LOTSE QUANTIFICATION OF TECHNOLOGICAL SCENARIOS FOR LONG-TERM TRENDS IN TRANSPORT

CLIENT: *Institute for Prospective Technological Studies (IPTS) European Commission, DG-JRC, Seville*

YEAR: *2003 - 2004*

DESCRIPTION OF ACTIVITIES

The objective of the LOTSE project, commissioned by Institute for Prospective Technological Studies (IPTS, EC DG-JRC) was to develop quantitative scenarios for long-term trends in transport. Since transport is a derived demand these scenarios considered demographic trends, economic development and technology paths to provide a quantitative framework for the quantification of long-term transport trends within an integrated assessment model.

The ASTRA model family

The model used was an extension of the ASTRA System Dynamics model developed in different projects awarded by EC (mainly the ASTRA project - Directorate General VII - Transport - in the IV Framework Research Programme and the TIPMAC project - Directorate General Transport and Energy in the V Framework Programme).

In the ASTRA modelling approach, mobility prediction is the result of a complex interaction process among four different components: transport, economy, land-use and environment.

The tool is then capable to illustrate the reciprocal influences among transport and ecological and socio-economic systems, providing useful insights into the question of whether transport policies are really moving towards sustainability. Based on state-of-the-art models in the four fields of macroeconomics, regional economics and land use, transport and environment a the model is build according the System Dynamics methodology and implemented with the VENSIM software package.

Activities of the project

Within the LOTSE project three main activities were envisaged:

1. enlarging the scope of the ASTRA model;
2. developing the baseline trends and identifying relevant variables to build and simulate alternative scenarios on the energy and technology side;
3. developing a user interface to allow JRC experts to produce, simulate and compare new scenarios.

TRT co-operated to task 1 and was responsible for task 3.

In task 1 the ASTRA model was extended in terms of geographical scope to include the New Member States (10 acceded in 2004, 2 will join in 2007) as well as Norway and Switzerland.

Furthermore the trade model was significantly detailed and extended to include the trade flows between the EU15 and the newly implemented countries in the model on a sectoral level of 25 sectors. In this phase, TRT worked on producing input data concerning transport variables for the EU25 countries.

In task 2 three main scenarios were developed: a reference Business as Usual scenario and two alternative scenarios. Both alternative scenarios include a technological shifts of engine technology towards hybrid and fuel cell vehicles. In addition, one scenario introduces a CO_2 tax whereas the second scenario assumes a strong increase of crude oil prices.

The simulation suggest that the technology shifts induce a positive economic development other than improving environment effects. The CO_2 tax scenario leads to a slightly negative development while the crude oil rising price scenario shows an even worse economic outcome though it seems that technology push induced by higher energy prices could outweigh the negative effects in the long run.

In task 3 a user interface was developed by TRT to allow a user-friendly interaction with the model. The interface allows the user to setup new scenarios by changing the values of a set of pre-defined input variables and reading the outcome of the simulation through the value assumed by several output variables categorised by topic (Transport, Economy, Environment, etc.).

At the end of the project the model and the interface were transferred to JRC-IPTS in Seville where a training course was organised for making IPTS staff capable to work with the model

The Consortium

The LOTSE project was carried out by IWW Institut für Wirtschaftpolitik und Wirtschaftsforschung Universität Karlsruhe (project leader) and TRT Trasporti e Territorio.

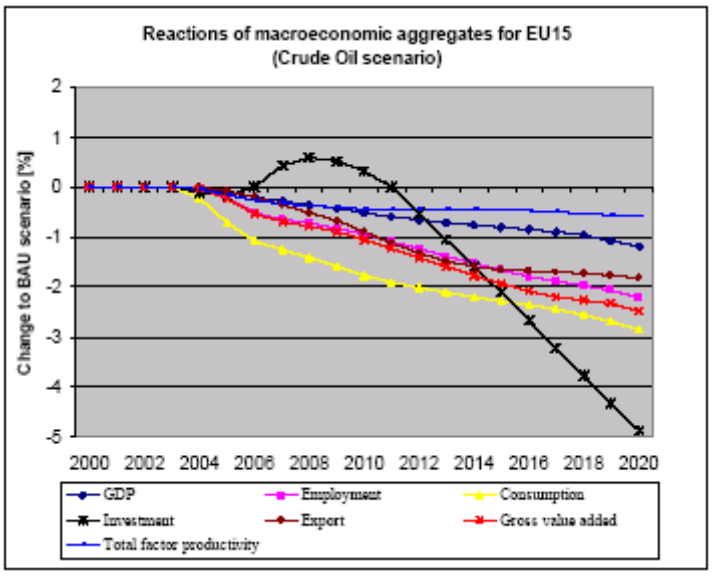

Fig. 1 An example of the ASTRA-Lotse results

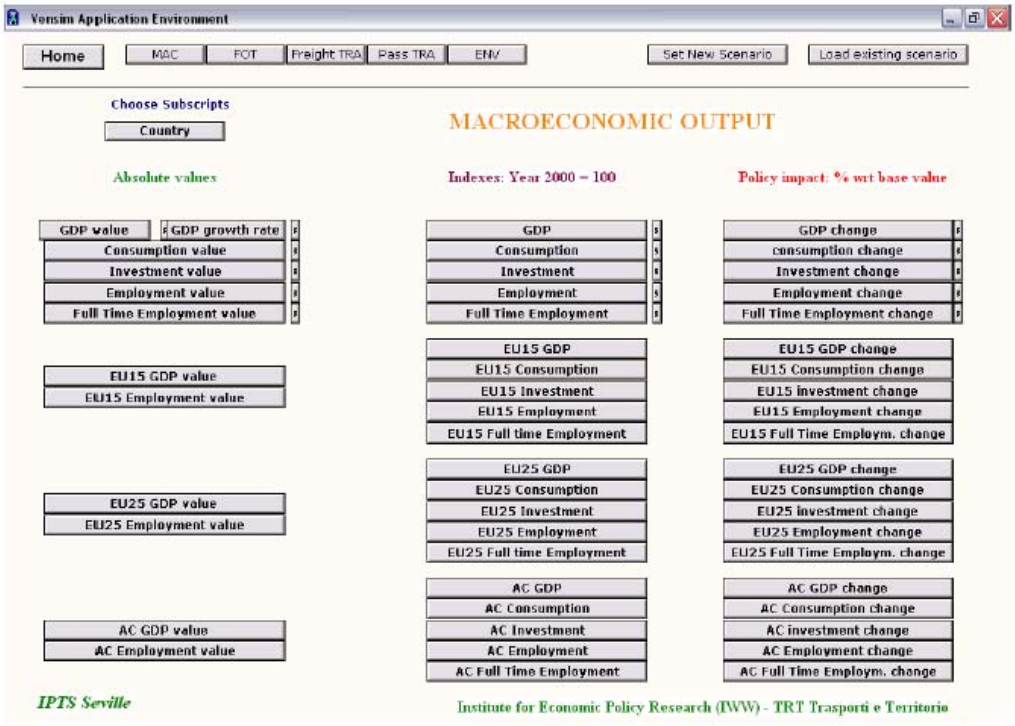

Fig. 2 An example of the ASTRA-Lotse interface