

BASIC LEAP TRANSPORT MODEL EXERCISE

Model historic emissions

Step 1.1 Name area

Step 1.2 Input settings

Select the years of the analysis:

- *Base year*
- *First scenario year*
- *End year*

Base year	2019
First scenario year	2020
End year	2050

Step 1.3 Build branches of tree structure

Build a structure that will allow you to model the measures you need to model:

Demand	Transport	Passenger	Road	Car
		Freight	Road	LDV
				HDV
			Rail	

Step 1.4 Select methodology (technologies)

Select a methodology for each modal branch of the tree that will allow you to model the measures you need to model:

- Top-down: Data required = Energy consumption
- Bottom-up: Data required = Vehicle kilometres travelled and energy intensity (fuel economy)

Within LEAP, this is expressed as a technology, either a *technology with total energy* or *technology with energy intensity*.

Passenger	Road	Car	Gasoline
Freight	Road	LDV	Diesel
		HDV	Diesel
	Rail		Diesel

Step 1.5 Set units

Within LEAP, choose the units that fit the activity data you have

Units	Scale	Unit
Passenger	Million	Vehicle-Kilometres
Road		Percent share of VKM
Freight	Million	Vehicle-Kilometres
Road		Percent share of VKM
Rail		Percent share of VKM

Step 1.6 Input activity data for historic years

Input activity data into all the required expressions for the methodology and structure used. Use functions to input data, e.g. *Remainder*

Activity level (VKM)	Value	Unit
Passenger	100	Mil VKM
Road	100%	% share of VKM
Freight	100	Mil VKM
Road	80%	% share of VKM
Rail	20%	% share of VKM

Freight	Value	Unit
Road		
LDV	50%	% share of VKM
HDV	50%	% share of VKM

Step 1.7 Input energy intensity data for historic years

Where using a bottom-up methodology, input *energy intensity* data, which in this case would be fuel economy data.

Energy intensity (fuel economy)	Value	Unit
Petrol		
Road: Car	0.12	L/KM
Diesel		
Road: LDV	0.13	L/KM
Road: HDV	0.29	L/KM
Rail	214.8	kJ/KM

Step 1.8 Input multiple effects data to get emission factors

In order to add emission factors to the energy demand model established, add "multiple effects" to the technology used. Choose an IPCC default emission factor if no country-specific factor is available.

Energy demand	Transport	Road	IPCC Tier 1 Default Emission Factors	Gasoline
				Diesel
	Rail	IPCC Tier 2 Default Emission Factors	European Diesel Engines Railways	

Model baseline scenario

Step 2.1 Create baseline scenario

Navigate to scenarios, create a new scenario under current accounts called "Baseline"

Step 2.2 Input growth rates/changes

Navigate to this scenario, input any data required to model the future changes in activity under the baseline scenario. Use functions to input data, e.g. [Growth](#)

Baseline scenario assumptions	10%	% growth in VKM
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Model mitigation scenarios

Step 3.1 Create measure scenarios

Navigate to the [Scenarios wizard](#), create a new scenario for each measure you want to model under the baseline scenario.

Step 3.1.1 Build fuel economy scenario

One of these scenarios can be a fuel economy scenario, name it "Fuel econ"

Navigate to this scenario, input the data required to model the measure. In this case, it would be adjusting the energy intensity figure over time to reflect the implementation of the measures. Use functions to input data, e.g. [Interp](#), [Remainder](#)

Fuel economy improvement ¹	2030	10%
	2040	20%
	2050	30%

Step 3.1.2 Build freight modal shift scenario

¹ Interp(2030, 0.12*0.9, 2040, 0.12*0.8, 2050, 0.12*0.7)

One of these scenarios can be a freight modal shift scenario, name it “Freight shift”

Navigate to this scenario, input the data required to model the measure. In this case, it would be adjusting the share of vehicle activity between modes over time to reflect the implementation of the measures. Use functions to input data, e.g. [Interp](#), [Remainder](#)

Proportion of road freight ²	2030	60%
	2040	50%
	2050	40%

Step 3.2 Build aggregate scenario

Once measure scenarios have been established, navigate to scenarios and create another scenario under the baseline scenario called “Aggregate mitigation.”

Once this scenario has been created, select this new scenario in the [Scenarios wizard](#), navigate to [Inheritance](#) and add your mitigation scenarios (fuel econ and freight shift) to the aggregate mitigation scenario.

Step 3.3 View results

Navigate to the “results” tab to view the outputs of the model.

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² Interp(2030,60,2040,50,2050,40)