RISK OF ENERGY AVAILABILITY: COMMON CORRIDORS FOR EUROPE SUPPLY SECURITY

THE PROJECT IN BRIEF

Import is increasingly contributing to energy consumption of EU27. According to the commonly accepted energy outlooks in 2030 about 70% of the European energy needs will be met by primary sources originating from foreign areas, some of which are very remote and geopolitically unstable. A relevant issue involves the reliability of the infrastructures, as far as likely accidents and terrorist attacks are concerned. In addition, the import of electricity will be relevant as many new interconnections are at several stages of design and implementation.

Our project "*REACCESS - Risk of Energy Availability: Common Corridors for Europe Supply Security*" is carried out under the 7th Framework Programme (FP7) of the European Commission. The project began on January 2008 and is expected to be finished on December 2010. The main goal is to build tools suitable for EU27 energy import scenario analyses, able to take into account at the same time the technical, economical and environmental aspects of the main energy corridors, for all energy commodities and infrastructures.

THE REACCESS WEB-SITE

The REACCESS Web-Site acts as the information portal for the project as well as a communication forum among all interested parties. The overall goal is to be elevated to constant node for the dissemination of all information about Energy Corridors - Security of Supply activities, incorporating appropriate tools and models for interested stakeholders. The project's Web-Site address is: http://reaccess.epu.ntua.gr/. The related tools developed, uploaded and incorporated in REACCESS website are presented in the following paragraphs.

SOCIOECONOMIC RISK ASSESSMENT FOR ENERGY CORRIDORS

The REACCESS Socioeconomic Risk Assessment for Energy Corridors has been designed and developed in web form so as to be uploaded and incorporated in REACCESS website, in order to represent the quantified outputs graphically. It includes 122 identified corridors and by selecting the country of origin and adding points, an Energy Corridor is created and the resulting risk aggregation is schematically depicted for the following Aggregation Options:

- *Option A:* The corridor risk is equated to the highest risk of the individual countries and chokepoints.
- *Option B:* The corridor risk calculated as the average of the individual risk of countries and chokepoints
- *Option C:* The corridor risk is calculated as the average between the maximum individual risk and the average of all the individual values of the countries and chokepoints (B)
- *Option D:* The corridor risk is calculated as the sum of the individual risk of the countries and the chokepoints.
- *Option E:* The corridor risk is determined using an elementary reliability formula for series networks, resulting in the calculation of a composite political risk parameter, which takes into account the individual risk indexes of all the traversed counties. The abovementioned formula is, namely: $R(Corridor)=1-(1-R(Corridory_{x1})*(Corridory_{x2})*(1-R(Corridory_{xn}))$.

The different fields that ought to be filled are depicted in Figure 1 and the "RISK AGGREGATION" is illustrated in Figure 2. Detailed information on the methodology adopted can be found in the "TN.4.4-1: Socioeconomic Risk on Energy Security: Alternative Options to Aggregate Risk Along the Corridors. The Spanish Case".

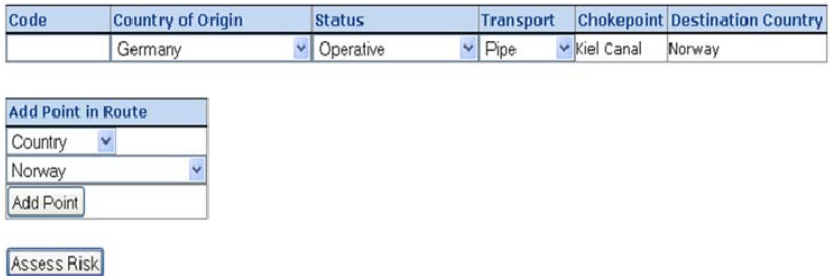

Figure 1. Data Sheet

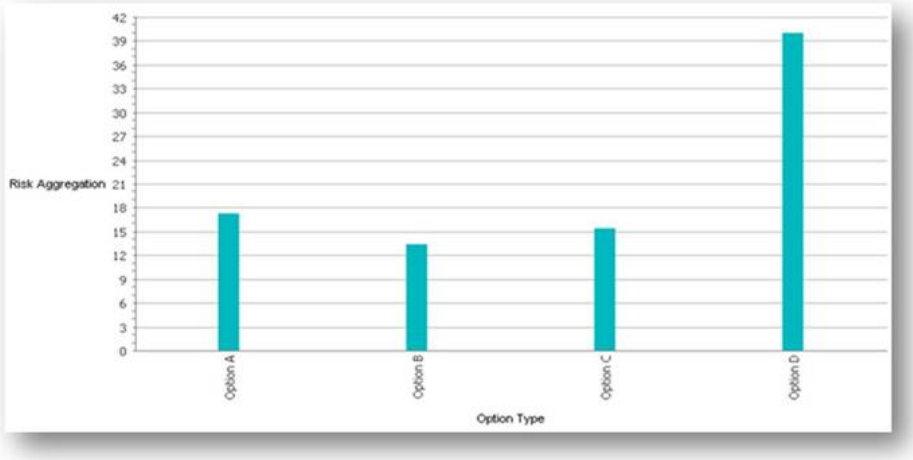

Figure 2. Risk Aggregation for Each Option

DYNAMIC WEB GIS APPLICATION

Existing, planned and possible future infrastructure in terms of pipelines, powerlines and open-sea routes supplying the EU27+ energy market are evaluated and through the utilization of a high dynamic web GIS application, i.e. Google Earth have been converted to a visualizing feature, which is depicted below.

Data collected include a very large number of elementary infrastructures, e.g. plants, fields. Additional information was taken from other sources, e.g. Google Earth, satellite images, shipping Data Base.

The identified and defined energy supply routes have been graphically represented and analysed with reference to their spatial characteristics and interactions. For each option there are provided starting points, destinations, geographic setup and length of single corridors and corridor sections so fare.

The tool will be enhanced with further evaluation layers, further kml' s files showing the results on the model runs will be included as soon as additional data and inputs are available. In Figures 3 and 4 Captive and Shipping Corridors are presented through GoogleEarth screenshots. Moreover, specific and detailed data are depicted, including information regarding the corridors.

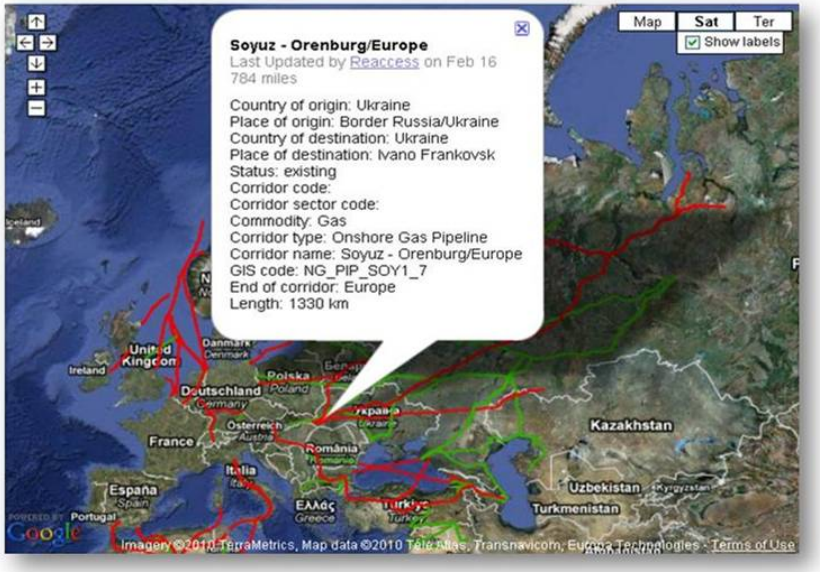

Figure 3. Representation of Captive Corridors through GoogleEarth

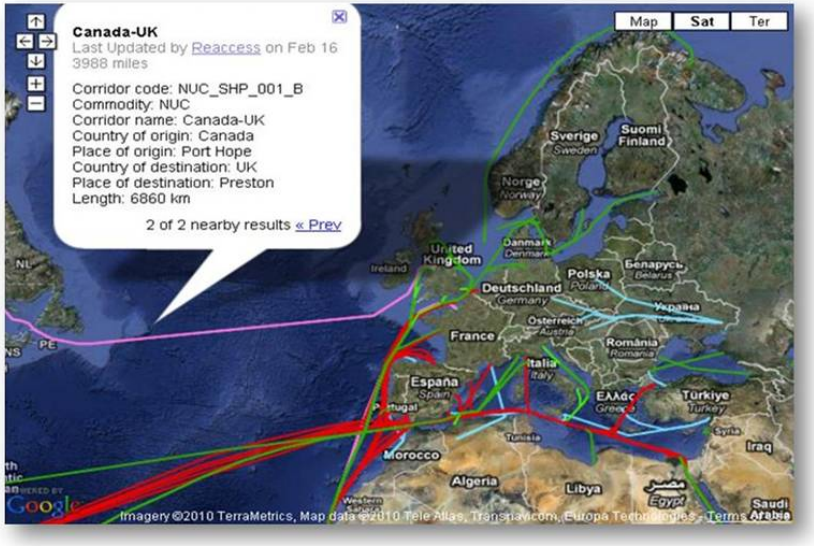

Figure 4. Representation of Shipping Corridors through GoogleEarth

REACCESS RECOR MODEL – E-PLATFORM

The energy corridors, whose technical economic characteristics are assembled in the Data Base Templates, are presented in the RECOR model. Before integrating it with the global TIAM model and the European PET30 model, the RECOR model is being tested in a stand-alone mode. Some results of these tests are shown in an e-platform, prepared by KANLO-KanORS for REACCESS (Figure 5).

Each set of results consists of several tables, which are categorized by sector/type. An embedded tabbed view enables comparison of a table across scenarios, or simultaneous viewing of multiple tables from a single scenario. It follows a screenshot showing the layout of one such table in which are presented data referring the energy balance of Gas and LNG.

In order to have access for exploiting the further features, provided by this tool, users should re-register and log in.

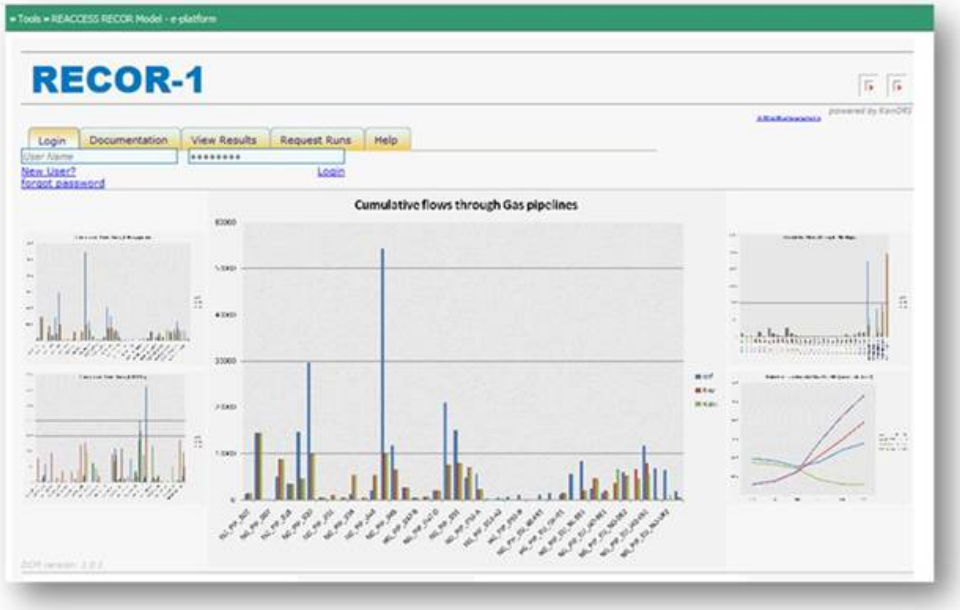

Figure 5. REACCESS RECOR Model – e-platform

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- Austrian Research Centres – Research Studios Austria (ARC), Austria.
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- University of Stuttgart (USTUTT), Germany.
- Institute of Methodologies for Environmental Analysis (CNR–IMAA), Italy.
- Applied Systems Analyses, Technology and Research, Energy Models, ASATREM, Italy.
- Climate Change Coordination Center (CCCC), Kazakhstan.
- Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (CIEMAT), Spain.
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