

EBS & MAED

Hands-on 6: Entering Input Data

Learning outcomes

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

1. Enter Base Year Data
2. Enter Scenario Data
3. View Results

Activity 1: Adding Base Data

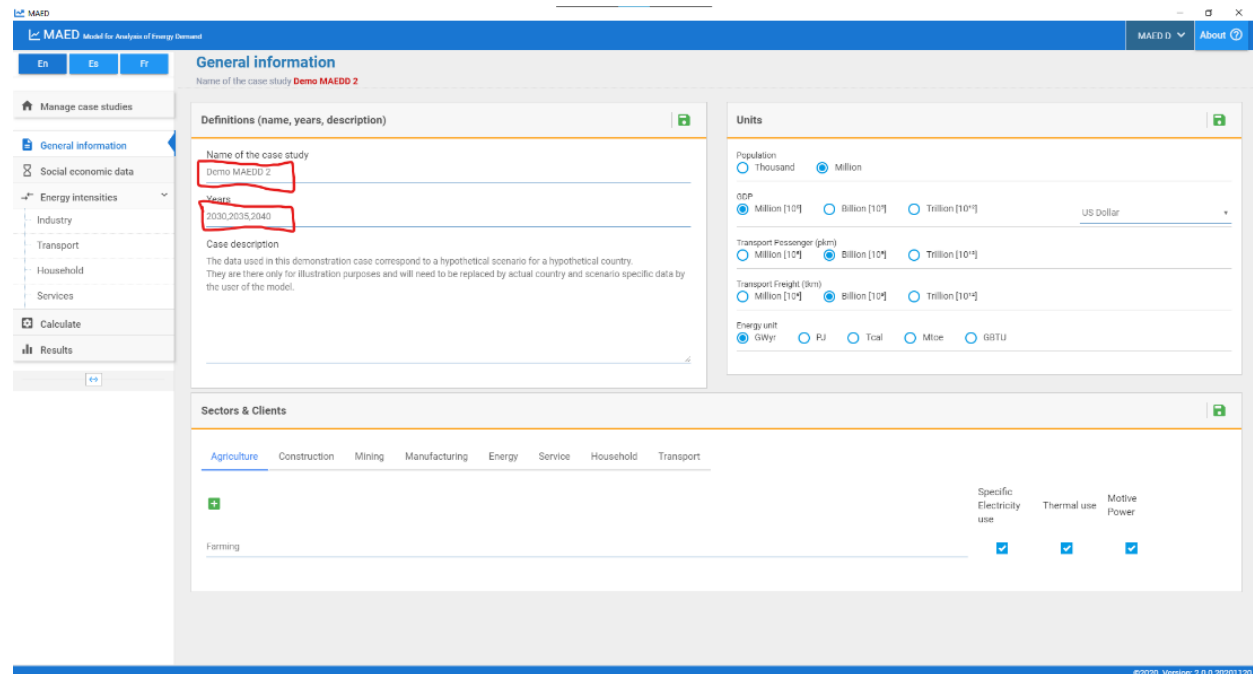
In the previous hands-on, we configured the model structure. All the input and output data tables now correspond to the defined structure. The model is now ready to be loaded with input data.

Input data are usually entered in two phases. The first phase involves reconstructing the base year. The second phase involves entering scenario data. The scenario data are input data with the assumptions about future years.

When phase one is completed and the reconstructed data for the base year are entered, it should not be changed. To test other scenarios, we need only repeat phase two and enter new scenario data based on new assumptions about future years.

We shall practise this procedure by entering some demonstration data in the two phases described above. We shall first create a copy of Demo MAED 1 and rename it Demo MAED 2. This will have the same structure as the case Demo MAED 1, because it is a copy of it. However, we shall change the planning period to practice adding new data. Change the planning years to "2030,2035,2040", as shown below. Because this is a new planning period, all input data should now be zero. This is done to avoid conflicts with the demo case data.

In this example, 2030 is our base year so we will assume we have fast-forward into the future and 2030 is a year in the past for which we have input data.



General information
Name of the case study: **Demo MAEDD 2**

Definitions (name, years, description)

Name of the case study: **Demo MAEDD 2**

Years: **2030,2035,2040**

Case description
The data used in this demonstration case correspond to a hypothetical scenario for a hypothetical country. They are there only for illustration purposes and will need to be replaced by actual country and scenario specific data by the user of the model.

Units

Population: ☐ Thousand ☒ Million

GDP: ☒ Million [10⁹] ☐ Billion [10⁹] ☐ Trillion [10¹²] US Dollar

Transport Passenger (plm): ☐ Million [10⁶] ☒ Billion [10⁹] ☐ Trillion [10¹²]

Transport Freight (9m): ☐ Million [10⁶] ☒ Billion [10⁹] ☐ Trillion [10¹²]

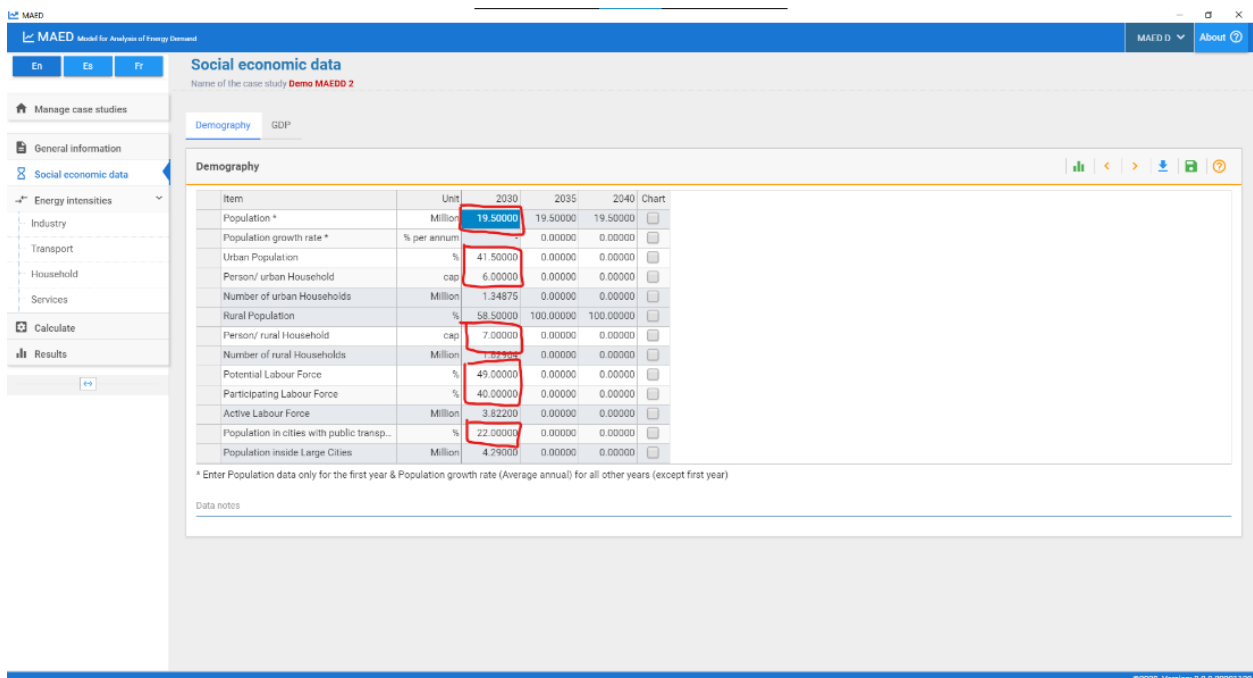
Energy unit: ☒ GWyr ☐ PJ ☐ Tcal ☐ Mtoe ☐ GBTU

Sectors & Clients

Agriculture Construction Mining Manufacturing Energy Service Household Transport

Farming ☒ Specific Electricity use ☒ Thermal use ☒ Motive Power

Let us start with entering the data for demography. As the base year is 2030, we must only enter data in the white cells for that year. Enter the data given in the screenshot below. Don't forget to click the Save button, every time you change data.



Social economic data
Name of the case study: **Demo MAEDD 2**

Demography GDP

Item	Unit	2030	2035	2040	Chart
Population *	Million	19.50000	19.50000	19.50000	<input type="checkbox"/>
Population growth rate *	% per annum	0.00000	0.00000	0.00000	<input type="checkbox"/>
Urban Population	%	41.50000	0.00000	0.00000	<input type="checkbox"/>
Person/urban Household	cap	6.00000	0.00000	0.00000	<input type="checkbox"/>
Number of urban Households	Million	1.34875	0.00000	0.00000	<input type="checkbox"/>
Rural Population	%	58.50000	100.00000	100.00000	<input type="checkbox"/>
Person/rural Household	cap	7.00000	0.00000	0.00000	<input type="checkbox"/>
Number of rural Households	Million	7.29556	0.00000	0.00000	<input type="checkbox"/>
Potential Labour Force	%	49.00000	0.00000	0.00000	<input type="checkbox"/>
Participating Labour Force	%	40.00000	0.00000	0.00000	<input type="checkbox"/>
Active Labour Force	Million	3.82200	0.00000	0.00000	<input type="checkbox"/>
Population in cities with public transp...	%	22.00000	0.00000	0.00000	<input type="checkbox"/>
Population inside Large Cities	Million	4.29500	0.00000	0.00000	<input type="checkbox"/>

* Enter Population data only for the first year & Population growth rate (Average annual) for all other years (except first year)

Data notes



The data in the shaded cells should automatically be calculated. For example, the percentage of the rural population is calculated as the difference between 100% and the declared value of the percentage of the urban population.

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Demography

GDP

Demography

Item	Unit	2030	2035	2040	Chart
Population *	Million	19.50000	19.50000	19.50000	<input type="checkbox"/>
Population growth rate *	% per annum	-	0.00000	0.00000	<input type="checkbox"/>
Urban Population	%	41.50000	0.00000	0.00000	<input type="checkbox"/>
Person/ urban Household	cap	6.00000	0.00000	0.00000	<input type="checkbox"/>
Number of urban Households	Million	1.34875	0.00000	0.00000	<input type="checkbox"/>
Rural Population	%	58.50000	100.00000	100.00000	<input type="checkbox"/>
Person/ rural Household	cap	7.00000	0.00000	0.00000	<input type="checkbox"/>
Number of rural Households	Million	1.62964	0.00000	0.00000	<input type="checkbox"/>
Potential Labour Force	%	49.00000	0.00000	0.00000	<input type="checkbox"/>
Participating Labour Force	%	40.00000	0.00000	0.00000	<input type="checkbox"/>
Active Labour Force	Million	3.82200	0.00000	0.00000	<input type="checkbox"/>
Population in cities with public transp...	%	22.00000	0.00000	0.00000	<input type="checkbox"/>
Population inside Large Cities	Million	4.29000	0.00000	0.00000	<input type="checkbox"/>

* Enter Population data only for the first year & Population growth rate (Average annual) for all other years (except first year)

Data notes

We shall similarly introduce data for the economy for the base year. Enter the data given in the screenshot below in the GDP and Distribution of GDP by subsectors tables.

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GDP

Item	Unit	2030	2035	2040	Chart
GDP	US\$ Million	33.50000	33.50000	33.50000	<input type="checkbox"/>
GDP Growth rate	% p.a.	-	0.00000	0.00000	<input type="checkbox"/>
GDP per capita	US\$/Cap	1.71795	1.55600	1.40932	<input type="checkbox"/>
Sectorial shares of GDP					<input type="checkbox"/>
Agriculture	%	24.50000	0.00000	0.00000	<input type="checkbox"/>
Construction	%	2.30000	0.00000	0.00000	<input type="checkbox"/>
Mining	%	5.50000	0.00000	0.00000	<input type="checkbox"/>
Manufacturing	%	13.00000	0.00000	0.00000	<input type="checkbox"/>
Energy	%	5.70000	100.00000	100.00000	<input type="checkbox"/>
Service	%	49.00000	0.00000	0.00000	<input type="checkbox"/>
Total		100.00000	100.00000	100.00000	<input type="checkbox"/>

* Enter GDP data for first Year & Average annual growth rate for each period timestep

Data notes

Distribution of GDP by subsectors

Item	Unit	2030	2035	2040	Chart
Agriculture					<input type="checkbox"/>
Farming	%	100.00000	100.00000	100.00000	<input type="checkbox"/>
Total		100.00000	100.00000	100.00000	<input type="checkbox"/>
Construction					<input type="checkbox"/>
Buildings	%	100.00000	100.00000	100.00000	<input type="checkbox"/>
Total		100.00000	100.00000	100.00000	<input type="checkbox"/>

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MAED Model for Analysis of Energy Demand

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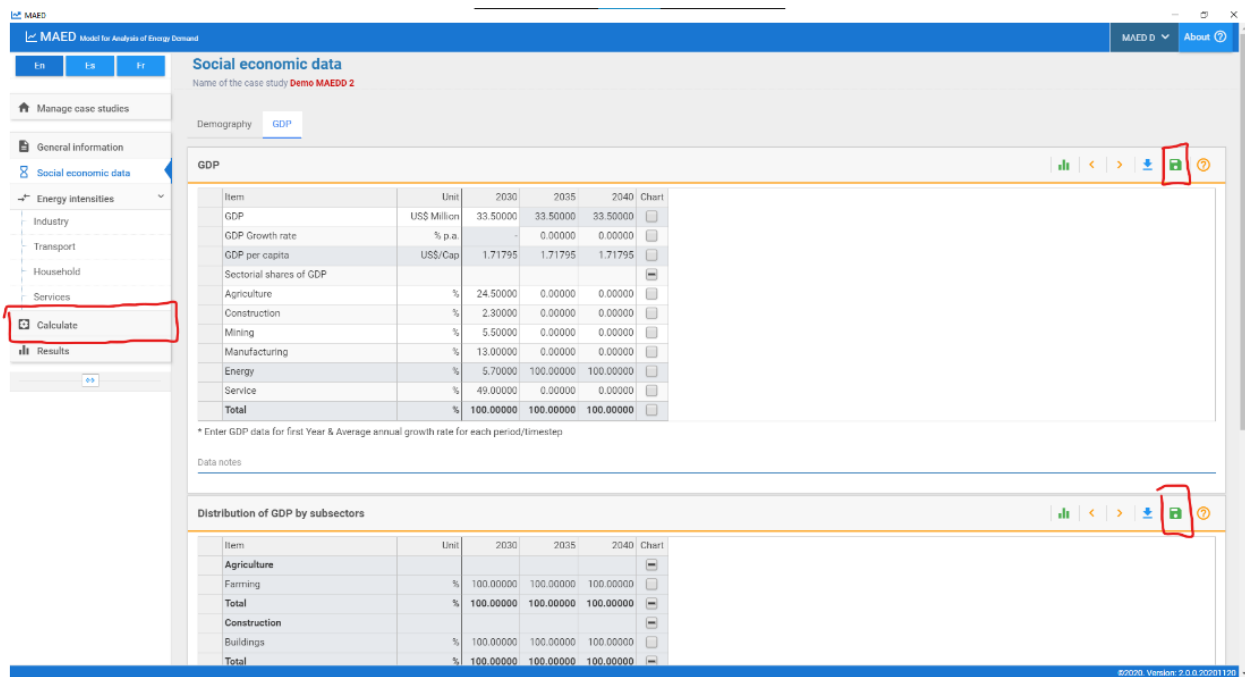
Data notes

Distribution of GDP by subsectors

Item	Unit	2030	2035	2040	Chart
Agriculture					<input type="checkbox"/>
Farming	%	100.00000	100.00000	100.00000	<input type="checkbox"/>
Total		100.00000	100.00000	100.00000	<input type="checkbox"/>
Construction					<input type="checkbox"/>
Buildings	%	100.00000	100.00000	100.00000	<input type="checkbox"/>
Total		100.00000	100.00000	100.00000	<input type="checkbox"/>
Mining					<input type="checkbox"/>
Metal ores	%	30.00000	0.00000	0.00000	<input type="checkbox"/>
Non-metal ores	%	70.00000	100.00000	100.00000	<input type="checkbox"/>
Total		100.00000	100.00000	100.00000	<input type="checkbox"/>
Manufacturing					<input type="checkbox"/>
Basic materials	%	100.00000	100.00000	100.00000	<input type="checkbox"/>
Total		100.00000	100.00000	100.00000	<input type="checkbox"/>
Energy					<input type="checkbox"/>
Energy	%	100.00000	100.00000	100.00000	<input type="checkbox"/>
Total		100.00000	100.00000	100.00000	<input type="checkbox"/>
Service					<input type="checkbox"/>
Commercial and tourism	%	30.00000	0.00000	0.00000	<input type="checkbox"/>
Public administration	%	10.00000	0.00000	0.00000	<input type="checkbox"/>
Finance and Buss	%	5.00000	0.00000	0.00000	<input type="checkbox"/>
Personal Services and others	%	55.00000	100.00000	100.00000	<input type="checkbox"/>
Total		100.00000	100.00000	100.00000	<input type="checkbox"/>

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Save the data that you have entered and click the "calculate" button from the main menu.



Social economic data
Name of the case study: Demo MAED 2

Demography: GDP

GDP

Item	Unit	2030	2035	2040	Chart
GDP	US\$ Million	33.50000	33.50000	33.50000	
GDP Growth rate	% p.a.	0.00000	0.00000	0.00000	
GDP per capita	US\$/Cap	1.71795	1.71795	1.71795	
Sectorial shares of GDP					
Agriculture	%	24.50000	0.00000	0.00000	
Construction	%	2.30000	0.00000	0.00000	
Mining	%	5.50000	0.00000	0.00000	
Manufacturing	%	13.00000	0.00000	0.00000	
Energy	%	5.70000	100.00000	100.00000	
Service	%	49.00000	0.00000	0.00000	
Total	%	100.00000	100.00000	100.00000	

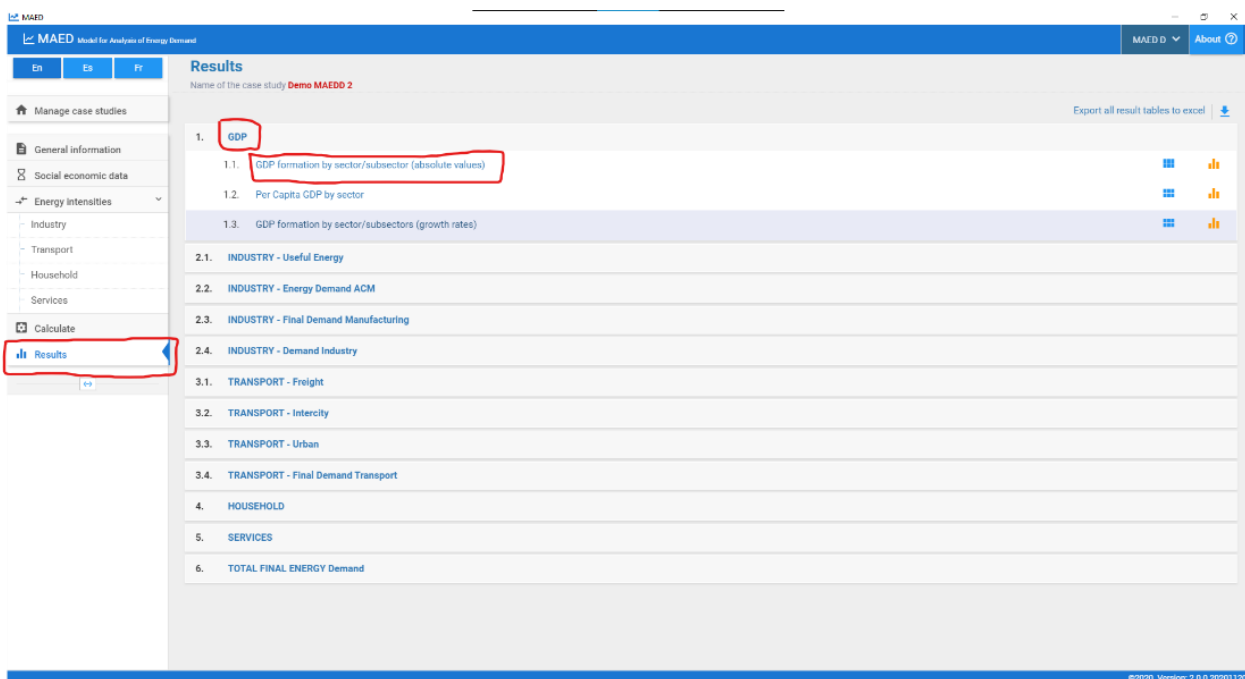
* Enter GDP data for first Year & Average annual growth rate for each period/timestep

Data notes

Distribution of GDP by subsectors

Item	Unit	2030	2035	2040	Chart
Agriculture					
Farming	%	100.00000	100.00000	100.00000	
Total	%	100.00000	100.00000	100.00000	
Construction					
Buildings	%	100.00000	100.00000	100.00000	
Total	%	100.00000	100.00000	100.00000	

Even with the little data that we have introduced, we should be able to see some intermediate results. Clicking the calculate button should already bring you to the Results page, if not, click the results button. Now click the GDP title on the Results page. This should show subresults for the GDP. Click GDP formation by sector/subsector (absolute values).



Results
Name of the case study: Demo MAED 2

Export all result tables to excel

- GDP**
 - GDP formation by sector/subsector (absolute values)**
 - Per Capita GDP by sector
 - GDP formation by sector/subsectors (growth rates)
- INDUSTRY - Useful Energy**
- INDUSTRY - Energy Demand ACM**
- INDUSTRY - Final Demand Manufacturing**
- INDUSTRY - Demand Industry**
- TRANSPORT - Freight**
- TRANSPORT - Intercity**
- TRANSPORT - Urban**
- TRANSPORT - Final Demand Transport**
- HOUSEHOLD**
- SERVICES**
- TOTAL FINAL ENERGY Demand**

This table shows the contribution to GDP of each subsector, in the base year.

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RESULTS

1. GDP

1.1. GDP formation by sector/subsector (absolute values)

CHART TABLE

1.1. GDP formation by sector/subsector (absolute values)

	US\$ 10 ⁶	2030	2035	2040
Agriculture		8.20750	0.00000	0.00000
Farming		8.20750	0.00000	0.00000
Construction		0.77000	0.00000	0.00000
Buildings		0.77000	0.00000	0.00000
Mining		1.84750	0.00000	0.00000
Metal ores		0.55275	0.00000	0.00000
Non-metal ores		1.28075	0.00000	0.00000
Manufacturing		4.35500	0.00000	0.00000
Basic materials		4.35500	0.00000	0.00000
Energy		1.00050	33.50000	33.50000
Service		16.41500	0.00000	0.00000
Commercial and tourism		4.92400	0.00000	0.00000
Public administration		1.64150	0.00000	0.00000
Finance and Insurance		0.82075	0.00000	0.00000
Personal Services and others		9.02825	0.00000	0.00000
Total GDP		33.50000	33.50000	33.50000

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Let us introduce more data. We shall now introduce the energy intensities for the motive power in each subsector of the Industry. Go to the Energy Intensities for Industry page and add the data for the base year shown below. Be carefully with the energy unit, highlighted by the red box. In this case, we have kWh/US\$.

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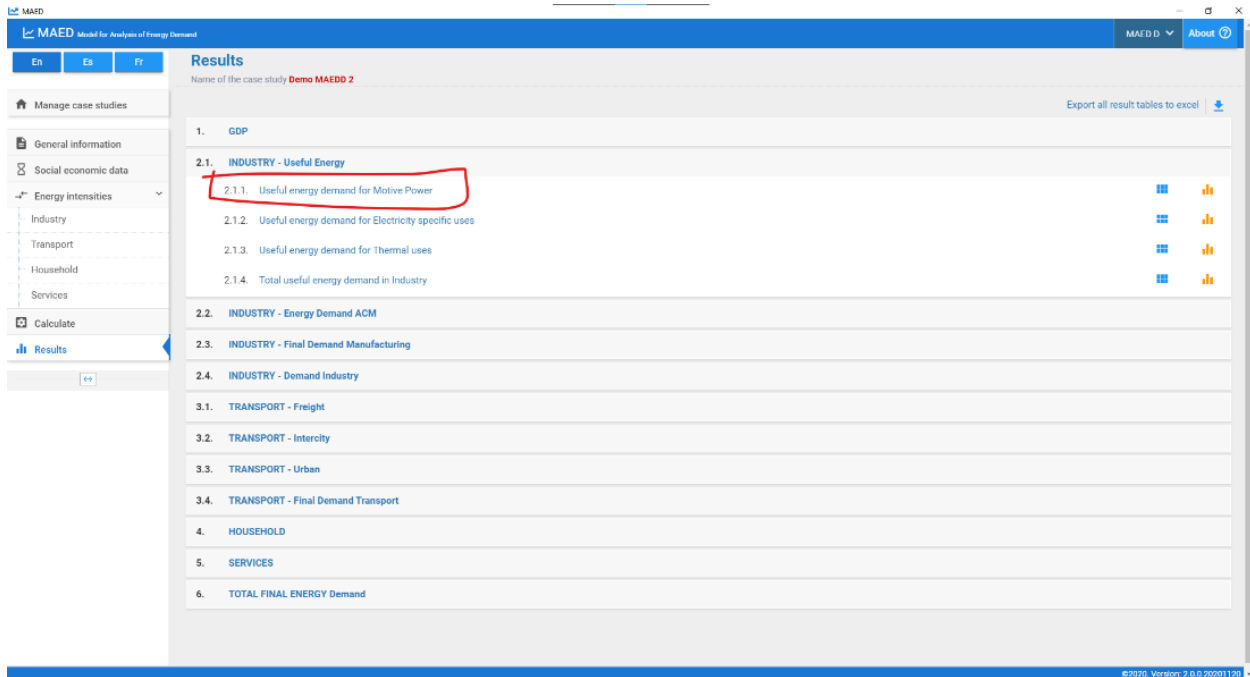
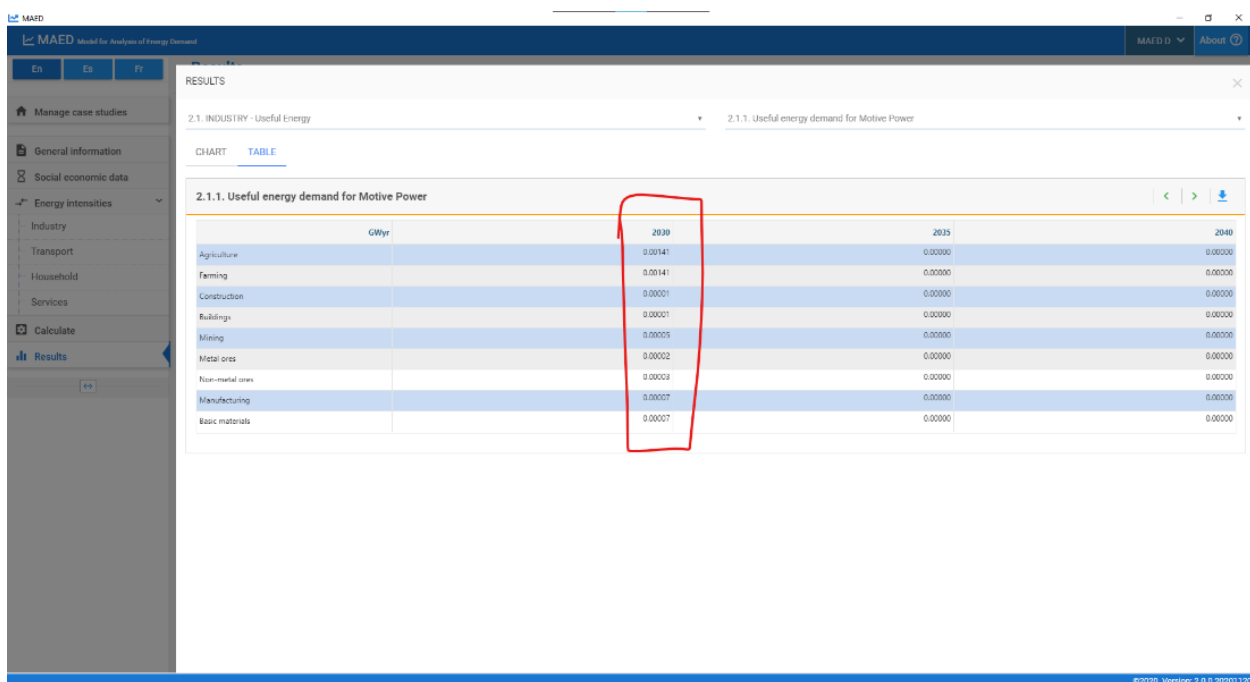
Energy intensities of Motive Power (final energy per unit of value added)

Item	Unit	2030	2035	2040	Chart
Agriculture					
Farming	kWh/US\$	1.50000			
Construction					
Buildings	kWh/US\$	0.10000			
Mining					
Metal ores	kWh/US\$	0.30000			
Non-metal ores	kWh/US\$	0.20000			
Manufacturing					
Basic materials	kWh/US\$	0.15000			

Data notes

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As soon as the values of the energy intensities for the motive power are introduced, some interesting results can be seen. For example, after clicking Calculate, we can see the values of the useful energy, used to produce the motive power in the Industry for the base year.

RESULTS

2.1. INDUSTRY - Useful Energy

2.1.1. Useful energy demand for Motive Power

CHART TABLE

2.1.1. Useful energy demand for Motive Power

	GWyr	2030	2035	2040
Agriculture		0.00141	0.00000	0.00000
Farming		0.00141	0.00000	0.00000
Construction		0.00001	0.00000	0.00000
Buildings		0.00001	0.00000	0.00000
Mining		0.00005	0.00000	0.00000
Metal ores		0.00002	0.00000	0.00000
Non-metal ores		0.00003	0.00000	0.00000
Manufacturing		0.00007	0.00000	0.00000
Basic materials		0.00007	0.00000	0.00000

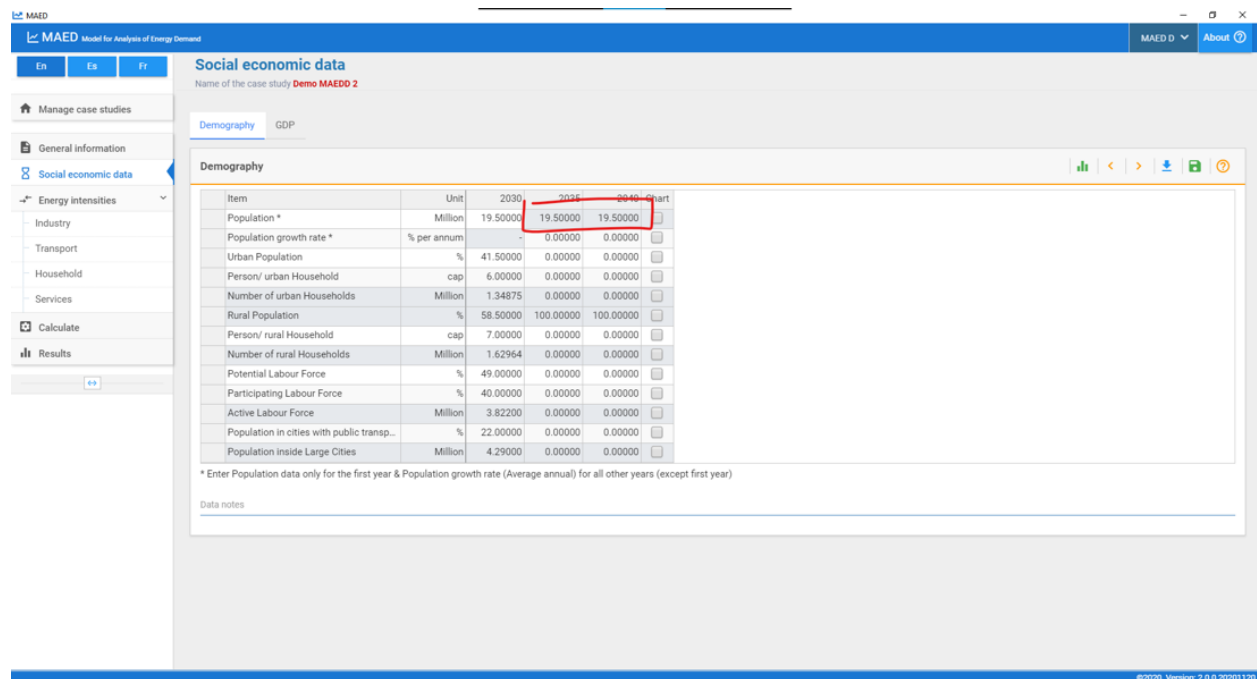
It is at this point in the process that the results from the MAED model should be compared to recorded data to confirm the accuracy of the reconstruction of the base year.

Activity 2: Adding Scenario Data

Let us move on to the scenario data. We shall start with the population and other parameters of the demographic data. The base year data have already been entered. We are now going to enter data for future years; these are referred to as the scenario data.

To add population scenario data in MAED-D, we need to enter the assumed population average annual growth rates for future years.

If we do not enter any data, the model interprets the growth rate as zero and assumes that the population remains constant.



The screenshot shows the MAED Model for Analysis of Energy Demand interface. The 'Social economic data' section is active, and the 'Demography' tab is selected. A table displays demographic data for the years 2030, 2035, and 2040. The table includes columns for 'Item', 'Unit', and values for each year. The 'Population *' row shows values of 19.50000 for 2030, 19.50000 for 2035, and 19.50000 for 2040. The 'Population growth rate *' row shows values of 0.00000 for 2035 and 0.00000 for 2040. The table also includes rows for 'Urban Population', 'Person/ urban Household', 'Number of urban Households', 'Rural Population', 'Person/ rural Household', 'Number of rural Households', 'Potential Labour Force', 'Participating Labour Force', 'Active Labour Force', 'Population in cities with public transp...', and 'Population inside Large Cities'.

Item	Unit	2030	2035	2040	Chart
Population *	Million	19.50000	19.50000	19.50000	<input type="checkbox"/>
Population growth rate *	% per annum	-	0.00000	0.00000	<input type="checkbox"/>
Urban Population	%	41.50000	0.00000	0.00000	<input type="checkbox"/>
Person/ urban Household	cap	6.00000	0.00000	0.00000	<input type="checkbox"/>
Number of urban Households	Million	1.34875	0.00000	0.00000	<input type="checkbox"/>
Rural Population	%	58.50000	100.00000	100.00000	<input type="checkbox"/>
Person/ rural Household	cap	7.00000	0.00000	0.00000	<input type="checkbox"/>
Number of rural Households	Million	1.62964	0.00000	0.00000	<input type="checkbox"/>
Potential Labour Force	%	49.00000	0.00000	0.00000	<input type="checkbox"/>
Participating Labour Force	%	40.00000	0.00000	0.00000	<input type="checkbox"/>
Active Labour Force	Million	3.82200	0.00000	0.00000	<input type="checkbox"/>
Population in cities with public transp...	%	22.00000	0.00000	0.00000	<input type="checkbox"/>
Population inside Large Cities	Million	4.29000	0.00000	0.00000	<input type="checkbox"/>

* Enter Population data only for the first year & Population growth rate (Average annual) for all other years (except first year)

Data notes

Note that the growth values for each interval are the average growth rates. In our case, the values are the average growth rates over the 5-year intervals. The model calculates the total population in the future.

Columns for the years 2035 and 2040 will contain the scenario data for the corresponding parameters. For example, according to this scenario, the size of the households in the urban area will be reduced, from 6 persons per dwelling in the base year, to 5.2 persons per dwelling at the end of the study period. At the same time, the proportion of potential labour is considered constant in this scenario.

Please, enter all these data shown below.

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Social economic data

Name of the case study: Demo MAEDD 2

Demography GDP

Demography

Item	Unit	2030	2035	2040	Chart
Population *	Million	19.50000	20.20215	20.81553	
Population growth rate *	% per annum	-	0.71000	0.60000	
Urban Population	%	41.50000	42.70000	44.00000	
Person/urban Household	cap	6.00000	5.40000	5.20000	
Number of urban Households	Million	1.94575	1.59747	1.76131	
Rural Population	%	58.50000	57.30000	56.00000	
Person/rural Household	cap	7.00000	6.50000	6.00000	
Number of rural Households	Million	1.82964	1.78090	1.94276	
Potential Labour Force	%	49.00000	49.00000	49.00000	
Participating Labour Force	%	40.00000	40.00000	40.00000	
Active Labour Force	Million	3.82200	3.95962	4.07984	
Population in cities with public transp...	%	22.00000	27.00000	33.00000	
Population inside Large Cities	Million	4.29000	5.45458	6.86913	

* Enter Population data only for the first year & Population growth rate (Average annual) for all other years (except first year)

Data notes

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We are now going to enter the scenario data for GDP growth and structure. Just like with the population, future GDP data is introduced using annual average GDP growth rates.

The data corresponding to the future GDP structure must be introduced in their respective blank cells. Enter the following data in the GDP and Distribution of GDP by Subsectors tables.

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Demography GDP

GDP

Item	Unit	2030	2035	2040	Chart
GDP	US\$ Million	33.50000	46.98548	62.87718	
GDP Growth rate	% p.a.	7.00000	6.00000	6.00000	
GDP per capita	US\$/Cap	1.71794	2.32577	3.02069	
Sectorial shares of GDP					
Agriculture	%	24.50000	21.00000	18.00000	
Construction	%	2.30000	2.10000	2.00000	
Mining	%	8.50000	5.30000	5.20000	
Manufacturing	%	13.00000	15.00000	17.00000	
Energy	%	5.70000	5.60000	4.80000	
Service	%	49.00000	51.00000	53.00000	
Total	%	100.00000	100.00000	100.00000	

* Enter GDP data for first Year & Average annual growth rate for each period/timestep

Data notes

Distribution of GDP by subsectors

Item	Unit	2030	2035	2040	Chart
Agriculture					
Farming	%	100.00000	100.00000	100.00000	
Total	%	100.00000	100.00000	100.00000	
Construction					
Buildings	%	100.00000	100.00000	100.00000	
Total	%	100.00000	100.00000	100.00000	

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Distribution of GDP by subsectors

Item	Unit	2030	2035	2040	Chart
Agriculture					
Farming	%	100.00000	100.00000	100.00000	
Total	%	100.00000	100.00000	100.00000	
Construction					
Buildings	%	100.00000	100.00000	100.00000	
Total	%	100.00000	100.00000	100.00000	
Mining					
Metal ores	%	30.00000	40.00000	50.00000	
Non-metal ores	%	70.00000	60.00000	50.00000	
Total	%	100.00000	100.00000	100.00000	
Manufacturing					
Basic materials	%	100.00000	100.00000	100.00000	
Total	%	100.00000	100.00000	100.00000	
Energy					
Energy	%	100.00000	100.00000	100.00000	
Total	%	100.00000	100.00000	100.00000	
Service					
Commercial and tourism	%	30.00000	28.00000	25.00000	
Public administration	%	10.00000	10.00000	10.00000	
Finance and Buss	%	5.00000	10.00000	15.00000	
Personal Services and others	%	55.00000	52.00000	50.00000	
Total	%	100.00000	100.00000	100.00000	

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We shall now enter the scenario data for the energy intensities of motive power. Enter the data shown below.

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Name of the case study: Demo MAED 2

El-Motive Power

El-Specific Electricity use

El-Thermal use

Penetration of Energy Forms in ACM

Efficiencies in ACM

Temperature level in Manufacturing

Penetration of Energy Forms in Manufacturing

Efficiencies in Manufacturing

Energy intensities of Motive Power (final energy per unit of value added)

Item	Unit	2030	2035	2040	Chart
Agriculture					
Farming	kWh/US\$	1.50000	1.50000	1.50000	
Construction					
Buildings	kWh/US\$	0.10000	0.10000	0.10000	
Mining					
Metal ores	kWh/US\$	0.30000	0.30000	0.30000	
Non-metal ores	kWh/US\$	0.20000	0.20000	0.20000	
Manufacturing					
Basic materials	kWh/US\$	0.15000	0.15000	0.15000	

Data notes

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You will now be able to click calculate and look at the results for the years 2035 and 2040.

Congratulations, you now know how to enter data into the MAED-D model.