

**Title: Clean and Sustainable Carbon-based Energies for Europe**

**(N-EU-CARB-EN)**

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**Overall Policy Objective**

*To ensure the development of all required technologies with a view to improving the sustainability and efficiency of all processes of the carbon-based energy chain (production of primary sources; transport & storage; conversion to secondary energy; distribution and end-use), while reducing or eliminating greenhouse gases (carbon management) and other emissions and securing energy supply for Europe*

**Europe's research position in a global context**

Clean and sustainable carbon-based energies has been identified by many countries in the world as a critical issue in the transition to a fully sustainable energy future. As a result, there has been an increase in the level of support for research, technology development and deployment of the technologies in many countries outside Europe, especially in Australia and North America. For example, the **USA** is heavily investing in new fossil fuels technologies, as an essential part of a comprehensive energy strategy dealing with both climate change and security of supply. With this respect, more than \$700 million will be allocated in 2005 to the US fossil fuels budget.

The objective of the US Department of Energy "**Fossil Energy programme**" is to develop new fossil fuels technologies along the whole chain:

- ✓ To locate and produce oil and gas beyond the reach of today's technologies
- ✓ To overcome the environmental challenges of using coal
- ✓ To extract clean-burning hydrogen from fossil fuels

Other important initiatives at US level include the **FuturGen programme** which aims at investing \$1 billion in a 10-year demonstration project to create the world's first coal-based, zero-emissions electricity and hydrogen power plant. Much of the benefit from these programmes, the countries involved will be through global deployment of the technology, to the detriment of industry in Europe.

It is recognised that Europe has a good basis on which to build (through actions in the EC Framework Programmes FP4 and 5, and to a lesser extent in FP6, together with Member State initiatives and those of the industry) but there is a strong need for the formation of a critical mass programme. This would bring together the current rather disparate activities in a synergistic manner and provide a focus to ensure a competitive position that will satisfy not only European needs but also those of the world.

**Primary Technical, Economic and Political Justification for action**

It is widely recognised (IEA, World Energy Outlook 2004) that fossil fuels will continue to dominate global energy use. They will account for around 85% of the increase in world primary demand estimated to be 60% higher than today by 2030. Their share in total demand will increase slightly, from 80% in 2002 to 82% in 2030. The expected increase in global energy supply calls for cumulative infrastructure investment of **\$16 trillion** over the period

2003-2030 (IEA, 2004). The electricity sector will absorb most future energy investment with \$10 trillions for power generation, transmission and distribution, while total investments in the oil and gas sector will each amount to \$3 trillion.

The energy industry has then to face the dual challenge of ensuring the affordable security of supply for primary energy and mitigating the increase of energy related CO<sub>2</sub> emissions projected to grow by 1.7% per year from 2002 to 2030 (64% more than 2002). In order to limit this surge, a large amount of investments into technologies which minimise the emissions of greenhouse gases and other pollutants all along the fossil fuel chain is strongly required.

The proposed NEUCARBEN Technology Platform on Clean and Sustainable Carbon-based Energies for Europe will allow to conceive a vision and structure a Strategic Research Agenda and a Deployment Strategy to develop and deploy the needed technical solutions to address the dual challenge of security of supply and carbon management. NEUCARBEN will be an essential facilitator to:

- ✓ Improve the sustainability and efficiency of all processes of the carbon-based energy chain
- ✓ Secure energy supply for Europe within an increasing worldwide demand
- ✓ Reduce or eliminate GreenHouseGases and other emissions, with a particular attention to carbon management, efficiency improvements through to zero emissions
- ✓ Ensure the economic and public acceptance and validation of the technologies, especially those related to carbon capture and storage
- ✓ Initiate the transition to the hydrogen economy with carbon-based production and distribution infrastructure

Substantial benefits will be provided, including:

- ✓ Structured socio-economic and technical research with the crucially important goal of sustainable and clean energy systems
- ✓ Stimulation and increased effectiveness of public- private partnerships and related R&D investment
- ✓ Essential contribution to knowledge generation, innovation and productivity leading to increased competitiveness
- ✓ Development and networking of regional clusters
- ✓ Removal of obstacles for deployment and acceleration of market penetration
- ✓ Enhancement of the EU's attractiveness for researchers and industrial investment
- ✓ Increased public awareness and acceptance of the technologies concerned.

For a more precise and detailed description, please refer to the NEUCARBEN position paper and the supporting documents such as EUROGIF Technology Master Plan, the EPPSA Clean Energy publication and the common strategy that has been developed by the stakeholders in the EC Thematic Networks relevant to this topic.

#### **Development of the Technology Platform (State of play)**

- ***October-November 2004:*** definition and finalisation of Technology Platform scope, goal structure and working groups
- ***First stakeholders' meeting*** on 15 November 2004
- ***December 2004:*** Presentation to European Commission's DGs (RTD, Enterprise,

Environment and TREN) and European Parliament

- **January 2005:** Implementation of Member States' Mirror Group
- **February 2005:** Official Launch

**Activities** (*existing and planned in short term*)

- The EC-Thematic Network CO2NET and several associated projects related to carbon capture and storage and co-financed by the European Union under both FP5 (e.g. Weyburn, Nascent, Recopol, Co2Store, Sacs, Gestco, Co2Net2, Grace, Ngcas, PowerClean, ICBM) and FP6 (CO2Sink, Castor, Encap, INCA-CO2) for a total amount in excess of €100million.
- EUROGIA (the EUREKA cluster in the energy sector): 12 projects labelled since March 2004 for a total amount of €53 million
- The ERA-NET Fossil Fuel Coalition (FENCO)
- The Network of Excellence CO2GeoNet
- Three EC-Thematic Networks (Trends, Floattech and SmartReservoirNet)

**Specific Deliverables** (*short to medium term*)

- ***Strategic Research Agenda*** in Q1 2005
- ***Deployment Strategy*** in Q4 2005, including recommended policy measures, lighthouse demonstration and deployment projects
- ***Public-private partnerships' scenarios and guidelines for funding mechanisms***
- ***Policy Interface / Framework*** - for interaction with political institutions.
- ***Recommendations for Joint Technology Initiatives***

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