

Model for Analysis of Energy Demand (MAED)

Hands-on 4: Setting Up the Structure Part III

Learning outcomes

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

- 1. Define the structure of the transport sector
- 2. Configure the end-use categories

Activity 1: Transport Sector - Fuel Types Definition

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.



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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**.



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Now change your list of Fuels to be the same as the one showed in the picture below. Then click **Save**.

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+	Fuel Name	Fuel Type			
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2	Steam Coal	Steam Coal	Ψ	×	
3	Diesel	Motor Fuel	Ŧ	×	
4	Gasoline	Motor Fuel	Ŧ	×	
5	JetFuel	Motor Fuel	Ŧ	×	
8	Alcohol	Motor Fuel	Ψ	×	



Activity 2: 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.

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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.

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Now edit this list based on the picture below and make sure are the same. Then click Save.

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Activity 3: 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.

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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.



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

	Energy intensities											
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Transport	Farming	kWh/US\$	0.14500	0.15000	0.15500	0.16000						
Household	Construction											
Sanicae	Buildings	kWh/US\$	0.02000	0.02000	0.02000	0.02000						
00111060	Mining										=	
Calculate	Metal ores	kWh/US\$	0.10000	0.10000	0.10000	0.10000						
Results	Non-metal ores	kWh/US\$	0.10000	0.10000	0.10000	0.10000						
0	Manufacturing	1.005-0.000	1.00400	1.00400	1.00.400	1.00400						
	Dasic materials	KNII/035	1.30400	1.36400	1.36400	1.38400						
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Let us finally look at energy intensities of thermal use.



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Mining		KWN/USS	0.10000	0.10000	0.10000	0.10000						
Calculate Metal ore		kwb/tiss	0.09000	0.09000	0.09000	0.09000						
- Non-mete	l ores	kWh/USS	0.07000	0.07000	0.07000	0.07000						
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e> Basic ma	terials	kWh/US\$	3.60000	3.40000	3.20000	3.00000						
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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.



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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.



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Manage case studies	FLMotive	ELSpecific Electricity	FLThermal	Penetratio	n of Energy Fr	orms in	Efficiencies in	Term	norature level i	0	Penetrat	ion of Energy Forms in	Efficiencies in	
General information	Power	use	use	ACM		ACM Manufa		lanufacturing		Manufacturing		Manufacturing		
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Industry	Construc	Construction		2010	2013	2020	2023	2030	2033	2040	2045			
Transport	Buildings		kWh/US\$	0.02000	0.02000	0.02000	0.02000							
Household	Mining													
Sanipas	Metal ore	Metal ores		0.10000	0.10000	0.10000	0.10000							
Gerviçes	Non-metal ores		kWh/US\$	0.10000	0.10000	0.10000	0.10000							
Calculate	Manufacturing													
Results	Basic materials		kWh/US\$	1.38400	1.38400	1.38400	1.38400							
	Data notes													

MAED												_	
MAED Model for Analysis of Ener	gy Demand											MAED D 🛰	About @
En Es Fr	Energy intensities Name of the case study Demo MAEDD 1												
♠ Manage case studies	El-Motive El-Specific Electricity	EI-Thermal	Penetratio	n of Energy F	orms in	Efficiencies in	Tem	perature level	in	Penetra	tion of Energy Forms in	Efficiencies in	
General information	Power use	use	ACM		ACM	Man	Manufacturing		Manufacturing		Manutacturing		
Social economic data	Energy intensities of Thermal uses (us	eful energy per u	unit of value	added)								di < > ≛	8 0
→ + Energy intensities ~													
Industry	Item	Unit	2010	2015	2020	2025	2030	2035	2040	2045	2050 Chart		
Transport	Ruildings	kwb/IIS\$	0.10000	0.10000	0.10000	0.10000							
Universited	Mining	KWII/035	0.10000	0.10000	0.10000	0.10000							
Housenoid	Metal ores	kWh/US\$	0.08000	0.08000	0.08000	0.08000							
Services	Non-metal ores	kWh/US\$	0.07000	0.07000	0.07000	0.07000							
Calculate	Manufacturing												
. Desults	Basic materials	kWh/US\$	3.60000	3.40000	3.20000	3.00000							
	Data notes												



In the **Manufacturing sector (part of the Industry Sector)**, thermal usage is further divided into three temperature ranges: **High Temperature**, **Medium Temperature**, **and Low Temperature**. 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.

MAED Model for Analysis of Energy	Demand	MAED D	V About (
En Es Fr	General information Name of the case study Demo MAEDD 1						
♠ Manage case studies	Definitions (name, years, description)	Units	а				
General information	Norma of the second de	Produce					
Social economic data	Demo MAEDD 1	Thousand I Million					
→ Energy intensities ✓	Years 2010;2015;2020;2025;2030;2035;2040;2045;2050	ODP Million [10*] Billion [10*] Trillion [10*3] US Dollar 	*				
Transport	Case description The data used in this demonstration case excrement to a humbhatical scenario for a humbhatical country.	Transport Pessenger (pkm) Million [10"] Million [10"]					
Household	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.	Transport Freight (tixm) Million [109] Billion [109] Trillion [1019]					
Calculate		Energy unit					
II Results		GWyr PJ Tcal Mtoe GBTU					
	Sectors & Clients		8				
	Agriculture Construction Mining Manufacturing Energy Service Household Transport Basic materials	Specific Electricity use Thermal use Temp High Temp Medium Temp Low Power Power C C C C C C C C C C C C C					

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.