

6 EXPERIENCE

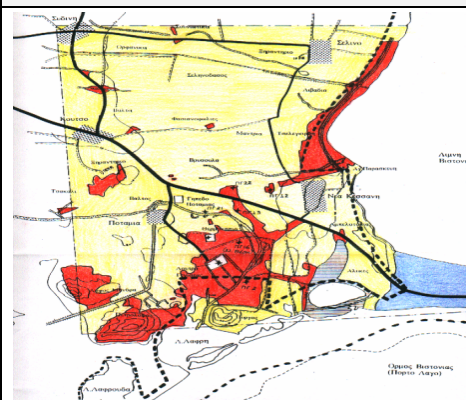
Acronym: **KESSANI**
Project No: **C-1999_9101**

Project Title: **EIA: EXPLOITATION OF THE NEA KESSANI GEOTHERMAL RESERVOIR, GREECE**

Name of legal entity	Country	Overall project value [in million €]	% carried out by EPSILON	No. of staff provided	Name of Client	Origin of Funding	Dates [start/end]	Name of partner(s) [if any]
EPSILON	GREECE	0,3	80 %	6	Ministry of the Industry & ETBA	ETBA: Industry Bank of Greece	01.01.1999 30.12.2001	EPSILON (GR) NTUA (GR)

Project Description

Type of Services Provided [Outlined]



Nea Kessani Geothermal Reservoir, Xanthi, GR

The Hellenic Power Corporation, PPT-DEH, in cooperation with the Ministry of Industry and the INDUSTRIAL Bank for Reconstruction and Development of Greece (ETBA) have undertaken a major project related to the exploitation and management of the large geothermal reservoir of the Prefecture of Xanthi, N. Greece. The VALOREN Energy Programme and other Structural and Cohesion Funds Programmes of the European Commission have financed the project.

The aim of the study has been the investigation of the environmental impacts of the exploitation of the geothermal reservoir in N. Kessani and introduction of mitigation measures, for a major development plan considering: energy production, use of thermal water for greenhouse operations and use of water for thermal surface water enrichments for industrial purposes as being fish cultivation.

A thorough study has been assumed, which considered environmental impacts related to the physical, biotic and socioeconomic environments of the region. Emphasis has been placed on the natural resources, the wildlife and natural vegetation due to the installation of well drilling, the new fishery unit and the energy transfer pipelines, air pollution from non-recovered CO₂, and introduced technologies related to the extraction of the low enthalpy energy.

The study involved tasks as: (i) Mapping of the environmental components and production of the base line, (ii) Evaluation of technologies to be used and effluents to be produced (quantity and quality), (iii) Estimation of impacts on the water resources of the region with an emphasis on groundwater, and on most other environmental components, (iv) Selected mathematical modeling on groundwater recharge from recycled water by considering various levels of purification from catalytic chemicals to be used in the operation, since the geothermal filed contains substantial concentrations of salts and other substances, (v) Establishment of the best practices in the filed operation and (vi) production of a preliminary environmental management plan by considering both, economics of the field operation and the use of water by the agricultural industry mainly (cost-benefit return).

Major mitigation measures considered: (i) A monitoring plan aimed to minimize impacts on the geological and hydrological environment: control of the water regime considering the level and stability of chemical variables, monitoring of the meta-seismic behaviour of the reservoir, monitoring of soil pollution due to salt conditions, monitoring of the ground level, (ii) A plan aimed to monitoring conditions in cases of waste water sea disposal: quantification of hazardous substances in periods when maximum consumption of geothermal liquid is expected, (iii) A plan to monitoring the biologic and ecosystem: changes in the micro flora, the upper level of vegetation, the fauna of species and the population, and measures to protecting water quality. In addition, the project has undertaken a non-detailed groundwater modelling effort with mass-balance equations for the confined aquifer, and an economic return on investment given the stringent environmental measures considered.

Services-Deliverables

- Consulting & engineering
- Environmental mapping
- Technologies evaluation
- Water resources & groundwater analyses
- Economic analysis
- Environmental impact assessment
- Mathematical modelling
- Management plan

Achievements-Innovation

- Integrated water resources & energy assessment
- Mathematical modelling of geothermal reservoir

Key Words

Agricultural development—Green house, Economics, Ecosystems, Engineering, Enthalpy, Environment, Geothermal reservoir, Greece—Kessani—Xanthi—Drama, Groundwater impacts, Hazardous substances, Management plan, Valoren—EC—Cohesion Funds.

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