



Date

June 15th 2010

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Assessment

Final Report

EMISIA SA Report

No: 10.RE.004.V1

Graphical User Interface for the European Transport Model REMOVE



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Project Title	Contract No
Graphical User Interface for the European Transport Model TREMOVE	07.0307/2009/548085/SER/C5
Report Title	Reference No
Upgrading TREMOVE's Graphical User Interface	10.RE.004.V1
Project Manager	Approved by
Dr. Giorgos Mellios	
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Summary This is the final report for an European Commission project designed to revise and update the Graphical User Interface (GUI) of the TREMOVE model. The report is based on the work performed by the projects team members on the update and upgrade of the Graphical User Interface of the TREMOVE model.	
Keywords TREMOVE, Graphical User Interface	

Internet reference			
http://emisia.com/gui/			
Version / Date		Classification statement	
Final Version / 15 June 2010		PUBLIC	
No of Pages	No of Figures	No of Tables	No of References
11			

Contents

1	Executive Summary	5
2	Work Performed.....	5
	Task 100: Update the existing GUI for TREMOVE.....	5
	Task 200: Training session.....	8
ANNEX	10

1 Executive Summary

In December 2009, The European Commission/DG Environment (currently Climate Action DG) awarded EMISIA SA with the update of the Graphical User Interface of the TREMOVE model. TREMOVE is a policy assessment model to study the effects of different transport and environment policies on the emissions of the transport sector. The model simulates policies such as road pricing, public transport pricing, emission standards, subsidies for cleaner cars etc, the transport demand, modal shifts, vehicle stock renewal and scrappage decisions as well as the emissions of air pollutants and the welfare level. The model however cannot be used by anyone not familiar with software programming. For this reason a Graphical User Interface was designed. The previous version of the model was TREMOVE GUI v1 which included the TREMOVE model v.3.1. This project deals with the update of this Interface.

The main objectives of the project were:

- to update the version of the TREMOVE model currently used in the GUI with the latest version of the model
- to assess the functionalities of the GUI, update them where necessary and/or add new functionalities
- to organize a training session for the new version of the GUI.

2 Work Performed

The following sections present the work performed to meet the requirements of the contract. The report follows in many ways the structure of the specifications of the project.

Task 100: Update the existing GUI for TREMOVE

Subtask 110: Assessment of the existing functionalities

Emisia together with the European Commission during the kick-off meeting decided to keep all features currently existing in TREMOVE GUI with the exception of one feature. The user no longer has access to the Demand Module and Demand Database. The Demand Module is a key feature of the model, and is very sensitive to changes introduced by the user. It is also important to recalibrate the model each time the Demand Module is changed. This proved to be out of the scope of this project.

Subtask 120: Assessment of the new functionalities

Emisia, with guidance from the European Commission, prepared a list of additional features and improvements to be included in the GUI update. These were discussed and it was decided to include them in the new version. The additional features are listed in the following paragraphs. In addition, JRC/IPTS suggested an update on the saving process of the GUI, namely to split the save file in two separate parts. One part will include the baseline

modifications and a second part will include the scenario files. This reduces the file size of the information that needs to be saved each time, and also facilitates the exchange of scenarios between the different users. It was also suggested that the GUI should be able to open scenario files created by advanced users, without the use of the software. Finally, the possibility to use different versions of the TREMOVE code was discussed. All the above suggestions were taken into consideration and were implemented in the updated version of the GUI. All modifications are listed in detail in the following paragraphs.

Subtask 130: Update of the GUI

Improvement of operational experience for end-users

Smoother running procedure

The new model GUI (v2.5) has successfully eliminated a number of errors that previously occurred during the database processing stage with Microsoft Access in GUI v1.0. The GUI now appropriately handles changes made by users so that they are passed to the model in the appropriate format and within the valid domain of the model process. Careful selection of scenario insert points and correct generation of scenario files also ensures the success of scenario runs.

Significant improvements to processing times

The previous version (v1.0) required 15-25 minutes to save changes made to a GUI input database and scenario, whereas the new model requires only 1 minute. This represents major and significant progress and affords the user greater flexibility in working with the model and developing new scenarios. The new mechanism to import new data into the model and targeted updating/importing of the database contributes to this time-saving improvement.

Efforts to make the model compatible with more operating systems

Besides Windows XP 32/64, the new model can be run in Vista 32/64 and Windows 7 32/64.

Alternative baseline use

A distinction is made between the baseline modifications and the scenario creation. For this reason the user is prompted to select not only a scenario file to open, but also the baseline associated with this scenario. This allows the user to create an alternative baseline and use this baseline for the execution of multiple scenarios. The size of the saved files is significantly reduced.

Improvements to accessibility and user-friendliness

Inheriting the coding flexibility from TREMOVE command line

The new GUI v2.5 includes functions that help the user to find the GAMS files and pivot tables from TREMOVE 3.3.1/3.1. This extends the function coverage over the command line version (TREMOVE 3.3.1, TREMOVE 3.1). Therefore, users who are willing to conduct more complicated

calibration at the coding level now can combine the GUI version with the command line version.

GUI interface to view the final results

The new result viewing functions provide graphical interfaces for the end-users to manipulate or query the final results. Filters can be added easily by clicks-on-windows to explore the result database under criteria such as countries, vehicle types, technologies, years, transport modes. The results of activity, vehicle stock, emission, social welfare are now clearly divided into road, rail, air and water transport.

Taxation and technology wizards

Taxation and technology wizards have been implemented to assist the user in creating and running scenarios. These wizards are a useful support for new users. Direct change methods are also provided for more advanced users who wish to make very specific modifications.

New data exported file formats

New data exported file formats, such as Excel files, text files, html files, have been added to enable users to view or analyse the TREMOVE data files in their preferred application environment.

Consideration of the continuation of modelling works

Save/load project, save/load database and load scenario allow users to continue their previous works or reuse their previous intermediate data.

Compatibility with TREMOVE 3.1 and TREMOVE 3.3.1

The GUI v2.5 can be run on the basis of TREMOVE 3.1 or TREMOVE 3.3.1. These two options of command line models help the users to run the new GUI v2.5 based on the command line version of TREMOVE they wish. This is important for users who may have previously modified a version of TREMOVE to their needs.

Pivot table view

Where necessary, the user will be able to create pivot tables in the forms for a better overview of the data presented in the GUI.

Saved file format

The user is given the option to save all related files in one single file. A second option is given to compress this file in order to reduce the size or even lock the file with a password. This however requires an increase in the time needed to save and open the file.

MS Excel data exchange

A new programming has been used to communicate data to and from MS Excel from the forms. This further decreases the time of this procedure. The functionality is included in all related forms.

Subtask 140: Updated user manual for the new GUI

The user's manual of the application was updated with the additional features and provides instructions on how to use the GUI. It describes the operation of the interface and provides information on how to define and perform scenario runs.

The user manual can be downloaded from the following address:

<http://emisiam.com/gui/>

A help file has also been added to the software. The help file is in chm format and can be accessed via the menu bar. Additionally, every form provides the user with the possibility to open the help file to the corresponding topic related to the specific form.

Subtask 150: Debugging of the software

A separate team (AP EnvEcon) was responsible for the debugging of the software. AP EnvEcon tested all menu options and major operational aspects of the intermediate versions of the GUI. On the basis of the various comments received, several bugs and errors were corrected and the final version was formulated.

To facilitate communication between relevant Emisia and AP EnvEcon staff, a forum for questions and answers on the GUI operation was created. Access to the forum was provided only to the developers and evaluators of the model during the project period. The main function of the forum was to help the exchange of information between the debugging and the developing team as well as keep a record of all tests and improvements. This forum proved to be a very valuable tool for both involved teams.

Subtask 160: Designing a website

The new GUI v2.5 is made available for download on a website designed and operated by Emisia. The site includes the main software files, links to all necessary information and documentation, as well as some example runs. The website can be found in the following address:

<http://emisiam.com/gui/>

Task 200: Training session

Emisia will deliver a one-day training course in Brussels. The GUI will be installed to a desktop computer provided by the European Commission.

The training course will cover the installation and use of the GUI and will include the execution of a number of real-world examples corresponding to the main functionalities of the GUI, such as input values or datasets, scenario management, etc.

The responsible for the training courses team members will also prepare presentations in MS PowerPoint format that will be presented to the attendees. These presentations will include all the key issues that will be covered during the courses.

The examples presented to the training session, the software, the documentation (help files and users manual) as well as the presentation will be made available to the attendees.

ANNEX

One DVD including:

- the current document
- a user manual for the new GUI
- the source code of the software
- the GUI installation file
- TREMOVE GUI example
- GAMS v22.0 installation files