



JOINT RESEARCH CENTRE

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Epsilon International Short Profile

EPSILON International SA is a Technology Resources Company since 1985. The Company specialises in the sectors of: (1) Space/Aerospace & Telecoms, (2) GIS & InfoSociety, (3) Environment & Civil Engineering, and (4) Management & Economics. It offers worldwide services in: (i) engineering design, (ii) consulting, (iii) research & technology development (RTD), (iv) geodata & spatial database infrastructures (SDI), (v) high-tech products development, (vi) outsourcing, and (vii) training.

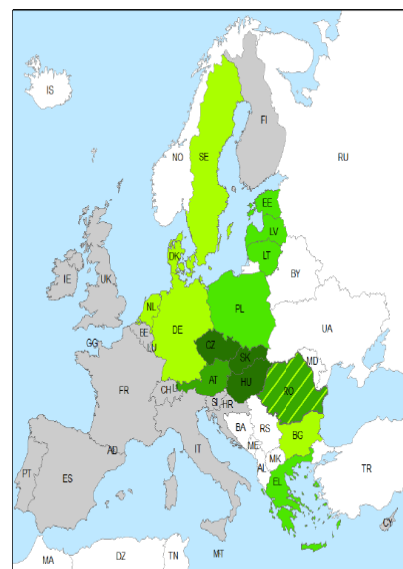
EPSILON International SA was first established in the USA (1985); today it operates world-wide as a pure European Company with links in Greece, Italy, Cyprus and Russia, also linked to leading organisational offices in numerous European countries. EPSILON International SA provides services & expertise to governments, the private sector, to international lending organisations, and to the European Commission. It has strong associations with leading technology organizations as Teletlas NV™ (BE), MairDumont™/Falk Geographischer Verlag GmbH (D), NavNGo Kft™ (HU), Elsacom Spa™ (I), ESRI™ GeoInformatik GmbH (D) and other.

Space/Aerospace & Telecoms: Expertise in space technologies, mobile- wifi- & satellite telecoms, aviation-technologies with an emphasis in GIS, and in earth observation with emphasis in remote sensing applications and GIS technologies in multiple sectors ranging from water resources, to environment and aviation.

GIS & InfoSociety: Services for the entire spectrum of SDI/GIS/IST technologies as geodata capturing & geo-statistics for INSPIRE/OGC geo-databases, geo-systems integration, geo-marketing products, and IST/ICT technologies.

Environment & Civil Engineering: Services in most civil-environmental engineering & sciences sectors. Emphasis in water, nature, environment, health and quality of life; climate change; nature & biodiversity; marine & coastal environments; sustainable consumption & production including waste; drivers & statistics of environmental change; law & regulations; engineering of treatment technologies; transport & geology-geotechnics, and mathematical modelling of all types

Management & Economics: Project management, techno-economics, market research, business planning, laws & regulations, R&D, technical assistance & research studies in: business management plans, business & geo-information statistics, regional & environmental economics, engineering projects-actions impact analyses, feasibility studies in support to engineering-sciences projects, marketing & long-term viability & sustainability analyses for business portals, space & telecoms marketing analyses.



EUGAS extension:
 ■ Phase 1
 ■ Phase 2
 ■ Phase 3
 ■ Phase 4
 ■ Next Phase

FIGURE 3. SPATIAL COVERAGE EVOLUTION OF THE PHASES OF DEVELOPMENT OF EUGAS.

Introduction

The Energy Security Unit (ESU) of the JRC-IET is actively committed to the analysis and development of quantitative techno-economic analysis of energy security, with a special focus on natural gas and natural gas transmission infrastructures, to support the Action 'Security of Supply', which is embedded in the JRC Thematic Area 'Energy Development of a Low Carbon Society'.

Within the legal framework provided by the Regulation n. 994/2010 and the directive 2008/114/EC, the ESU has started to develop a hydraulic model of the National Natural Gas Transmission System (NNGTS) of the EU Member States. The "European Gas Assessment" (EUGas) model has been designed to test the resilience of national gas transmission networks, to identify ECI at the European scale, and to support scenario creation under different disruption or crisis events.

EUGas is a country level model of the European NNGTS covering 16 Member States (i.e., Austria, Bulgaria, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Latvia, Lithuania, Netherlands, Poland, Romania, Slovakia, Sweden). EUGas is built using a combination of commercially available software to provide a technical insight into the operation of such a complex system. In particular the software tools ESRI ArcGIS® and GL Noble Denton "SynerGEE® Gas" are used to collect, process, manage and run the model.

Coordinator

Epsilon International

<http://www.epsilon.gr>

Partners

Simulation Software

Limited

<http://www.ssl-int.com/>

Subcontractor

Giuliano Basso

EUGas - European Gas Assessment model

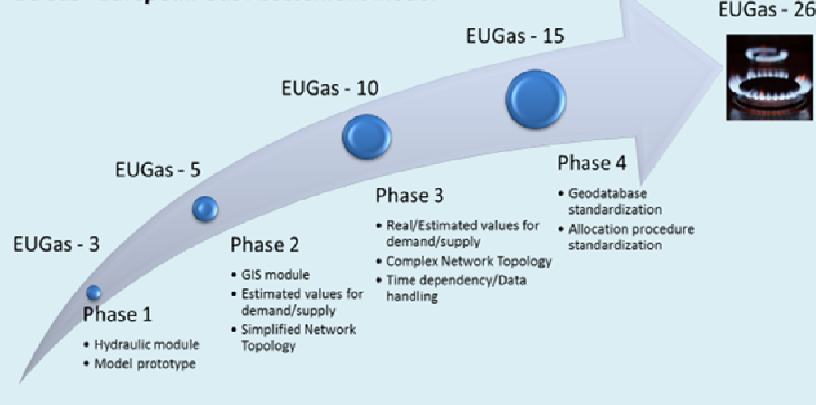


FIGURE 2. EVOLUTION OF THE EUGAS MODEL SHOWING THE ADDITION OF NEW FEATURES, THE INCREASE IN NUMBER OF ANALYSED COUNTRIES AND OF THE SPATIAL-TEMPORAL COMPLEXITY OF THE GAS NETWORK.

Collect

Check

Model

Develop

Report

Train

Support

Description of Work

The primary driver for the work is to support the security analysis of the European infrastructure being considered at IET-JRC and to allow a view to be taken on its resilience by evaluating and analysing scenarios of the network responses and dynamics caused by loss of facilities, geopolitical gas crises and other potential threats and hazards that could jeopardise EU energy security.

In this framework, Epsilon International SA is the leader of the consortium that has to complete the following tasks:

- Collect, from validated data providers, the information concerning values of the gas demand/supply for each country
- Check and update the topology and facilities' attributes of the NNTGS of each Country based on the validated geodatabase provided by the ESU JRC-IET.
- Develop a hydraulic model for each country to evaluate the national transmission system resilience and to support the creation of scenarios to simulate security implications. Each individual model has to solve the network problem with a steady state solution.
- Elaborate, implement and test a procedure to link and integrate the results of a country level hydraulic model against the EUGas model as well as any model derived by aggregating single country models (i.e., after shown to be individually stable, the new aggregated model has to be stable as well by matching the entry/exit flows).
- Provide two reports, one concerning model development and one concerning models integration. The model developing report shall describe in details and for each country: (i) model assumptions, (ii) data assumptions and limits, (iii) model development steps, (iv) model inputs and outputs, and (v) model validation procedure. The models integration report shall describe in details for each country: (i) link and integration assumptions, (ii) link and integration limits, and (iii) description of the steps for the integration. Any technical problem or software limitation has to be clearly stated in the reports.
- Provide a training session on: (i) major steps of model development, (ii) use of the developed model, (iii) scenario creation, and (iv) models link and integration.
- Provide a "support service" to the ESU for 3 months after the delivery of results, models and reports.