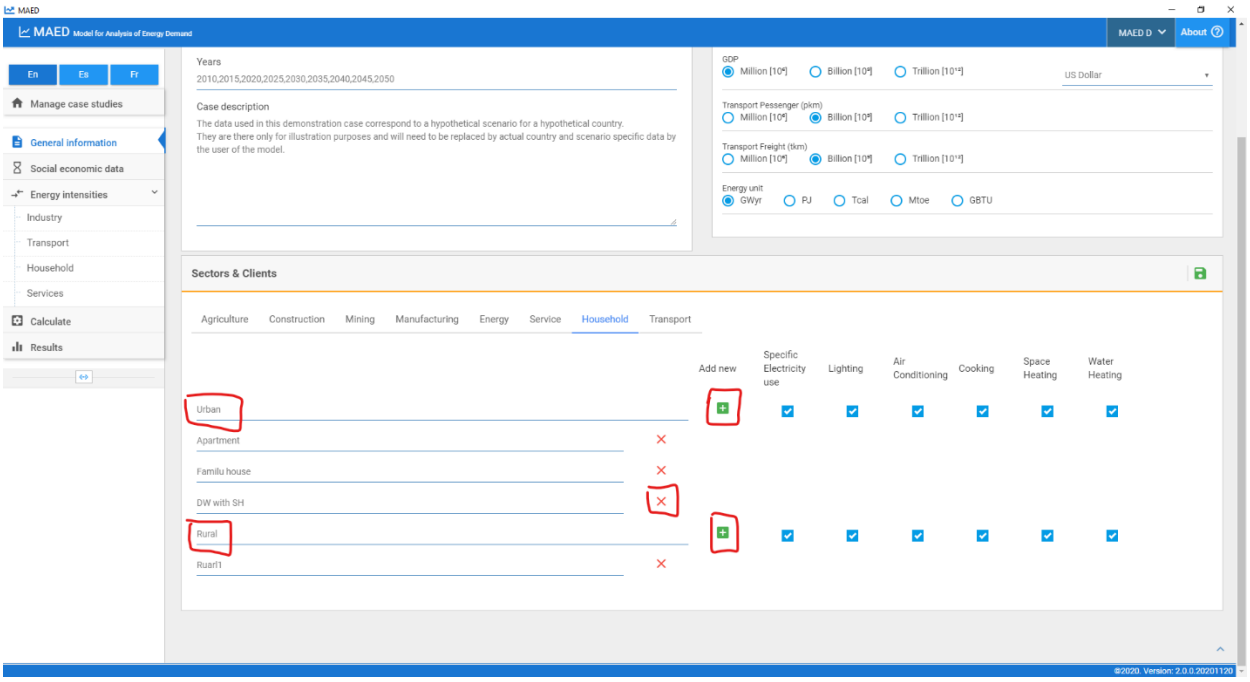


Also note that the transport sector does not appear in the sectoral share of GDP in this table. The GDP component of the transport sector must be added to the service sector. And the same must be done with the energy consumed in the facilities associated with transportation. For example, electricity consumed at airports.



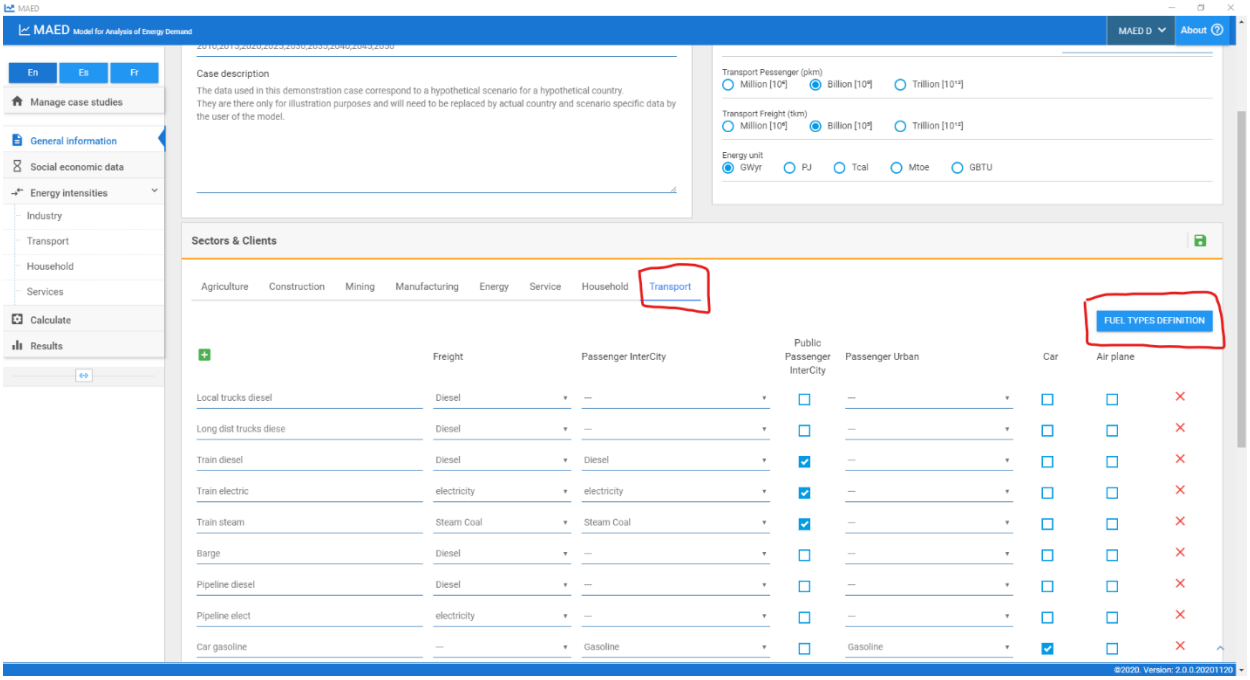
Activity 3: Household Sector

We are now going to work with the structure of the residential sector; this is referred to as the household sector in MAED. Let us go to the Household tab in the Sectors & Clients block on the General Information page. In this case study, a few types of household have been established for urban and rural areas. In each area, you can add or delete household types. Again, the number of different types of households to be included depends on the availability of information or the type of study to be done. For example, in this case, we wish to study the different types of urban households. There are three urban household types. However, there is only one rural household type, this is because all sectors/clients in MAED need to have at least one subsector/sub-client.

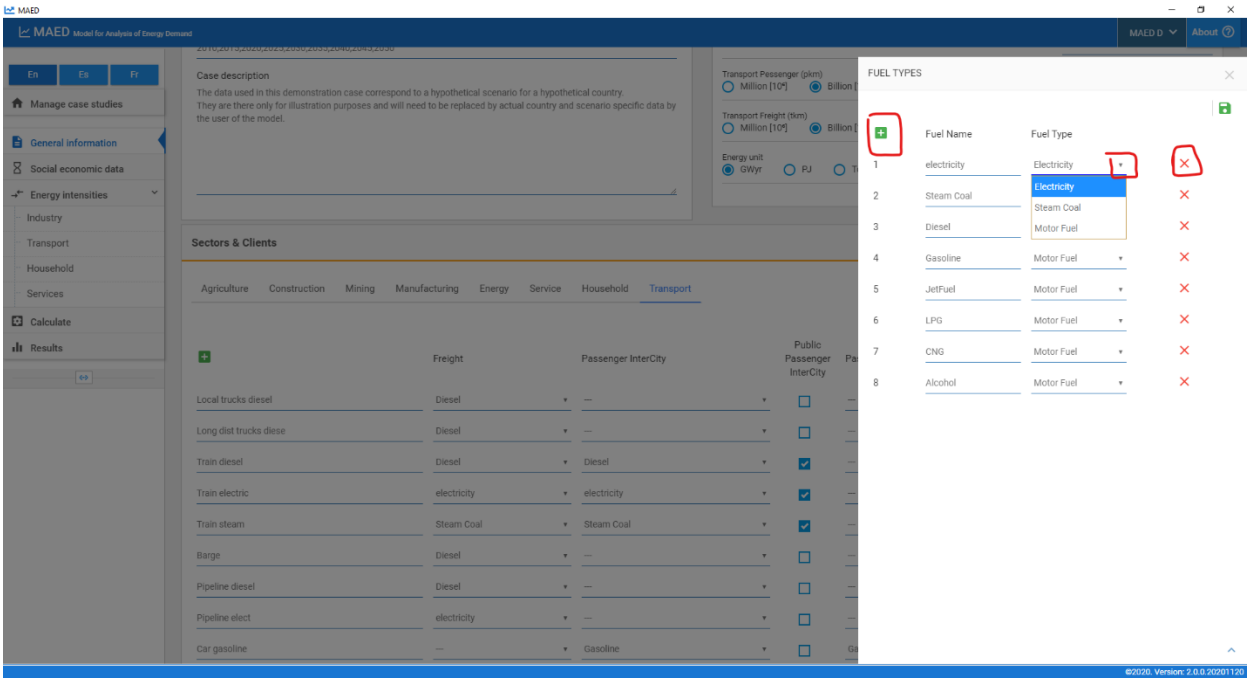


Activity 4: Fuel Types

Now, let us move on to define the structure of the transportation sector. We must first specify the fuels we want to model. To access the fuel types, click the Fuel Types Definition button in the Transport tab.



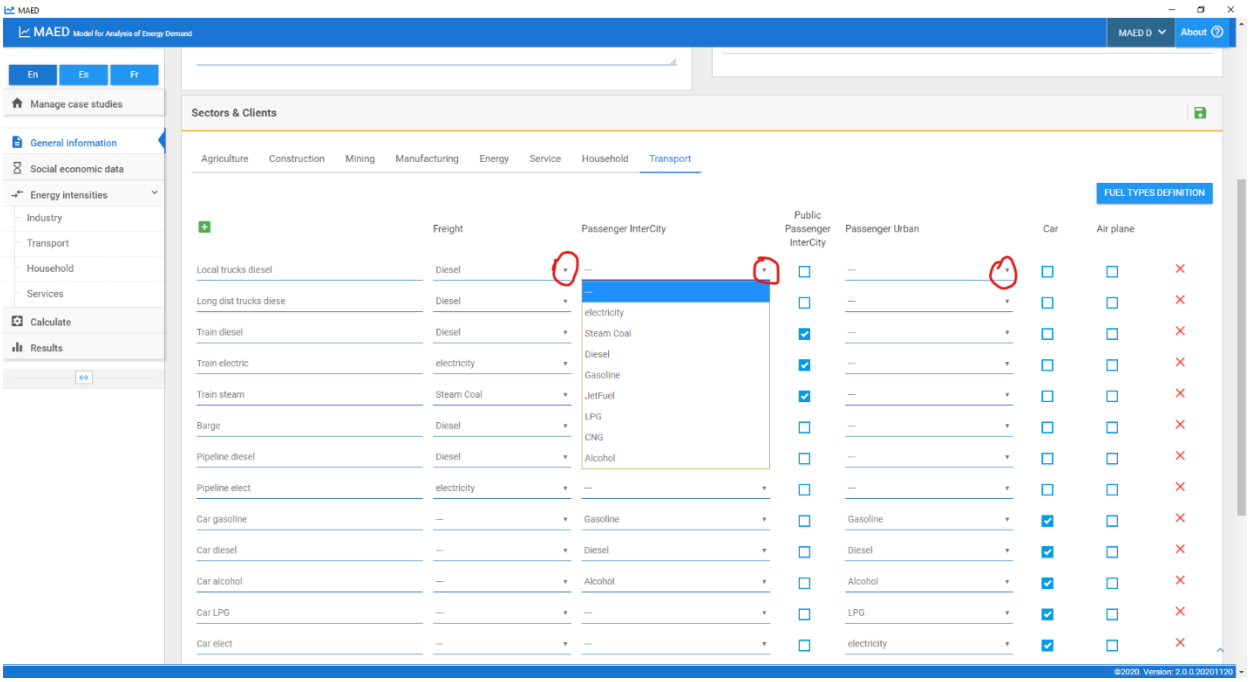
You can add or delete fuels using the respective buttons from this menu. Each fuel specified needs to be associated with a fuel type using the drop-down menu. The MAED methodology groups fuel into three fuel types: electricity, steam coal, and motor fuel.



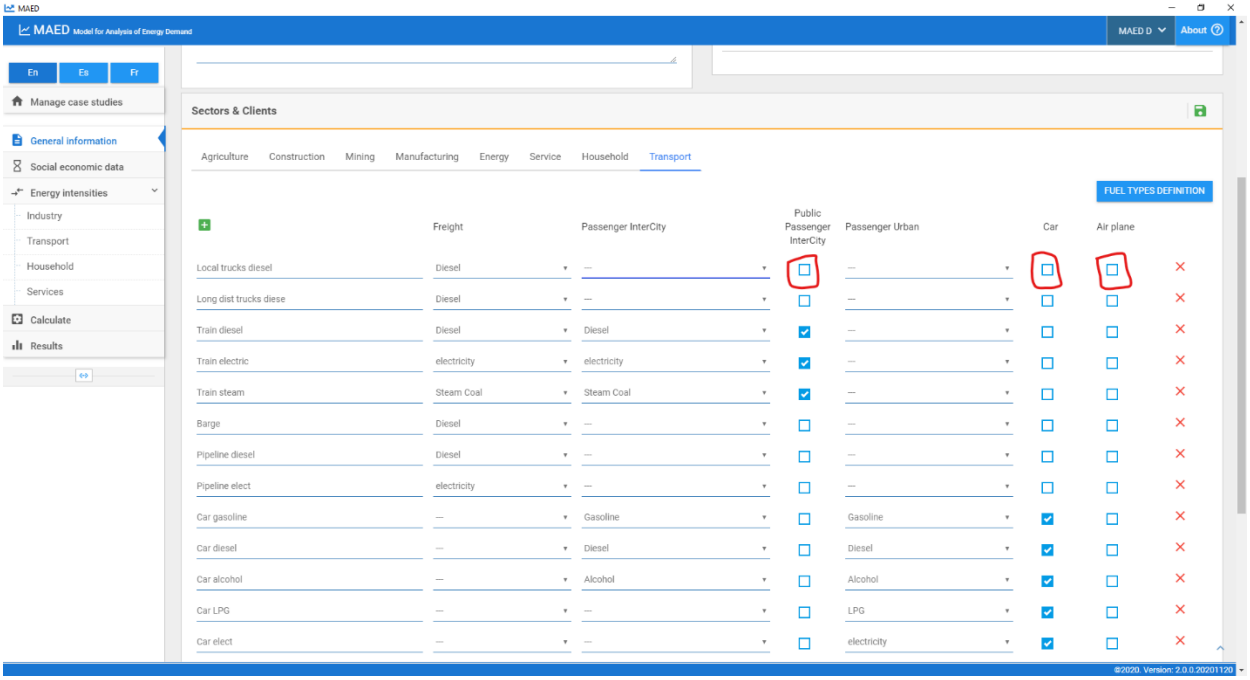
Activity 5: Transport Modes

The next step is to define the transport modes. The transport modes can be accessed using the Transport tab in the Sectors & Clients block in the General Information page. Each transport mode can be associated with the three transport subsectors: Freight, Passenger InterCity, and Passenger Urban.

With the buttons, add, or delete, the user creates or deletes transport modes. And with the check boxes the user decides in which subsector the transport mode defined belongs to. For example, long-distance trucks belong to freight transport. Each transport mode can be associated with any of the subsectors but must be associated with at least one subsector. We can associate a transport mode with a subsector by selecting the fuel type used for that subsector for that transport mode; this is done using the drop-down menu. If no fuel type is selected for a transport subsector, then that transport mode will not be modelled for that transport subsector.

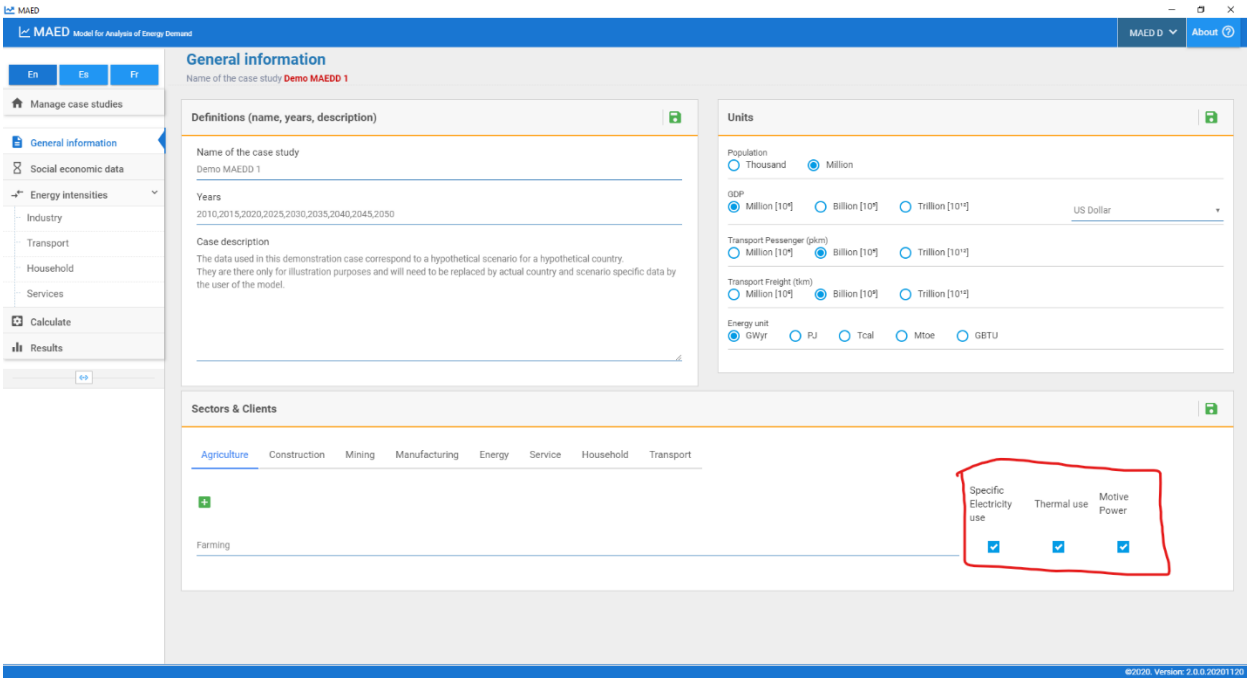


Finally, we must tell the programme which transport modes are cars or airplanes. We must also tell the programme if the transport mode for intercity passengers is considered public. These can be done by using the checkboxes. There is no limit to the number of modes you want to use.

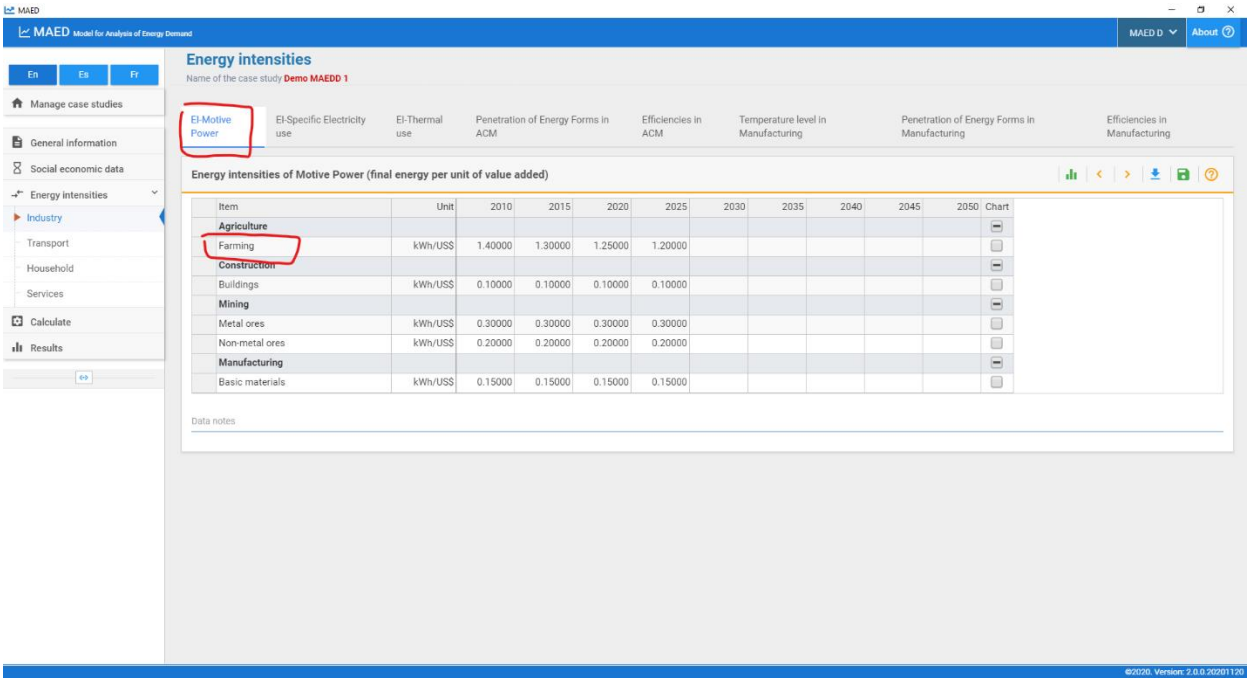


Activity 6: End-Use Categories

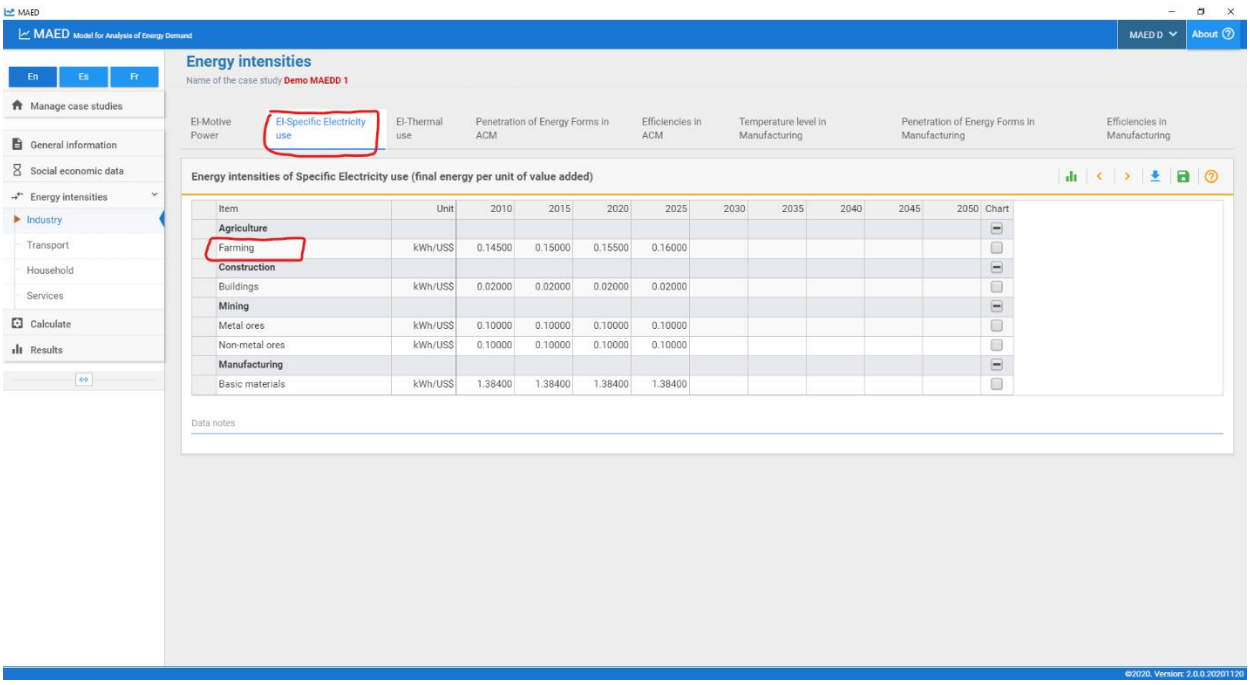
The final step in defining the structure of the model is the configuration of end-use categories. We must remember that, in MAED, there are 3 end-use categories: motive power, thermal uses, and specific uses of electricity. In the previous version of MAED the user was forced to fill in data tables for the three categories, in each sector or subsector defined. However, some end-use categories may not exist or may not be significant in some subsectors. Furthermore, even if that end-use exists, the data for that end-use may not be available for some subsectors. In the new version, we can define which categories of end-uses are present in each subsector. This is done by using check boxes. Let us focus, for instance, on the farming subsector of the agriculture sector. Note that all end-uses have been chosen in the sector definition block.



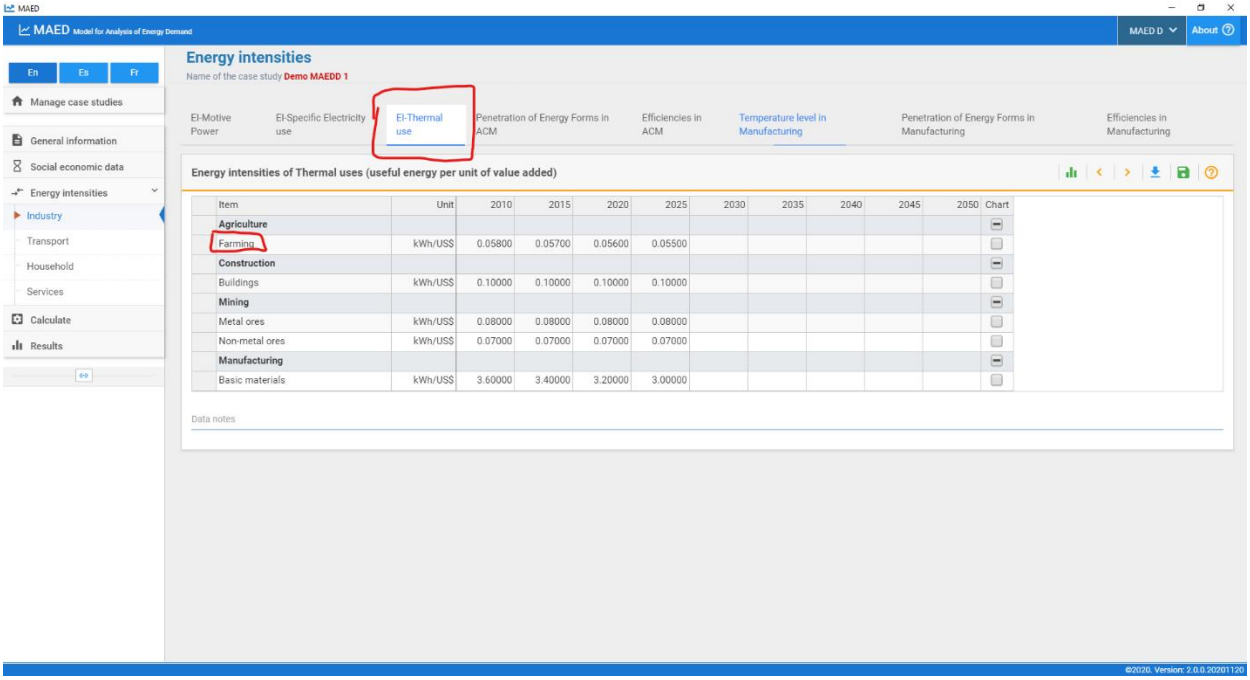
We should now be able to enter energy usage data for each of the three end-use categories. Let us confirm this by looking at the usage tables of the three end-use categories. Let us first look at the energy intensities of motive power.



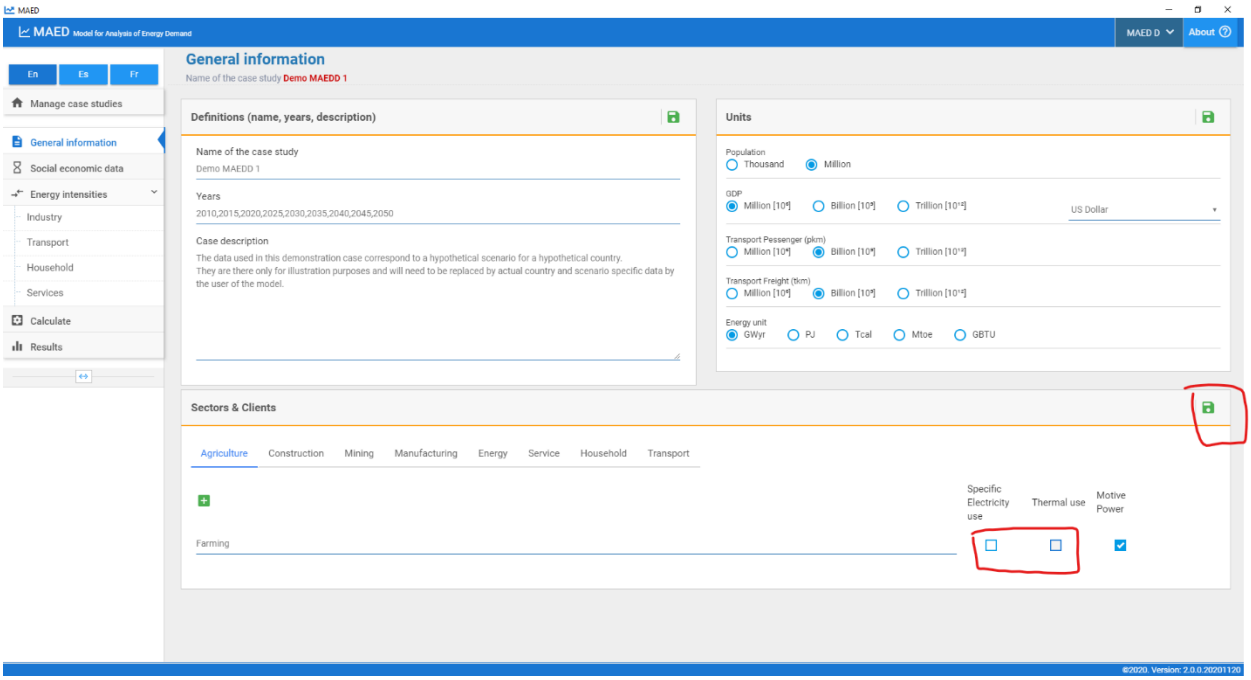
Let us now look at energy intensities of specific electricity use.



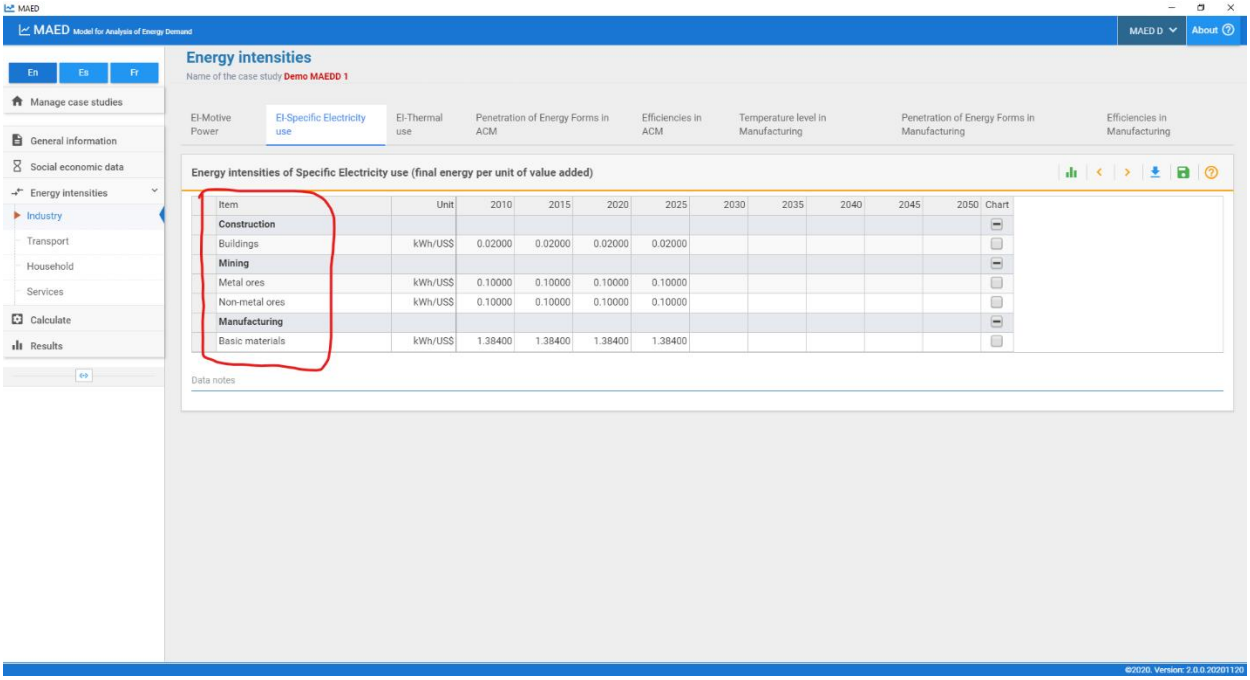
Let us finally look at energy intensities of thermal use.

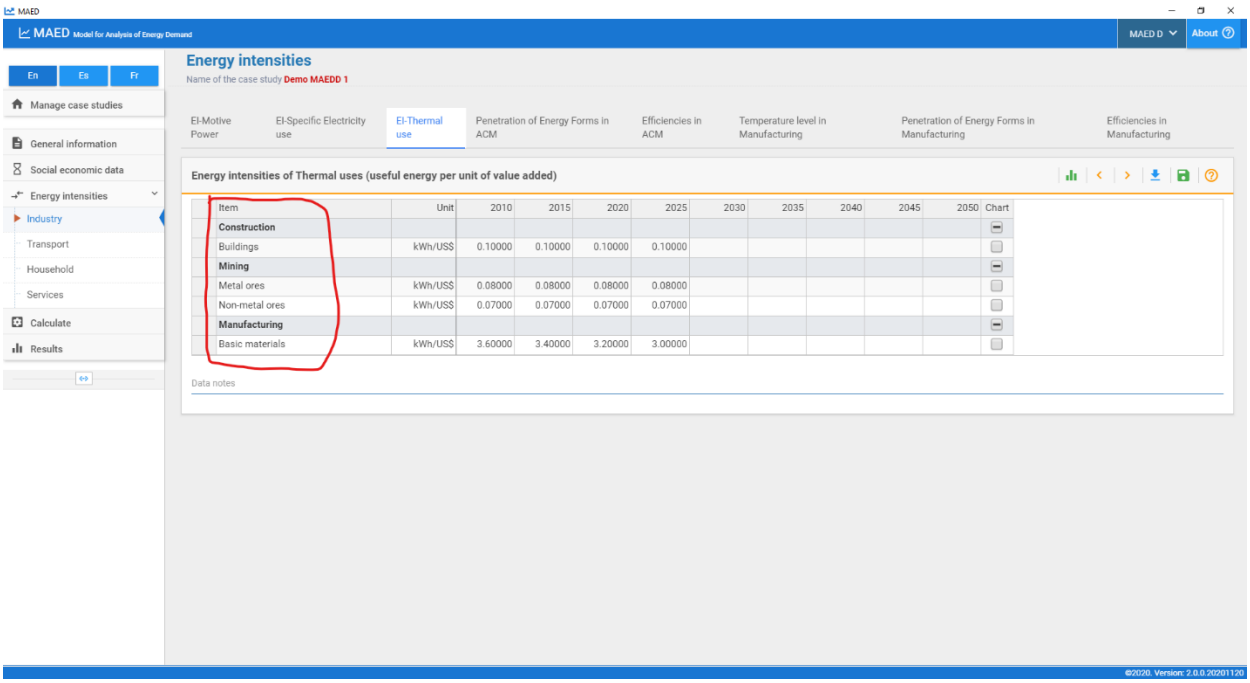


Let us consider the scenario where the specific uses of electricity and thermal uses are not present in the farming subsector. To model this, we uncheck the Specific Electricity Use and Thermal Use boxes and click save.



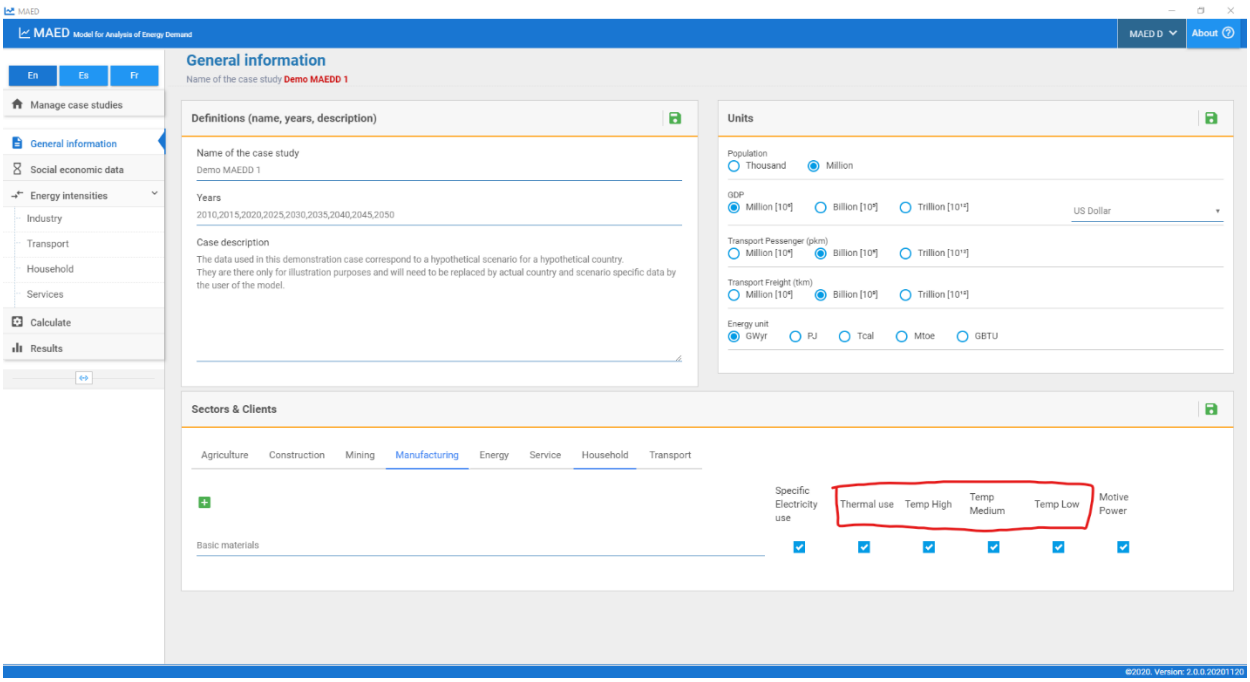
Let us now look at the three energy usage tables again. Farming is still present in the energy intensity of motive power. However, it is no longer present in the energy intensities of specific electricity use and the energy intensities of thermal use.



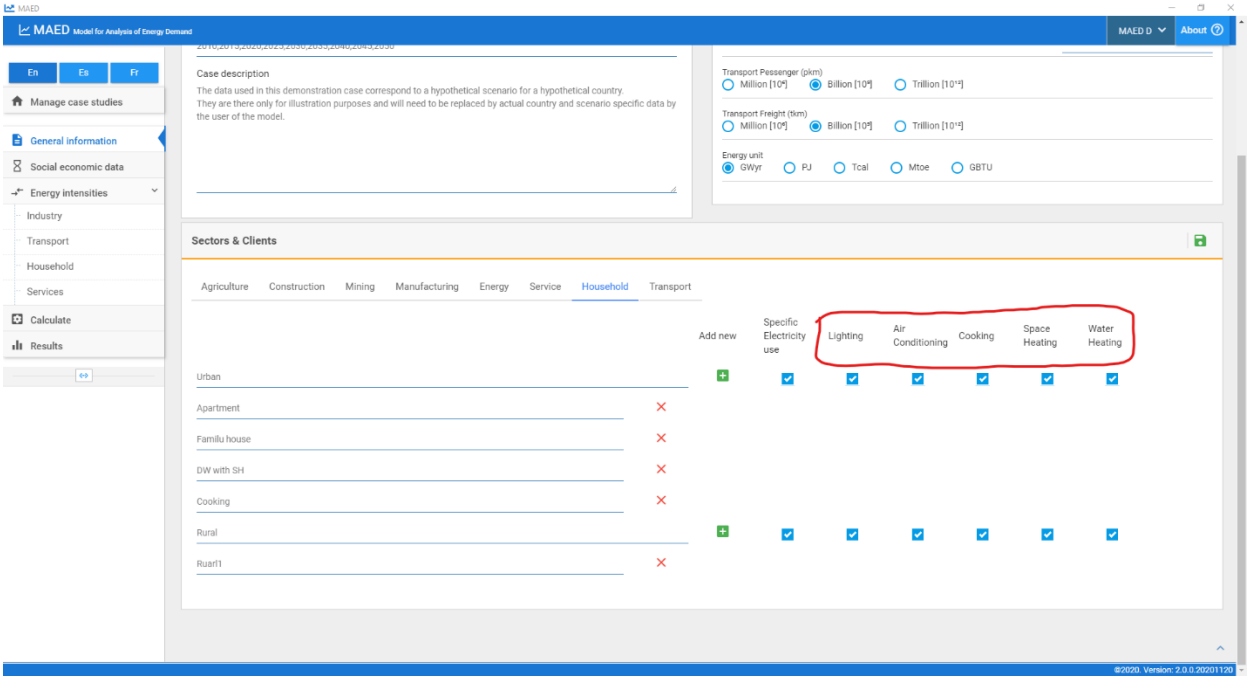


In the manufacturing sector, thermal usage is further divided into three temperature ranges: Temp High, Temp Medium, and Temp Low. When modelling thermal use of subsectors in the manufacturing sector,

we also need to select which temperature ranges of thermal use to model for each subsector. In this case study, all three temperature ranges have been chosen for Basic Materials.



The household sector contains the following additional end-use sub-types: Lighting, Air Conditioning, Cooking, Space Heating, and Water Heating.



The model structure is now configured. And all input data tables, and output tables, correspond to the defined structure.

The model is ready to be loaded with the input data.