

# European Network for Research in Geo-Energy



## Energy Is Not for Free

A position paper

Prospective energy studies from institutions like the International Energy Agency predict that throughout the first half of this century the world will, to a large extent, further depend on non-renewable fossil fuels. Oil and gas will continue to play a key role in the energy supply. Recently the oil price has increased, reaching an all-time high of more than 55 US\$/b on October 25, 2004, and has remained high since.

Irrespective of speculation as to whether this is due to a shortage in production capacity or the result of political instabilities, keeping energy supply in line with the permanently growing demand needs a strong and sustained effort in exploration and exploitation. The key factors for success are sufficient capital investment, abundance of skilled human resources, together with a clear commitment to an increased investment in technological progress, hence research and development.

ENeRG is a network of European research institutions on Geo-Energy. ENeRG is involved in European energy policy development and subsequent technological innovation related to new subsurface energy infrastructures. The network's "research portfolio", established through research investment over decades, encompasses oil, gas and coal exploration and production, geological storage of CO<sub>2</sub>, underground production and storage of thermal energy and nuclear waste disposal. Members in the network are recognized global innovators and leaders in their respective fields. This paper provides a view of ENeRG members on the future of geo-energy related research.

### Hydrocarbon systems

In order to guarantee security of energy supply, world wide necessary investments over the coming 30 years will amount to almost 3 trillion €. This creates a major opportunity for export of European technology and 'know-how'.

European hydrocarbon basins are mature and production profiles will soon start to decline. Therefore, in Europe, research should focus on innovative and enhanced recovery methods (getting more out of existing fields) and on the development of unconventional resources such as coal-bed methane, tight gas fields and oil shales. Major efforts will also have to be made in technology for infrastructure and supporting policies to enable the development of economically marginal fields.

ENeRG supports the Technology Master Plan of Eurogif (<http://www.eurogif.org>) expressing the need for more European research and development to safeguard Europe's position in this energy market sector. Research spent in Europe to enhance hydrocarbon recovery can be leveraged by further research spend and demonstration studies in the global market. Every

percentage point that oil recovery can be improved at the global scale can extend hydrocarbon supplies for several years. The ENeRG network can sustain percentage point improvements given support and encouragement for research.

## Coal

Coal exploration and mining in Europe has declined for decades due to high production cost and environmental concerns. Now, with the application of controlled gasification and capture of  $\text{NO}_x$ ,  $\text{SO}_x$  and  $\text{CO}_2$ , a renewed growth of coal usage can be expected to balance possible shortage in oil and gas. In-situ gasification, coal bed methane and  $\text{CO}_2$ -enhanced coal bed methane benefit from synergies between traditional coal and the innovative hydrocarbon industries and the ENeRG network is well placed to promote interactions.

## $\text{CO}_2$ capture and geological storage

Large scale  $\text{CO}_2$  capture and storage is a promising solution for Europe to fulfil the Kyoto  $\text{CO}_2$  reduction targets for 2010 and beyond. Research focuses currently on developing cheaper capture technologies and on the safety of long-term geological storage of  $\text{CO}_2$ . The European 6<sup>th</sup> Framework Program for Research and Technological Development strongly stimulates (30 million €) ongoing research in this area.

## Geothermal production and storage systems

Heat represents an important percentage of energy consumption in Northern Europe, produced and distributed either in central district heating systems, or generated locally. A small part of that heat is produced from low enthalpy geothermal energy or from soil storage and exchange systems. Geothermal energy is environmentally friendly and needs little space and infrastructure at the surface.

Much more summer waste heat could be made available for heating in winter, through seasonal subsurface storage. In southern Europe, geothermal systems could provide for the growing cold energy demand. A relatively small research effort into geothermal energy production and thermal energy storage could have a major impact on clean heat production, energy efficiency and  $\text{CO}_2$  reduction. Synergies between heat-generating facilities and geological storage sites need to be mapped and promoted by the ENeRG network.

## Nuclear energy

Nuclear energy is expected to remain an important source of energy in Europe. Especially the safe storage of nuclear waste is an issue to be solved in the coming decades. Geological storage provides a durable, environmentally safe way of dealing with both high and low nuclear waste materials, for thousands of years to come.

## European Coordination of Geo-Energy Research

ENeRG has established itself as the exemplary pan-European research network in Geo-Energy, and has rapidly and enthusiastically taken up new members in the joining countries. The network is promoting Geo-Energy research in the 7<sup>th</sup> EU Framework Program for Research and Technological Development, where the needs for further investment in energy (including hydrocarbons) can be recognized.

**A strong and well coordinated investment in European Geo-Energy R&D is needed to enable the transition towards a sustainable energy future.**