

Determining the environmental impacts of conventional and alternatively fuelled vehicles through LCA

Vehicle Lifecycle Assessment (LCA) Model Module 5: LCA Results Viewer

Introduction

The "Vehicle LCA: Module 5, LCA Results Viewer" workbook [2020_study_data_viewer_en.xlsm] was developed to explore and visualise the results generated for the DG CLIMA Vehicle LCA project.

It can be used to import and summarise the outputs from calculations from the other modules: (i) Electricity Chains, (ii) Fuel Chains and (iii) Overall Vehicle LCA.

The workbook contains the following sheets:

Sheet Name	Explanation
Title	This sheet provides a first introduction to the workbook
Map	This sheet provides a workbook map, sheet list and colour key
Guide	This sheet explains how to use the workbook
LCA Overview	Overview of the LCA modelling framework
IMPORT Controls	Import controls for bringing in inputs from other modules/models
IMPORT1	Imported data from the electricity production chain module
IMPORT2	Imported data from the fuel production chain module
IMPORT3	Imported data from the overall vehicle LCA module
UnitConversions	Lookups for unit conversions
DefinePtrain	This sheet contains the definitions for the vehicles and powertrains used in the vehicle LCA module
ModuleSensitivity	Sheet for definition of module sensitivity settings
FuelChainList	Provides a list of the fuel chains included in the public dataset
ElecChainSummary	Summary of results for electricity chains including configurable tables/charts
FuelChainSummary	Summary of results fuel chains including configurable tables/charts
VehicleChainSummary	Summary of results for the full vehicle/energy lifecycle including configurable tables/charts
Categories	Includes the definitions of all the categories used in the model

User Guide

An overview of the Vehicle LCA modelling framework is provided in the 'LCA Overview' worksheet.

A summary overview of this Results Viewer module structure, a list of worksheets and their status, and explanations on colour-coding of cells is provided in the 'Map' sheet. Clicking on the 'Goto' links from this sheet will take you to the relevant page/worksheet indicated.

△ The 'Home' button in the top-left of each sheet can be used to navigate back to the 'Map' worksheet at any time.

How to view outputs from the Ricardo Vehicle LCA modelling framework

Below is a summary of the more extensive explanation provided in the 'Guide' worksheet of the workbook.

Step 1. Import results databases

Outputs from the Ricardo Vehicle LCA modelling framework may be imported into the Results viewer Excel file through the 'IMPORT Controls' worksheet:

- IMPORT1**: Import results database for the **Electricity Production Chains** module (File #1: see Table 1 for file list).
- IMPORT2**: Import results database for the **Fuel Production Chains** module (File #2: see Table 1 for file list).
- IMPORT3**: Import results database for the **Overall Vehicle LCA** module (Files #3-7: see Table 1 for file list).

Instructions on how to import the results datasets are provided on the 'IMPORT Controls' sheet.

Please note the input files are provided as ZIP files and have to be unzipped before they can be imported.

Step 2. View/configure data in the summary tables/charts

Once one or more results datasets has been imported into the Results Viewer, the data can be explored in a range of dynamically configurable tables and charts, which are found on the following worksheets:

ElecChainSummary	results for Electricity Production Chains.
FuelChainSummary	results for Fuel Production Chains.
VehicleChainSummary	results for the Overall Vehicle LCA.

Fields that are editable by the User are highlighted in pale green.

The workbook will be locked by default, meaning that other cells will not be editable.

At the top of each Summary sheet there are a number of controls that will result in different selections of data to be brought into the configurable tables.

An explanation of the acronyms used is provided in the worksheet 'Categories'.

Table 1: Summary of EC Vehicle LCA results data files

File#	Import Data File Name (once unzipped)	Summary description of contents	Import #	Final Report Section
1	Electricity Chain Results.xlsx	The full set of electricity production chain results for all scenarios.	IMPORT1	Section 5.2
2	Fuel Chain Results.xlsx	The main fuel production chain results for all impacts, scenarios and 2 sensitivities (see also 'FuelChainList' tab in the data viewer workbook for further information).	IMPORT2	Section 5.3
3	Vehicle Chain Results.xlsx	The main set of overall vehicle LCA results for all scenarios, impacts, vehicles and powertrains using the default sensitivity assumptions.	IMPORT3	Section 5.4
4	Vehicle Chain Sensitivities_Regional Variation.xlsx	The overall vehicle LCA sensitivity results for regional variations in operation within the EU	IMPORT3	Section 5.5.2
5	Vehicle Chain Sensitivities_Tailpipe Emissions.xlsx	The overall vehicle LCA sensitivity results for improvement in future tailpipe air quality pollutant (AQP) emissions	IMPORT3	Section 5.5.6
6	Vehicle Chain Sensitivities_Fuels Methodology.xlsx	The overall vehicle LCA sensitivity results for varying fuel production chain LCA methodology (see 'FuelChainList' tab in the data viewer for further information).	IMPORT3	Section 5.5.8
7	Vehicle Chain Sensitivities_Other Sensitivities.xlsx	The overall vehicle LCA sensitivity results for:	IMPORT3	Section 5.5.1
		<i>Lifetime kilometre activity</i>		Section 5.5.3
		<i>PHEV charging behaviour / share of electric mileage</i>		Section 5.5.4
		<i>Vehicle loading</i>		Section 5.5.5
		<i>Ambient temperature</i>		Section 5.5.7
		<i>Material composition of the glider</i>		Section 5.5.9
		<i>The electric range of xEVs</i>		Section 5.5.10
		<i>Energy density of batteries</i>		Section 5.5.11
		<i>Battery manufacturing and end-of-life (EoL)</i>		Section 5.5.12
		<i>Vehicle manufacturing and end-of-life (EoL) (excluding batteries)</i>		Section 5.5.13
		<i>Second life applications of batteries</i>		Section 5.5.14

The 'ModuleSensitivity' worksheet in the results data viewer provides more information on the specific Vehicle Chain Sensitivities, for which results are provided in the files indicated above.