



# Public money for fossil fuels in the EU and in three EU member states

A research paper prepared for Friends of the Earth Europe

*Profundo*  
economic research

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Europe**

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## Summary

This research report aims to provide an overview of all forms of public money spent on the production and primary processing of fossil fuels (oil, gas and coal) in France, the Netherlands, United Kingdom and the European Union since early 2004. Public money includes R&D subsidies, investment and other subsidies; export credits and guarantees; tax rebates and reductions; bilateral development aid and other forms of financial incentives.

### R&D subsidies

All countries and the European Union provide R&D subsidies to the fossil fuels production and primary processing sector. The main focus of most of these R&D subsidies is the development of Carbon Capture and Storage (CCS) technologies. In the United Kingdom programmes for maximising oil and gas recovery are also an important part of R&D subsidies. And in the Netherlands research on “clean fossil fuels” plays an important role.

### Export credits and guarantees

The three member states all grant export credits and guarantees to support exports of equipment and supplies for the production and primary processing of fossil fuels. The European Union does not provide export credits and guarantees.

Some of the major projects to which export guarantees are provided are:

- the P52 platform off-shore of Brazil, one of the world’s largest floating oil platforms (€ 64.1 million);
- the Baku-Tbilisi-Ceyhan oil pipeline (BTC) passing through Azerbaijan, Georgia and Turkey (€ 204.5 million);
- Yemen LNG Project € 119.7 million); and
- the South Pars Gas Field stage 9 & 10, located in the Persian Gulf (€ 215.0 million).

### Tax rebates and reductions

We only found a tax reduction programme in the Netherlands, giving a direct financial advantage to Dutch companies that invest in energy-saving equipment and sustainable energy.

Both in the Netherlands and the United Kingdom tax relief can be expected the next years for mine companies that invest in marginal oil fields in the North Sea.

Fiscal agreements with individual fossil fuel companies probably exist, but no specific information could be found.

### Development aid

The countries researched, as well as the European Union, hardly invest development aid funds in the production of oil, gas and coal. In France the aim of energy projects of the French development bank AFD is to develop rural areas with for example solar energy or hydropower. Both the Netherlands and United Kingdom ministries responsible for development aid are involved in the Emerging Africa Infrastructure Fund, who provided a loan for the privatisation of a petrochemical plant in Nigeria. And also the Dutch Development Finance Institute FMO is involved in this fund.

Besides that, FMO stimulates investments of Dutch companies in emerging markets. As a result it participates in the Vietnam Fund, which invests in the oil and gas sector of Vietnam and in project company Artumas, active in Tanzania where it is developing a fully integrated energy project.

## Other forms of public money

The Dutch government purchases emission reduction rights via the Joint Implementation (JI) and Clean Development Mechanism (CDM) of the Kyoto Protocol. Partly these emission reduction rights are acquired from oil and gas companies.

Public money of the European Union is mostly spent through loans of the European Investment Bank. For the period 2004-2009 loans with a total amount of € 6,782 million were provided to the production and primary processing of fossil fuels. Almost all of the loans are provided to gas-related activities, mostly for the construction of pipelines and transmission grids. In March 2009 the European Council agreed on a European recovery plan of which € 3.98 billion will be spent on energy projects, including over € 1.25 billion for CCS projects.

A major part of the public money to the fossil fuel sector in the United Kingdom is spent through the Coal Investment Aid and represents € 75.2 million in the period of 2004-2008.

The following table presents an overview of public money spent in the oil and gas sector from 2004 until 2009 by France, the Netherlands, United Kingdom and the European Union.

**Table 1 Public money in European Union and three member states for fossil fuels in 2004-2008, in millions.**

	R&D subsidies	Export guarantees	Tax rebates and reduction	Development aid	Other	Total
<b>France</b>	€ 12.2	€ 392.7	-	-	-	€ 404.9
<b>Netherlands</b>	€ 114.2	€ 461.6	€ 29.5	€ 54.5	ERU 1.4 <sup>1</sup>	€ 659.8
<b>United Kingdom</b>	€ 13.9	€ 582.1	-	€ 15.8	€ 75.2 <sup>2</sup>	€ 687.0
<b>European Union</b>	€ 75.4	-	-	-	€ 8,032.0 <sup>3</sup>	€ 8,107.4

As the table shows, export guarantees are the most significant form of public expenditure of the individual countries to the production and primary processing of fossil fuels. The Netherlands show a remarkable high expenditure on research and development, of which most is spent on new technologies as Carbon Capture and Storage and clean fossil fuels. Loans provided by the European Investment Bank (€ 6,782 million) are the most significant form of public expenditure of the European Union to the production and primary processing of fossil fuels.

Major oil companies such as BP, ENI, GDF Suez, Petrobas, Repsol, Shell, Sonatrach, Statoil and Total are involved in various projects supported by public money. These are often R&D subsidies going to projects run by research institutes in which private companies participate. In Table 13 we present an overview of companies that benefit from public money, direct and indirect.

<sup>1</sup> Carbon Credits programme. An Emission Reduction Unit (ERU) is equivalent of one tonne of CO<sub>2</sub> reduced

<sup>2</sup> Coal Investment Aid

<sup>3</sup> Loans provided by the European Investment Bank (EIB) and the projected investments included in the European Recovery Plan

## Introduction

The aim of this research project is to provide an overview of all forms of public money spent on the production, transport and primary processing of fossil fuels (oil, gas and coal) in France, the Netherlands, United Kingdom and the European Union since early 2004. Primary processing includes refineries, storage facilities and petrochemical facilities, including related Carbon Capture and Storage (CCS) projects. Electricity plants and other downstream facilities are excluded from the research, as are CCS projects related to electricity plants.

Public money includes R&D subsidies, investment and other subsidies; export credits and guarantees; tax rebates and reductions; bilateral development aid; and other forms of financial incentives. Bilateral development aid includes all aid given by individual countries' international aid agencies but does not include the contributions of countries to multilateral financial institutions such as the World Bank or the EBRD - which also can provide financing to the fossil fuel sector.

For each form of public support identified, the following information is provided:

- Company receiving the support
- Type of support
- Amount of support
- Period
- Objective

The amounts of support found are summarized per country and per sector, as well as for the EU as a whole.

In the first three chapters the results of the research on France, the Netherlands and the United Kingdom are presented. Chapter 4 provides the results of the research on the European Union. Finally, conclusions are drawn and the trends per country and per sector are illustrated in Chapter 5. In this chapter the information found on large oil and gas companies receiving public money is also summarized.

A summary of the findings of this research project can be found on the first pages of this report.

## Chapter 1 France

### 1.1 R&D subsidies

#### 1.1.1 Agence Nationale de la Recherche

The French National Research Agency (L'Agence Nationale de la Recherche - ANR), a public institution for the management of administrative issues, is a funding agency for research projects. Since 2005 it has several programmes related to energy and CO<sub>2</sub> storage of which the "Programme CO<sub>2</sub> Capture and Storage" is of interest to this study.

The objectives of this programme are on the one hand to adjust production processes to generate a nearly pure flow of CO<sub>2</sub> at lower cost and, on the other hand, to devise methods for the storage of CO<sub>2</sub>, particularly in the subsoil. The call for projects is open to projects in public-private partnerships on five thematic areas:

- Capture and transportation
- Storage and Monitoring, Verification and Mitigation (MM & V)
- Analysis of risk, safety criteria, regulations
- Breakthrough technologies mostly for CO<sub>2</sub> capture
- Socio-technical, economical and environmental evaluations

ANR spent a total of € 7.52 million in 2006, € 6.67 million in 2007 and € 4.76 million in 2008 on projects within this programme. The programme started in 2005 but financial information over 2005 is not available.<sup>1</sup>

All projects financed within this programme deal with Carbon Capture and Storage (CCS) projects. But some projects deal with CCS projects related to electricity plants, which are not included in this research report. The CCS projects related to the production, transport and primary processing of fossil fuels are listed in 1.1.6.

#### 1.1.2 ADEME

The French Environment and Energy Management Agency (ADEME) is a public agency under the joint supervision of the French Ministries for Ecology, Energy, Sustainable Development and Spatial Planning, and for Higher Education and Research. It participates in the implementation of public policies in the fields of the environment, energy and sustainable development.

The agency makes its expertise and consultancy skills available to business, local communities, public authorities and the general public and helps them to finance projects in five areas (waste management, soil preservation, energy efficiency and renewable energies, air quality and noise abatement) and to make progress with their sustainable development procedures.<sup>2</sup>

#### 1.1.3 BGRM

Bureau de Recherches Géologiques et Minières (BRGM) is France's leading public institution involved in the Earth Science field for the sustainable management of natural resources and surface and subsurface risks. Its objectives are:

- to understand geological phenomena, develop new methodologies and techniques, and produce and disseminate pertinent, high-quality data.



- provide public authorities with the necessary tools for drawing up policies for surface, subsurface and resource management, prevent natural risks and pollution, and regional development and planning.

In 2007 BRGM spent about € 4.4 million on CO<sub>2</sub> storage research.<sup>3</sup>

#### 1.1.4 CNRS

The Centre National de la Recherche Scientifique (National Center for Scientific Research) is a government-funded research organization, under the administrative authority of France's Ministry of Research.

Founded in 1939 by governmental decree, CNRS has the following missions:<sup>4</sup>

- To evaluate and carry out all research capable of advancing knowledge and bringing social, cultural, and economic benefits for society
- To contribute to the application and promotion of research results
- To develop scientific information
- To support research training
- To participate in the analysis of the national and international scientific climate and its potential for evolution in order to develop a national policy

#### 1.1.5 Institut Français du Pétrole (IFP)

IFP is a public-sector research and training centre, funded both by a State budget and by resources provided by private French and foreign international partners. ANR funded 17 projects in 2006 and the IFP is currently involved in two ANR programmes. The projects include private parties, such as Total and GdF Suez, and are mostly funded by ANR.

The industrial companies (mostly set up to further enhance IFP technologies) that IFP helps to develop through stake-holdings represent major technology transfer vectors, fostering the emergence of the innovations of tomorrow and supporting the creation of jobs. IFP's investments are shown in Table 2.

**Table 2 Portfolio of IFP's investments (as of 1 February 2008)<sup>5</sup>**

Activity	Company	IFP participation
Refining and petrochemicals, catalytic processes	Axens	100%
	Eurecat	50%
Process simulation	RSI	100%
Industrial equipment	Vinci Technologies	34%
	CTI	18%
Natural gas treatment, engineering	Prosernat	100%
CO <sub>2</sub> storage, engineering	Geogreen	40%
Powertrain engineering	D2T	100%
Geoscience consulting and software	Beicip-Franlab	100%
	Tech' Advantage	100%
Training	IFP Training	51%
Spin-off	Poweltec	48%
Investment funds	Demeter	10%

Activity	Company	IFP participation
Stakes held in listed companies	3E	6%
	CGGVeritas	5%
	Technip	3%

### 1.1.6 Overview of R&D projects

In the programmes described in the previous sub-paragraphs, which are funded by French government agencies like ANR or funded from the State budget of public research bodies as IFP, BRGM and CNRS, are a number of projects which are directly related to the production, transport and primary processing of fossil fuels. These projects are listed below.<sup>6</sup>

- **GeoForschungZentrum Postdam**

Partners: Schlumberger, Total, IFP, Universität Karlsruhe and Oxand.

Type of support: Project Eurogia / Eureka

Amount of support: unknown

Period: 2005-2010

Objective: Cosmos 2 - Evaluation of electromagnetic monitoring of CO<sub>2</sub>, modelling and monitoring the integrity of wells and sealants.

- **IFP**

Partners: BRGM, GDF Suez, Geostock, INPL Images, Total and CNRS

Type of support: GeoCarbone programme of ANR (no. ANR-05-C02-007)

Amount of support: unknown

Period: 2005-2007

Objective: The aim of the INJECTIVITE project is to develop a methodology to understand and predict the evolution of CO<sub>2</sub> injection in wells during the entire storage period in deep saline aquifers or hydrocarbon reservoirs.

- **IFP**

Partners: BRGM, CEA, INPL Images, and Armines CNRS

Type of support: GeoCarbone programme of ANR

Amount of support: unknown

Period: 2005-2008

Objective: The aim of the INTEGRITY project is to develop a methodology to assess the integrity of a CO<sub>2</sub> storage operation through the modelling of confined CO<sub>2</sub>.

- **BRGM**

Partners: IFP, INPL Images and INERIS

Type of support: GeoCarbone programme of ANR

Amount of support: unknown

Period: 2005-2007

Objective: The MONITORING project is investigating the safety and security issues of the storage installations as well as quantitative aspects concerning material balance, which is basically the relationship between the effective CO<sub>2</sub> stored and any possible leakage into the atmosphere. The project will result in a handbook of good practice that will support the drawing up of future French legislation.

- **IFP**

Partners: BRGM, Géostock, GDF Suez, Univ. P.&M. P. & M. Curie, ENSMSE, INERIS, Air Liquide Curie, ENSMSE, INERIS, Air Liquide

Type of support: firstly by RTPG (Network of Oil and Gas Technologies) and then by the GeoCarbone programme of ANR

Amount of support: unknown

Period: 2005-2007

Objective: PICOREF is devoted to preparing and running -by 2009- a semi-industrial CO<sub>2</sub> injection and storage pilot. The project will examine two site possibilities in the southeast of the Paris Basin: a mature hydrocarbon reservoir and a deep saline aquifer.<sup>7</sup>

- **IFP**

Partners: GDF Suez, Aker Yards, SAIPEM -SA and Air Liquide

Type of support: ANR project

Amount of support: unknown

Period: 2005-2008

Objective: Trans CO<sub>2</sub> is to study the impact of impurities resulting from capture on the thermodynamic properties of the fluid transported.

- **IFP**

Partners: CNRS, Armines Messer France and Vallourec SETVAL

Type of support: ANR project (no. ANR-06-C02-011)

Amount of support: € 754,716

Period: 2006-2009

Objective: The Puits CO<sub>2</sub> project searches for mechanisms of degradation of sealants for wells.

- **BRGM**

Partners: ECA, Schlumberger, IFP and CNRS

Type of support: ANR project (no. ANR-06-C02-006)

Amount of support: € 691,912

Period: 2006-2009

Objective: The Heterogeneities CO<sub>2</sub> project is about assessing the impact of physical and mineralogical heterogeneities on the physical-chemical processes associated with CO<sub>2</sub> storage in a deep saline aquifer.

- **INPL Pictures**

Partners: Armines, IFP, Total and BRGM

Type of support: ANR project (no. ANR-06-CO2-005)

Amount of support: € 641,598

Period: 2006-2010

Objective: The Annexes gas project is about assessing the simulation of thermodynamic properties of mixtures of water-gas-salts during geological CO<sub>2</sub> storage.

- **BRGM**

Partners: Armines-Ensmc-Cg, Université Paul Sabatier-Irit, Chyn, Total

Type of support: ANR programme CCS 2006

Amount of support: € 400,390

Period: From 2006

Objective: The CRISCO<sub>2</sub> project seeks to assess the criteria for a secure storage of CO<sub>2</sub>: aim is to produce quantitative and qualitative scenarios of the risks involved.

- **IFP**

Partners: Snecma (Subsidiary of SAFRAN), INPT-GC

Type of support: ANR programme CCS 2006

Amount of support: € 697,912

Period: from 2006

Objective: GASCOGNE project is to capture CO<sub>2</sub> from carbon composite (Original text: Garnissage Structuré en composite carbone/carbone pour le captage du CO<sub>2</sub> par lavage aux amines)

- **CGG Veritas**

Partners: BRGM, ESCPI, IFP, CNRS and Magnitude.

Type of support: ANR project (no. ANR-07-001-PCO2)

Amount of support: € 890,841

Period: 2007-2009

Objective: The EMSAPCO<sub>2</sub> project is to develop electromagnetic and seismic methods for the active and passive monitoring of storage tanks of CO<sub>2</sub>.

- **GEOSCIENCES AZUR**

Partners: Laboratoire de Université Joseph Fourier, Géophysique Interne et de Tectonophysique (LGIT), SITES, PETROMETALIC, INERIS

Type of support: ANR Programme CCS 2007

Amount of support: € 851,026

Period: From 2007

Objective: High Pulse Poroelasticity Protocole (HPPPCO<sub>2</sub>) for geophysical monitoring of CO<sub>2</sub> injection in reservoirs.

- **BRGM**

Partners: IFP, Schlumberger, CNRS, INPL Images ITASCA Consultants, Total and GDF Suez

Type of support: ANR programme CCS 2007 (no. ANR-005-076pCO2)

Amount of support: unknown

Period: 2007-2010

Objective: assessing the physical-chemical materials of the wells during the injection of CO<sub>2</sub>.

- **BRGM**

Partners: IFP; Etudes Et Productions Schlumberger; Cnrs - Laboratoire Des Fluides Complexes (Lfc); Inpl - Images; Itasca Consultants S.A.S., Total SA, GDF Suez

Type of support: ANR Programme CCS 2007

Amount of support: € 1,161,887

Period: From 2007

Objective: PROCHEPUIITS project is to asses behaviour of when injecting CO<sub>2</sub>.

- **INPL**

Partners: Total, IFP, Kaiser Optical, INERIS, CNRS, INRA and BRGM

Type of support: ANR programme CCS 2007 (no. ANR-07-pCO2-007)

Amount of support: € 1,284,845

Period: 2007-2011

Objective: the Sentinelle project is a geochemical monitoring of surface storage of CO<sub>2</sub>: the aim is to establish and interpret a balance sheet before injection and a track record during injection.

- **IFP**

Partners: BRGM, Inria-Rocquencourt, Ecole des Mines de Saint Etienne, LAGA

Type of support: ANR programme CCS

Amount of support: unknown

Period: 2007-2010

Objective: a high performance simulation of geological storage of CO<sub>2</sub>. The underground model makes it possible to estimate injectivity, the migration

of CO<sub>2</sub> underground and the impact of geochemical and geomechanical changes on the integrity of overburdens and wells in order to assess the safety of storage in the mid and long terms.

- **BRGM**

Partners: ENPC – Navier, INPL – G2r, Schlumberger, Ensam – Cer Châlons.

Type of support: ANR programme CCS

Amount of support: € 769,515

Period: 2008

Objective: Interface is a project for developing materials for safe wells for CO<sub>2</sub> storage.

- **IFP**

Partners: CNRS – IRCE Lyon, Rhodia, CNAM

Type of support: ANR programme CCS

Amount of support: € 881,947

Period: 2008

Objective: ACACIA aims to characterize and understand the changes in a cement formula exposed to a very acidic fluid.

- **BRGM**

Partners: Total, INPT – LGC, BIO, Institut De Physique Du Globe De Paris (IPGP)

Type of support: ANR programme CCS

Amount of support: € 690,522

Period: 2008

Objective: CARMEX - CO<sub>2</sub> mineralization ex-situ. (Original text: Carbonatation Minérale Ex-situ de résidus miniers – Procédé innovant, évaluation de la filière)

- **CNRS – LMTG**

Partners: CNRS – GM, Institut de Physique du Globe de Paris (IPGP), CNRS - ICMCB

Type of support: ANR programme CCS

Amount of support: € 825,819

Period: 2008

Objective: An experimental approach for CO<sub>2</sub> mineralization in-situ.

- **CNRS - GM**

Partners: CNRS – FAST, CEA, IRSN, CSIC, Total, Lafarge

Type of support: ANR programme CCS

Amount of support: € 817,838

Period: 2008

Objective: CO-LINER is a study of the integrity of damaged covers of wells for CO<sub>2</sub> storage: characterisation, modelling and remediation

- **CNRS - EVC**

Partners: BRGM, IDIL, PERFOS, CNRS – CIMAP, Université de Rennes 1 – IETR

Type of support: ANR programme CCS

Amount of support: € 775,774

Period: 2008

Objective: OPTIQUE CO<sub>2</sub>: Application of innovative fibres for monitoring CO<sub>2</sub> geological storage.

- **BRGM**

Partners: IFP, INERIS, GDF Suez, GEOSTOCK, ENSMP, CIRED, Institut De Physique Du Globe De Paris (IPGP), Univ. de Pau.

Type of support: ADEME project

Amount of support: unknown

Period: 2006-2008

Objective: Development of a methodology for selecting sites for CO<sub>2</sub> storage in reservoirs in France.

## 1.2 Export credits and guarantees

On behalf of the French state, the credit insurance company Coface manages public procedures for export guarantees provided by the French State.

Since early 2004, Coface provided the following export credit guarantees:<sup>8</sup>

- **Amec Spie**

Type of support: Export credit guarantee

Amount of support: € 52 million

Financiers: Banking syndicate arranged by ABN Amro Bank, Citi, Mizuho Bank and Société Générale<sup>9</sup>

Period / Contract date: 2004

Objective: Construction of the pipeline in Georgia and pumping stations in Azerbaijan and Georgia on behalf of the Baku-Tbilisi-Ceyhan oil pipeline (BTC) passing through Azerbaijan, Georgia and Turkey.

- **Europipe**

Type of support: Export credit guarantee

Amount of support: € 32 million

Financiers: Banking syndicate arranged by ABN Amro Bank, Citi, Mizuho Bank and Société Générale<sup>10</sup>

Period / Contract date: 2004

Objective: Delivery of nearly 50 000 tonnes of steel tubes in large diameter on behalf of the Baku-Tbilisi-Ceyhan oil pipeline (BTC) passing through Azerbaijan, Georgia and Turkey.

- **Technip France**

Type of support: Export credit guarantee

Amount of support: € 56.2 million

Period / Contract date: 2004

Objective: Providing equipment and technical assistance for the production of polyethylene 9<sup>th</sup> petrochemical complex in Bandar Asaluyeh in Iran

- **Technip France**

Type of support: Export credit guarantee

Amount of support: € 90 million

Period / Contract date: 2004

Objective: Construction and start-up of the ethylene plant Kharg Petrochemical Complex II, in Iran.

- **Entrepose Contracting**

Type of support: Export credit guarantee

Amount of support: € 11.17 million

Period / Contract date: 2005

Objective: Supply and construction of four new LPG storage spheres at port Radès, Tunisia.

- **Amec SPIE Capag**

Type of support: Export credit guarantee

Amount of support: € 119.7 million <sup>1</sup>

Financiers: Banking syndicate arranged by Bank of Tokyo-Mitsubishi UFJ, BNP Paribas, Calyon, Citigroup, ING, Royal Bank of Scotland, SMBC and Société Générale<sup>11</sup>

Period / Contract date: 2006

Objective: Construction and supplies on behalf of the Yemen LNG Project, which is undertaken by a consortium headed by Total SA.

- **Thomson CSF Idmatics**

Type of support: Export credit guarantee

Amount of support: € 31.6 million

Period / Contract date: 2007

Objective: Installing a new system of technological security for the existing network of pipelines west of Algeria.

### **1.3 Tax rebates and reductions**

We did not find any French instrument for tax rebates and reductions to oil, gas and coal production, distribution and primary processing companies.

### **1.4 Development aid**

We did not find any relevant investments of French development aid to the oil and gas sector. The aim of energy projects of the French development bank AFD is to develop rural areas with for example solar energy or hydropower.

### **1.5 Summary**

The French government invests mostly in the oil and gas sector through its national research programmes, focusing on CO<sub>2</sub> storage. As the French research agencies do know their way to European subsidies, a lot of projects are also funded by European research programmes, as we will see in Chapter 4.

But these investments are relatively low compared to the export credit guarantees given by the French export credit agency, Coface. It is involved in some major projects, which explains the high amounts of export guarantees in 2004 and 2006.

Energy projects of the French development bank AFD are aimed at development of rural areas and not directly invested in the oil and gas sector. We also did not find any tax reductions and rebates related to the production or primary processing of fossil fuels.

Table 3 provides a summary of the French public money investments that have been provided to the production and primary processing of fossil fuels in the last five years.

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<sup>1</sup> According to Project Finance Magazine the Yemen LNG gas extraction and export project is backed with a total amount of US\$ 450 million from Coface (Middle East Syndicated Loans - news in brief: Yemen, Euroweek - Issue: 1048, London, 4 April 2008).

**Table 3 Overview of French public money for fossil fuels 2004-2008, in millions.**

	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Total</b>
<b>R&amp;D subsidies</b>	-	-	€ 3.2	€ 4.2	€ 4.8	€ 12.2
<b>Export guarantees</b>	€ 230.2	€ 11.2	€ 119.7	€ 31.6	-	€ 392.7
<b>Tax rebates and reduction</b>	-	-	-	-	-	-
<b>Development aid</b>	-	-	-	-	-	-
<b>Other</b>	-	-	-	-	-	-



## Chapter 2 The Netherlands

### 2.1 R&D subsidies

#### 2.1.1 Energy Research Subsidies (EOS)

Energy Research Subsidies (EOS) are investments subsidies for research about energy: from nuclear energy to solar energy and to oil and gas production. In the years 2004-2007 the Dutch government spend respectively € 14.8 million, € 3.7 million, € 6.8 million and € 6.8 million on research to oil and gas extraction. Another field of attention is clean fossil fuels / new gas on which respectively € 8 million, € 16 million, € 14 million and € 44 million was spend. The rise of subsidies in 2007 was caused by the research on the technology of Carbon Capture and Storage (CCS).

Neither the monitoring report from PriceWaterhouseCoopers nor does the project database reveal the amount of subsidies given to specific companies.<sup>12</sup>

We found the following organisations receiving R&D subsidies from the EOS programme:

- **Twister**

Partners: TNO Bouw, Stork FDO, VIRO, FMI, MULTIN, S&T, Ansys-CFX and Gasunie Research

Type of support: EOS Innovatiesubsidie Samenwerkingsprojecten (Innovation subsidy cooperation projects)

Amount of support: unknown

Period: September 2006 - September 2008

Objective: Development of commercial Cryogene Twister to get a Higher Natural Gas Liquid (NGL) extraction resulting in improved revenue streams. It can be used to condense and separate water and heavy hydrocarbons from natural gas and applied to underground gas storage and NGL recovery. Benefits of the process are a reduced chemical consumption - eliminating or reducing chemical logistics, storage, regeneration and recovery systems - within a closed system - no environmental emissions (e.g. BTX).

- **Krohne NMB**

Type of support: EOS Demonstration

Amount of support: unknown

Period: 1 March 2007 - 31 December 2008

Objective: Demonstration energy saving oil production without platforms by NMR multiphase flowmeter technology

- **TNO MEP**

Type of support: EOS

Amount of support: Unknown

Period: 1 September 2002 - 31 May 2004

Objective: Experimental research and preliminary design of supercritical gasification of fossil fuels to get clean energy

- **Shell Nederland Chemie**

Type of support: Progr. Eff. DGOI, an innovation programme.

Amount of support: € 4000

Period: 2007

Objective: unknown

## 2.1.2 Carbon Capture and Storage

We found the following companies receiving a subsidy on carbon storage project development:

- **Gaz de France (part of GDF Suez)**  
Type of support: subsidy  
Amount of support: unknown  
Period: since 2004  
Objective: Injection of carbon dioxide in empty gas field K12B in the North Sea near Den Helder, the Netherlands.<sup>13</sup>
- **Shell Nederland Raffinaderij and NAM**  
Type of support: subsidy for demonstration project  
Amount of support: € 30 million  
Period: assigned in November 2008  
Objective: Development of carbon storage, delivered by Shell, in an empty gas field at Barendrecht, The Netherlands.<sup>14</sup>
- **GTI Zuidoost (part of GDF Suez) and DSM**  
Type of support: subsidy for demonstration project  
Amount of support: € 30 million  
Period: assigned in November 2008, start project 2010  
Objective: Development of carbon storage, delivered by two ammonia plants of DSM, in an empty coalmine in Geleen, the Netherlands.<sup>15</sup>

## 2.2 Export credits and guarantees

We found the following companies receiving export guarantees from the Dutch state, via the export credit agency Atradius:<sup>16</sup>

- **Danieli Corus Europe**  
Type of support: export guarantee  
Amount of support: € 7.4 million  
Period/Contract date: April 15, 2004  
Objective: Products for a gas cleaning plant and a blast furnace to India Jindal Steel and Power, India.
- **Deltastaal**  
Type of support: export guarantee  
Financing bank: Deutsche Bank  
Amount of support: € 11.4 million  
Period/Contract date: July 28, 2004  
Objective: Export credit insurance for products and services bought by National Iranian Oil Company (NIOC) for the development of South Pars Gas Field stage 9 & 10 of the EPC Consortium.
- **Ferrostaal Piping Supply**  
Type of support: export guarantee  
Financing bank: Deutsche Bank  
Amount of support: € 107.3 million  
Period/Contract date: July 28, 2004  
Objective: Products for the development of the South Pars Gas Field stage 9 & 10, to the Offshore Contractor of the EPC Consortium, National Iranian Oil Company (NIOC), Iran.

- **Van Oord Dredging and Marine Contractors**  
 Type of support: export guarantee  
 Financing bank: ABN Amro Bank  
 Amount of support: € 19.3 million  
 Period/Contract date: August 3, 2005  
 Objective: repairing the foundation of the breakwater of the Dung Quat refinement to the consortium of LLC - Pvecc - TLC Licogi - Tedi South, Vietnam.
- **Technip Benelux**  
 Type of support: export guarantee  
 Amount of support: € 28.7 million  
 Period/Contract date: August 23, 2005  
 Objective: products, engineering and technical assistance for the development of a reformer to OAO Kazanorgsintez JSC, Rusland.
- **Selmers**  
 Type of support: export guarantee  
 Amount of support: € 769,900  
 Period/Contract date: August 22, 2005  
 Objective: Coating equipment for pipelines and engineering to Altumet, Algerije
- **ABB Lummus Heat Transfer**  
 Type of support: export guarantee  
 Amount of support: € 17 million  
 Period/Contract date: November, 2005  
 Objective: Delivery of a reformer for an ethylene plant at Nizhnekamsk, Russia and detailed engineering, design and procurement services to OSJC Nizhekamskneftekim, Russia.
- **Thomassen Compression Systems**  
 Type of support: export guarantee  
 Financing bank: Hypo Vereinsbank  
 Amount of support: € 5.5 million  
 Period/Contract date: November 15, 2005  
 Objective: Delivering products for the renovation of compressors and turbines Nizhnekamsk ethylene plant, Tartastan, Russia to OSJC Nizhekamskneftekim.
- **Geoquest Systems**  
 Type of support: export guarantee  
 Financing bank: HSBC Bank, guarantee Petroleos Mexicanos  
 Amount of support: € 89 million  
 Period/Contract date: December 8, 2005  
 Objective: The right to use special software for the exploration of new oil field and analyses to Pemex Project Funding Master Trust, Mexico.
- **Thomassen Service Europe**  
 Type of support: export guarantee  
 Financing bank: Hypo Vereinsbank  
 Amount of support: € 22 million  
 Period/Contract date: February 9, 2006  
 Objective: Delivering products for the renovation of compressors and turbines Nizhnekamsk ethylene plant, Tartastan, Russia to OSJC Nizhekamskneftekim.

- **Technip Benelux**  
 Type of support: export guarantee  
 Financing bank: ING Bank  
 Amount of support: € 495.188  
 Period/Contract date: December 12, 2006  
 Objective: Engineering for the extension and revamping of a poly-ethylene plant to Sibur Neftehim, Russia.
  
- **Selmers Technology**  
 Type of support: export guarantee  
 Financing bank: ABN Amro Bank  
 Amount of support: € 24 million  
 Period/Contract date: March 13, 2007  
 Objective: Coating equipment for pipelines and engineering to OAO Vyska SteelWorks, Russia.
  
- **Bauhuis International**  
 Type of support: export guarantee  
 Financing bank: ABN Amro Bank  
 Amount of support: € 4.2 million  
 Period/Contract date: May 31, 2007  
 Objective: Coating equipment for pipelines and engineering to OAO Vyska SteelWorks, Russia.
  
- **Danieli Corus**  
 Type of support: export guarantee  
 Financing bank: ING Bank / Société Generale, guarantee: Industrial Union of Donbass, Donetsk  
 Amount of support: € 83.4 million  
 Period/Contract date: April 03, 2008  
 Objective: Products for a gas cleaning plant and a blast furnace to Alchevsk Iron-and-Steel Works, Ukraine.
  
- **Lummus Technology Heat Transfer**  
 Type of support: export guarantee  
 Financing bank: Hypo VereinsBank  
 Amount of support: € 43 million  
 Period/Contract date: May 28, 2008  
 Objective: Delivery of two reformers for an ethylene plant to OSJC Nizhnekamskneftehim Nizhnekamsk, Russia.

### 2.2.1 Programme for Economic Cooperation Projects (PESP)

The Programme for Economic Cooperation Projects (PESP) aimed to support export and economical cooperation with non-industrialised countries. It has ended in 2008. The programme was executed by the Dutch export support agency EVD.

We found the following companies receiving support from the PESP-programme:<sup>17</sup>

- **Sokhna Refining Petrochemical Company (SRPC) and Vopak**  
 Type of support: Financial support for a feasibility study  
 Amount of support: Unknown  
 Period: Delivered in October 2007  
 Objective: study to understand the economical, technical and financial aspects of the possibility to built a terminal and oil refinement in the port of Sokhna, Egypt.

- **DMT Milieutechnologie**  
 Type of support: Financial support for a feasibility study  
 Amount of support: Unknown  
 Period: The PESP feasibility study ended in June 2008  
 Objective: Feasibility study for export of a gas treatment facility in Russia.
  
- **Doedijns and Technip**  
 Type of support: Financial support for a feasibility study  
 Amount of support: Unknown  
 Period: The PESP feasibility study ended August 1, 2006  
 Objective: Development of (environmentally) save off-shore production facilities in the recent discovered Kikeh Offshore Oil Field, Malaysia.
  
- **Tamalone**  
 Type of support: Financial support for a feasibility study  
 Amount of support: Unknown  
 Period: The PESP feasibility study ended July 2, 2004  
 Objective: Re-cycling and re-use of parts of the oil production facility Goudtjespoel (Chevron) at an oil production facility in the Chinese Bohai sea.
  
- **Unknown company**  
 Type of support: Financial support for a feasibility study  
 Amount of support: Unknown  
 Period: The PESP feasibility study is to be delivered in January 2009.  
 Objective: For the development of a public oil and gas terminal in the port of Constanta, Romania.

## 2.3 Tax rebates and reductions

### 2.3.1 Energy Investment Reduction (EIA)

The Energy Investment Reduction (EIA) programme is a tax relief for investments in energy-saving equipment and sustainable energy. This tax relief programme gives a direct financial advantage to Dutch companies that invest in energy-saving equipment and sustainable energy. 44 percent of the annual investment costs of such equipment (purchase costs and production costs) are deductible from the fiscal profit over the calendar year in which the equipment was procured, subject to a maximum € 111 million.

In the annual report of 2006 the advantage for companies from this tax relief programme is estimated at € 305 million in 2006 and € 160 million in 2007. The reduction is mostly used by agricultural and horticultural companies. High investments for energy saving projects are reported by the metal, chemical, oil and gas extraction and oil refinement industry.

Within the sector oil and gas extraction 21 companies requested tax rebate with total investments of about € 47.8 million in 2006 and 19 requests with investments of € 149 million in 2007. Within the oil and coal process industry there were 67 requests with reported investments of € 35.6 million in 2006 and 51 requests of € 35.8 million investments in 2007. There is no information about which companies took advantage of this tax relief, except for one example.

Hexion produces coatings by burning acetylene. Until now acetylene was flared together with natural gas by neighbour Shell. Hexion receives tax relief of over half a million euro for its investments to use the acetylene of Shell and therefore reducing the gas flaring by Shell.

### 2.3.2 New incentive for investing in small Dutch gas fields

A planned incentive is to stimulate Dutch mine companies to invest in the exploration of marginal gas fields. The companies may reduce their profits once a year with an amount of 25% of investments in these gas fields.<sup>18</sup>

## 2.4 Development aid

### 2.4.1 Fund Emerging Markets (FOM)

The Fund Emerging Markets (Fonds Opkomende Markten - FOM) is financed by the Ministry of Economic Affairs. It stimulates investments of Dutch companies in emerging markets. The fund is managed by the Dutch development bank FMO.

We found the following organisations receiving support from the FOM programme for projects in the oil and gas sector:<sup>19</sup>

- **Vietnam Fund**

Type of support: Loan

Amount of support: € 5.1 million

Period: Since July 31, 2007

Objective: This Vietnam-based investment fund serves healthcare, education, telecom and media, financial services and oil and gas. The FMO financing will provide scarce and much needed growth capital to Vietnamese companies. The fund mainly invests in large and medium-sized businesses.

- **Artumas**

Type of support: Equity

Amount of support: € 33.6 million

Period: Since June 30, 2007

Objective: A project company of Canadian Artumas is developing a fully integrated energy project (gas exploration, transmission and distribution) in Mtwara, Tanzania. About 500,000 consumers, and a number of industries in remote rural areas will benefit from access to reliable electricity and improved infrastructure. Current government subsidies and the dependence on imported diesel and oil will be reduced.

### 2.4.2 Emerging Africa Infrastructure Fund

The Emerging Africa Infrastructure Fund (EAIF) is a Public Private Partnership able to provide long-term denominated debt or mezzanine finance on commercial terms to finance the construction and development of private infrastructure in Africa. EAIF was initiated by the Private Infrastructure Development Group (PIDG), whose founding members are the UK Government's Department for International Development (DFID), the Netherlands Ministry of Foreign Affairs (DGIS), the Swiss State Secretariat for Economic Affairs (SECO) and the Swedish International Development Corporation Agency (SIDA). These PIDG members provide equity to EAIF through the PIDG Trust. Senior and subordinated debt is provided by commercial lenders and Development Finance Institutions (DFIs, amongst others the Dutch FMO).<sup>20</sup>

We found one relevant project.

- **Eleme Petrochemicals**

Country: Nigeria

Type of support: loan from the Emerging Africa Infrastructure Fund of DFID

Amount of support: US\$ 20 million (€ 15.75 million)

Period/Contract date: The project was signed in February 2007

Objective: This project forms part of Nigeria's privatisation programme support. EAIF has committed a US\$ 20 million loan to support the privatisation of this petrochemical plant as part of a total financing package of US\$ 160 million. The project will contribute significantly to the rehabilitation of Nigeria's infrastructure, including through import substitution, privatisation demonstration effects and a community programme bringing power to an area of 50,000 people.

## 2.5 Carbon credits

SenterNovem is the Dutch agency responsible for R&D subsidies. SenterNovem also operates a carbon credit programme on behalf of the Dutch state.

If a project achieves a measurable reduction in greenhouse gases the Netherlands can:

- purchase the emissions reduction, the so called 'carbon credits';
- use the reduction for compliance with the Kyoto Protocol.

The Carbon credits team with SenterNovem purchases emission reductions on behalf of the Dutch government via the Joint Implementation (JI) and Clean Development Mechanisms (CDM) of the Kyoto Protocol. The current portfolio exists of 24 JI and 4 CDM projects in 11 different countries existing of various energy technologies like wind power production, methane gas recovery, biofuel and co-generation. The total contracted volume is 17,4 million tonnes of CO<sub>2</sub> equivalent.

SenterNovem has offered companies financial support for investments in renewables, energy efficiency and methane capture and/or an additional source of income to boost the economic feasibility of projects. At this moment the purchase programmes for CDM (CERUPT) and JI (ERUPT) projects are closed.

The amount of financial support to companies for their emission reduction is not clear. Only the Emission Reduction Units (ERU's)<sup>1</sup> were given with the project details. We found the following companies receiving financial support for emission reductions in the field of oil and gas extraction and distribution:<sup>21</sup>

- **Overgas AD**

Type of support: ERUPT programme 5

Amount of support: SenterNovem purchases the emission reduction of this project, namely 300,000 ERU's

Period: 2005-2011

Objective: The Project envisages essentially:

- the construction of a 10 bar and 16 bar gas distribution network (11 km);
- the construction of a 4 bar gas distribution network (175 km);
- switch of end users to natural gas;
- the construction of the gas distribution network starts in 2005 and will finish in 2011.

- **Overgas AD**

Partners: Sofiagas and Overgas Engineering AD

Type of support: ERUPT programme 4

Amount of support: SenterNovem purchases the emission reduction of this project, namely 500,000 ERU's

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<sup>1</sup> An Emission Reduction Unit (ERU) is equivalent to one tonne of CO<sub>2</sub> reduced.

Period: 2004-2008

Objective: The project aims to reduce GHG emissions in the region of Sofia Municipality, Bulgaria, by substituting solid and liquid fuels for natural gas as well as by improving the energy efficiency of end-users' combustion installations. The project includes construction of a gas distribution network in Sofia Municipality.

- **Overgas AD**

Partners: Gastec BG AD, the Bulgarian Centre for Gas and Overgas Engineering AD

Type of support: ERUPT programme 3

Amount of support: SenterNovem purchases the emission reduction of this project, namely 350,000 ERU's

Period: 2004-2005

Objective: Gasification of the towns of Veliko Tarnovo, Gorna Oryahovitsa and Lyaskovets, Bulgaria, started alongside with the design and construction of the 50 km gas main branches and two Automatic Gas Regulation Stations. The project envisages the construction of 200 km gas distribution network of steel and polyethylene gas pipes, 9 690 ancillary facilities and the re-equipment of the end users installations.

- **Stadtwerke Herne**

Type of support: ERUPT programme 5

Amount of support: SenterNovem purchases the emission reduction of this project, namely 250,000 ERU's

Period: 2005

Objective: In the project coal mine gas from an abandoned coal mine is utilised in 3 cogeneration gas-engines with a total capacity of 4.05 MW.

## 2.6 Summary

Oil and gas companies in the Netherlands can receive some public money for investments, research and development and export. Overall investments aim to stimulate sustainable energy, use of renewable energy resources and climate neutral projects. We did not find direct investments of the Dutch government in fossil fuel production. Carbon capture and storage projects are mostly related to the development of technologies of zero emission power plants. But we also found a recent subsidy for carbon storage of the carbon dioxide produced by the Shell refinery.

0 provides a summary of the Dutch public money investments that have been made in the production and primary processing of fossil fuels in the last five years.



**Table 4 Overview of Dutch public money for fossil fuels 2004-2008, in millions.**

	2004	2005	2006	2007	2008	Year not specified	Total
<b>R&amp;D subsidies</b>	€ 22.9	€ 19.7	€ 20.8	€ 50.8	-	-	€ 114.2
<b>Export guarantees</b>	€ 126.1	€ 160.2	€ 22.5	€ 26.4	€ 126.4	-	€ 461.6
<b>Tax rebates and reduction<sup>1</sup></b>	-	-	€ 9.2	€ 20.3	-	-	€ 29.5
<b>Development aid</b>	-	-	-	-	-	€ 54.5	€ 54.5
<b>Carbon Credits<sup>2</sup></b>	-	-	-	-	-	ERU 1.4	ERU 1.4

<sup>1</sup> Estimated tax relief is equivalent to 11% of investments in energy saving technologies.

<sup>2</sup> An Emission Reduction Unit (ERU) is equivalent to one tonne of CO<sub>2</sub> reduced. The costs of the projects in euros are unknown.

## Chapter 3 United Kingdom

### 3.1 R&D subsidies

#### 3.1.1 Carbon Capture and Storage (CCS) projects

Stimulating renewable energy and reducing greenhouse gasses is a priority for the UK government. We therefore found various subsidies on carbon capture and storage projects:

- **CCS Demonstration Competition**

Indeed the Department for Business, Enterprise and Regulatory Reform has launched a 'CCS Demonstration Competition' to support the world's first commercial scale CCS project using post combustion capture on a coal fired power station. It is intended that the winner of the competition will be announced at the end of 2009 and the project selected will be operational by 2014, making the UK a world leader in this globally important technology. But in 2008 one of the four pre-qualified companies, BP decided to withdraw from the competition. BP's withdrawal leaves Germany's E.On, Iberdrola-owned Scottish Power and a consortium of UK-based Peel Holdings and Danish energy firm Dong Energy in the running.<sup>22</sup>

- **Energy Technologies Institute**

The UK Energy Technologies Institute (ETI) considers CCS one of its future technology themes. With a potential billion pound budget for investment across a broad range of low carbon technologies, the ETI is bringing together government and some of the world's biggest companies with a view to accelerating the development of low-carbon energy technologies towards commercial deployment. ETI's target is to secure up to 11 private sector investors, each contributing up to £ 5 million per year for 10 years, with the UK Government matching these investments to create a potential £ 1.1 billion investment fund for new energy technologies. Companies who already have joined the ETI programmes: BP, Shell, EDF, EON, Rolls Royce and Caterpillar. One of the current programmes starting up now is the UK Storage Capacity Appraisal on CCS.<sup>23</sup>

- **North Sea Basin Task Force**

On 30 November 2005 it was agreed to establish a North Sea Basin Task Force (NSBTF), composed of public and private bodies from countries on the rim of the North Sea. Its mandate is to develop common principles for managing and regulating the transport, injection and permanent storage of CO<sub>2</sub> in the North Sea sub-seabed; and that these principles should enable cost-effective and environmentally responsible operations.

UK Membership is made up of: BERR, Defra, BGS, BP and Shell.

Norway Membership is made up of: The Ministry of Petroleum and Energy, The Ministry of the Environment, DnV, Statoil and Hydro.

Both the Dutch and German governments are invited.

In October 2007 the group approved a study on transport and storage infrastructure.

#### 3.1.2 Technology Strategy Board

Ensuring energy supply for the UK has caused a recent given priority to maximising oil and gas recovery, as can be concluded from Table 5.

**Table 5 Expenditure on ensuring the reliable supply and efficient use of clean, safe and competitively-priced energy, in million pounds.<sup>24</sup>**

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
<b>Resource Expenditure in DEL</b>	<b>Outturn</b>	<b>Outturn</b>	<b>Outturn</b>	<b>Outturn</b>	<b>Plans</b>	<b>Plans</b>	<b>Plans</b>
Energy Efficiency including Carbon Trust	0	0	9,000	6,000	0	0	0
Sustainable Energy Programmes	31,572	27,214	9,079	9,963	9,136	9,173	9,207
Non proliferation, including subscriptions to international organisations	18,671	20,431	18,013	17,875	20,001	20,501	21,201
Energy Watch	0	12,984	12,300	10,783	10,642	10,642	10,642
Licence fee income	-13,417	-13,081	-12,288	-11,084	-12,605	-12,605	-12,605
Maximising Oil and Gas Recovery	7,108	6,410	5,325	4,857	8,901	8,991	9,079
Other programmes	620	995	496	1,678	95	95	95
<b>Total Resource Expenditure</b>	<b>44,554</b>	<b>54,953</b>	<b>41,925</b>	<b>40,072</b>	<b>36,170</b>	<b>36,797</b>	<b>37,619</b>
<b>Capital Expenditure in DEL</b>							
Coal Investment Aid	29,307	18,038	4,116	1,521	0	0	0
Capital Grants for Sustainable Energy, and the Environment Transformation Fund	24,455	38,763	51,694	26,619	65,200	52,900	49,200
<b>Total Capital Expenditure</b>	<b>53,762</b>	<b>56,801</b>	<b>55,810</b>	<b>28,140</b>	<b>65,200</b>	<b>52,900</b>	<b>49,200</b>
<b>Total Expenditure</b>	<b>98,316</b>	<b>111,754</b>	<b>97,735</b>	<b>68,212</b>	<b>101,370</b>	<b>89,697</b>	<b>86,819</b>

The Technology Strategy Board manages a range of programmes and delivery mechanisms to drive innovation, including programmes for maximising oil and gas recovery:

- Collaborative research and development (the former Technology Programme in which over 700 CR&D projects have received investment since 2004, amounting to over £ 1 billion).
- Knowledge Transfer Networks (KTNs)
- Knowledge Transfer Partnerships (KTPs)
- Micro and Nanotechnology Centres
- International programmes (UK coordination role within EUREKA, responsible for the FP7 UK National Contact Point service).

At this moment companies are in the run for the January competition of the Technology Strategy Board, which has allocated an indicative investment of £ 5 million in innovative technology solutions to help in maximising recovery of UK's hydrocarbon resources.

We found the following companies using the Technology Programme:<sup>25</sup>

- **Schlumberger Cambridge**

Partners: Imperial College London and Process Systems Enterprise

Type of support: Technology Programme Spring 2004

Amount of support: £ 774,030 (€1,141,516)<sup>1</sup>, 49% of estimated total project costs

Period/Contract date: 45 months from start of the project in March 2005

Objective: New sensor systems and advanced thermo physical models will permit real-time distributed monitoring of reservoir fluid properties and enable advanced reservoir management strategies. Benefits will include control of injection processes (e.g. CO<sub>2</sub> for enhanced oil recovery or sequestration), increased hydrocarbon recovery, reduced environmental impact, and extended life for brown-field sites (e.g. North Sea).

<sup>1</sup> The conversion of pounds to euros is based on an average currency per year. For 2004: 1,47477; for 2005: 1,46271; for 2006: 1,46725; for 2007: 1,46206; and for 2008: 1,25968.

- **Doosan Babcock Energy Limited**  
Partners: Corus, E.ON UK Power Technology, Kande International, Phoenix Inspection, Sonatest, University of Paisley  
Type of support: Technology Programme Spring 2004  
Amount of support: £ 388,909 (€ 573,551), 49% of estimated total project costs  
Period/Contract date: 36 months from start of the project in March 2005  
Objective: Ultrasonic Scanning and Monitoring at Running Plant Temperatures (ULTRASMART). The project aims to develop advanced ultrasonic (UT) inspection technology for the detection and monitoring of flaws and degradation in high temperature pipework and pressure vessels. This offers the potential for saving operators millions of pounds through avoidance of scheduled /unscheduled plant shutdowns.
- **CaltecPhase 1**  
Partners: CaltecPhase 2, Cranfield University Phase 2, CranfieldPhase 1, Global Web Phase 2, Petrofac Facilities Management phase 2  
Type of support: Technology Programme Autumn 2004  
Amount of support: £ 1,051,559 (€ 1,550,807), 27% of estimated total project costs  
Period/Contract date: 54 months from start of the project in November 2005  
Objective: Demonstration of an entirely new environmentally friendly process for boosting production of low pressure oil and gas wells near the end of field life using the available energy on platforms.
- **Lion Engineering Services and Artificial Lift Co**  
Type of support: Technology Programme Autumn 2004  
Amount of support: £ 398,340 (€ 587,459), 40% of estimated total project costs  
Period/Contract date: 24 months from start of the project in December 2005  
Objective: to build and demonstrate a 3.8" diameter electrical submersible pump system which can be deployed through the existing well tubing without modification to that well, and be installed and recovered without a rig to finally pump up the last fluid or gas from the well.
- **Beta R&D and Sondex Wireline**  
Type of support: Technology Programme Autumn 2004  
Amount of support: £ 199,304 (€ 293,927), 40% of estimated total project costs  
Period/Contract date: 24 months from start of the project in November 2005  
Objective: Demonstration and testing of rechargeable batteries (used to power instrumentation for oil and gas exploration) which can operate up to 300°C without operating limitations
- **Compound Semiconductor Technologies**  
Partners: Cascade Technologies, Shell Research, University of Glasgow (EE+E), University of Glasgow (Physics), University of Sheffield  
Type of support: Technology Programme Spring 2005  
Amount of support: £ 1,038,811 (€1,519,479), 43% of estimated total project costs  
Period/Contract date: 36 months from start of the project in May 2006  
Objective: to create a compact, portable system that will be applied to oil & gas prospecting. In addition, the platform technology has far-reaching applications in environmental monitoring, emissions monitoring, pipeline leak detection, security, military counter measures and healthcare.
- **Gooch & Housego (Formally Sifam Fibre Optics)**  
Partners: EvanesCo, OptoSci, University of Strathclyde (Dept. of Electrical and Electronic Engineering)

Type of support: Technology Programme Spring 2005

Amount of support: £ 660,437 (€ 966,027), 55% of estimated total project costs

Period/Contract date: 36 months from start of the project in March 2006

Objective: High power fibre laser systems for remote gas detection. Target applications include the detection of accidental or deliberate leaks from gas, fuel and oil pipelines, toxic gases emissions for security and military applications and environmentally sensitive gas emissions.

- **Pera Innovation**

Partners: Chevron North Sea, Cranfield University, De Flow, Endress & Hauser, ROSS

Deeptech Initiatives, Scandpower Petroleum Technology

Type of support: Technology Programme Autumn 2005

Amount of support: £ 453,023 (€ 662,641), 50% of estimated total project costs

Period/Contract date: 27 months from start of the project in December 2006

Objective: Developing a novel slug optimal control system to extend well life, induce slug losses and increase oil production from UK brown fields.

- **Stingray Geophysical and EADS Defence and Security Systems**

Type of support: Technology Programme Autumn 2005

Amount of support: £ 1,195,563 (€ 1,748,761), 30% of estimated total project costs

Period/Contract date: 30 months from start of the project in June 2006

Objective: Applied research and experimental development of fibre-optic-based sensors to meet the requirements of seismic hydrophones and geophones for time-lapse, four-component (4D-4C) seismic-based permanent oil and gas reservoir monitoring.

- **MTEM and BP**

Type of support: Technology Programme Autumn 2005

Amount of support: £ 538,325 (€ 787,413), 48% of estimated total project costs

Period/Contract date: 24 months from start of the project in February 2007

Objective: to develop a method for monitoring hydrocarbon production, or carbon dioxide sequestration, in sub-sea reservoirs, using a low-cost multi-transient electromagnetic (MTEM) method.

- **OHM**

Partners: BP Plc, University of Southampton

Type of support: Technology Programme Autumn 2005 (£ 136,240), Research Council funding (£ 350,447)

Amount of support: £ 486,687 (€ 711,881), 72% of estimated total project costs

Period/Contract date: 27 months from start of the project in December 2006

Objective: to extend the application of marine controlled source electromagnetic (CSEM) survey to reservoir appraisal and monitoring, through the development of survey geometries and data analysis techniques. This technology can dramatically reduce the risk of drilling dry exploration wells.

- **GE Aviation Systems**

Partners: Gwent Electronic Materials, Sondex Wireline, Thermastrate, University of Oxford, Vibro-meter

Type of support: Technology Programme Spring 2006 (£ 192,135), Research Council funding (£ 104,830)

Amount of support: £ 296,965 (€ 434,373), 50% of estimated total project costs

Period/Contract date: 36 months from start of the project in March 2007

Objective: to extend the high temperature electronics packaging capability for down-well logging in the oil and gas industries to up to 250°C for a lifetime of up to 10 years.

- **MERL**  
Partners: Baker Oil Tools, Clwyd Comounders, Precision Polymer Engineering  
Type of support: Technology Programme Spring 2006  
Amount of support: £ 402,326 (€ 590,312), 50% of estimated total project costs  
Period/Contract date: 24 months from start of the project in December 2007  
Objective: to define which polymers are suitable for Enhanced Oil Recovery (EOR) applications and quantify material durability.
- **TUVNEL and Schlumberger**  
Type of support: Technology Programme Spring 2006  
Amount of support: £ 290,514 (€ 426,256), 50% of estimated total project costs  
Period/Contract date: 24 months from start of the project in April 2007  
Objective: to provide information vital to the production of heavy oil and the development of high viscosity multiphase flow technologies for use in the oil & gas industry through development of an innovative model and a Centre of Excellence for heavy oil flow.
- **Beta Research and Development and Sondex Wireline**  
Type of support: Technology Programme Spring 2006  
Amount of support: £ 245,919 (€ 372,872), 44% of estimated total project costs  
Period/Contract date: 30 months from start of the project in April 2007  
Objective: High energy density Power Source in Oil & Gas Exploration (HEDIPSOE): further developing the production processes of high density battery, qualifying it for down-hole use, integrating it with the instrumentation pack and conducting field trials.
- **BP Exploration Operating Company and University of Surrey**  
Type of support: Research Council funding  
Amount of support: £ 260,825 (€ 382,695), 31% of estimated total project costs  
Period/Contract date: 24 months from start of the project in February 2008  
Objective: Developing of Smart Injectable Nanoparticles (SIN), through which BP will optimise the operation of oil-wells, extend their lives and most importantly increase the fraction of recoverable reserves.
- **Durham University**  
Partners: CAST, M-I SWACO, NEWI, UCL  
Type of support: Technology Programme Spring 2007  
Amount of support: £ 820,941 (€ 1,200,264), 51% of estimated total project costs  
Period/Contract date: 36 months from start of the project in February 2008  
Objective: New Improved Muds from Environmental Sources (NIMES): to develop new drilling fluids (from biodegradable polymers) that will boost cost effective accessing of reserves, sustain and improve existing production and enhance the environmental requirements for production in the UK continental shelf (UKCS)

### 3.1.3 Research Councils' Energy Programme

The Research Councils' Energy Programme aims to position the UK to develop, embrace and exploit sustainable, low carbon and/or energy efficient technologies and systems. The Programme is co-ordinated by the Engineering and Physical Sciences Research Council (EPSRC). The Energy Programme aims to fund a diverse energy research portfolio. This portfolio is being developed in partnership with industry. The UK Research Councils receive a combined budget most of all from the Government's Science Budget, which is administered through the Department of Innovation, Universities and Skills (DIUS).

The already mentioned Energy Technology Institute (ETI) and the UK Energy Research Centre are both funded by the Research Councils Energy Programme. This programme also funds UK Technology Programme projects, mentioned in paragraph 3.1.2. An interesting research consortium funded by the Research Councils is on Carbon Capture and Storage.<sup>26</sup>

- **Imperial College London**

Partners: 13 other universities throughout UK  
Type of support: Research Council Energy Programme  
Amount of support: £ 2 million (€ 2.93 million)  
Period/Contract date: 3 years, from June 2005  
Objective: researching how to safely store carbon dioxide

### 3.2 Export credits and guarantees

On behalf of the UK government, the export credit agency ECGD manages public procedures for export guarantees provided by the British State. Since early 2004, ECGD provided the following export credit guarantees.<sup>27</sup>

- **Demag Delaval Industrial Turbomachinery**

Type of support: Export guarantee  
Amount of support: £ 36,048,402 (€ 53,163,101)  
Period/Contract date: 2003-2004  
Objective: OZ2 Pipeline Project for Sonatrach.

- **BP Exploration (Caspian Sea) and CB&I John Brown Limited**

Type of support: Export guarantee  
Financiers: Banking syndicate arranged by ABN Amro Bank, Citi, Mizuho Bank and Société Générale  
Amount of support: £ 81,703,893 (€ 120,494,450)  
Period/Contract date: 2003-2004  
Objective: Construction of the Baku-Tbilisi-Ceyhan Oil Pipeline passing through Azerbaijan, Georgia and Turkey for Baku-Tbilisi-Ceyhan (BTC) Pipeline Company, Azerbaijan.<sup>28</sup>

- **Diamond Offshore Drilling (UK)**

Type of support: Export guarantee  
Amount of support: £ 46,327,531 (€ 68,322,452)  
Period/Contract date: 2003-2004  
Objective: Drilling Offshore Exploration Wells, for Petroleo Brasileiro Sa (Petrobras), Brazil

- **Snamprogetti**

Type of support: Export guarantee  
Amount of support: £ 58,496,556 (€ 86,268,965)  
Period/Contract date: 2003-2004  
Objective: Styrene Monomer Production Plant, to Pars Petrochemical Company, Iran

- **CRI Catalyst Company UK**

Type of support: Export guarantee  
Amount of support: £ 9,814,488 (€ 14,474,112)  
Period/Contract date: 2003-2004  
Objective: Monoethylene Glycol Plant to Jam Petrochemical Company, Iran

- **Pipeline Tube and Casing**  
 Type of support: Export guarantee  
 Amount of support: £ 655,879 (€ 967,270)  
 Period/Contract date: 2003-2004  
 Objective: Pipes, Fittings, Flanges, Valves, Gaskets, Bolts to Fajr Petrochemical Company, Iran
- **Johnson Matthey Plc**  
 Type of support: Export guarantee  
 Amount of support: £ 544,304 (€ 802,723)  
 Period/Contract date: 2003-2004  
 Objective: Chemical Catalysts to Razi Petrochemical Company, Iran
- **Balcke Marley UK**  
 Type of support: Export guarantee  
 Amount of support: £ 644,440 (€ 950,400)  
 Period/Contract date: 2003-2004  
 Objective: Cooling Towers, to Shahid Tondgooyan Petrochemical Company, Iran
- **Pipeline Tube and Casing**  
 Type of support: Export guarantee  
 Amount of support: £ 947,823 (€ 1,397,820)  
 Period/Contract date: 2003-2004  
 Objective: Carbon Steel Pipes to Fajr Petrochemical Company, Iran
- **Capital Valves**  
 Type of support: Export guarantee  
 Amount of support: £ 855,224 (€ 1,261,258)  
 Period/Contract date: 2003-2004  
 Objective: Valves for Hydrogen Peroxide Plant, to Iran Petrochemical Commercial Company, Iran
- **Capital Valves**  
 Type of support: Export guarantee  
 Amount of support: £ 1,603,745 (€ 2,365,155)  
 Period/Contract date: 2003-2004  
 Objective: Valves for C2 Gathering and Transmission line for Supplying Petrochemical Industries, Equipment & Chemicals Company, Iran
- **Sembcorp Simon-Carves**  
 Type of support: Export guarantee  
 Amount of support: £ 17,253,669 (€ 25,445,193)  
 Period/Contract date: 2003-2004  
 Objective: Factory upgrade for Petroquimica Cangrejera SA de CV, Mexico
- **MAN Limited**  
 Type of support: Export guarantee  
 Amount of support: £ 48,383,094 (€ 70,770,435)  
 Period/Contract date: 2004-2005  
 Objective: South Pars Gas Field stage 9 & 10 Onshore, to National Iranian Oil Company (NIOC)



- **Salzgitter Mannesmann (UK) Limited**  
 Type of support: Export guarantee  
 Amount of support: £ 17,560,418 (€ 25,685,799)  
 Period/Contract date: 2004-2005  
 Objective: South Pars Gas Field stage 9 & 10 Offshore, to National Iranian Oil Company (NIOC)
- **Capital Valves Limited**  
 Type of support: Export guarantee  
 Amount of support: £ 263,779 (€ 385,832)  
 Period/Contract date: 2004-2005  
 Objective: Supply Of Valves For C2 Gathering & Transmission Line in Iran, Marun Petrochemical Company
- **Alderley Systems**  
 Type of support: Export guarantee  
 Amount of support: £ 11,078,145 (€ 16,204,113)  
 Period/Contract date: 2004-2005  
 Objective: Supply Of Hydrocarbon Liquid, Custody Metering Packages, to Mobin Petrochemical Company
- **Kellogg Brown & Root Limited**  
 Type of support: Export guarantee  
 Amount of support: £ 6,636,455 (€ 9,707,209)  
 Period/Contract date: 2004-2005  
 Objective: Engineering Services For Alibekmola Oil Field, to Kazakhoil Aktobe L.L.P
- **Petrobras**  
 In the period 2005-2006, ECGD provided support for a US\$ 52 million loan by unidentified banks for the P52 platform off-shore of Brazil, one of the world's largest floating oil platforms. The P52 will be installed in the Roncador Oil Field, 125km off the southeast coast of Brazil. The borrower for the P52 project is Petrobras Netherlands, a subsidiary company of Petrobras, the Brazilian state-owned oil company. The ECGD support for the loan consisted of the following export guarantees to four UK companies:

  - **Rolls-Royce Power Engineering plc**  
 Type of support: Export guarantee  
 Maximum guarantee: £ 31,964,268 (€ 46,754,454)  
 Period/Contract date: 2005-2006  
 Objective: Power Generation Modules for the P52 project, to Petrobras Netherlands
  - **VWS Westgarth**  
 Type of support: Export guarantee  
 Maximum guarantee: £ 7,768,717 (€ 11,398,650)  
 Period/Contract date: 2005-2006  
 Objective: Sulphate Reduction for P52 project, to Petrobras Netherlands
  - **Koch Chemical Technology Group**  
 Type of support: Export guarantee  
 Maximum guarantee: £ 2,513,830 (€ 3,688,417)  
 Period/Contract date: 2005-2006  
 Objective: Vacuum Deaeration for P52 project, to Petrobras Netherlands

- **Invsat**

Type of support: Export guarantee

Maximum guarantee: £ 1,578,285 (€ 2,315,738)

Period/Contract date: 2005-2006

Objective: Telecom Package for P52 project, to Petrobras Netherlands

- **SLP Engineering Limited.**

Type of support: Export guarantee

Amount of support: £ 13,275,285 (€ 19,409,263)

Period/Contract date: 2006-2007

Objective: KMZ Oil Field Offshore Accommodation Platform to Pemex Exploracion y Produccion, Mexico

### **3.3 Tax rebates and reductions**

The UK introduced a new oil tax regime in 2002 that hiked tax on production profits but favoured those willing to invest in squeezing the last drops from older fields has accelerated the trend in the North Sea. But in 2005 the British chancellor John Brown, now prime minister, announced a tax rise for North Sea oil producers starting on January 1, 2006.<sup>29</sup>

We did not find any special tax rebates for the oil and gas industry, except the following that might be possible in 2009.

- **Island Gas**

Type of support: possible different fiscal treatment

Amount of support: unknown

Period/Contract date: From 2009

Objective: generating electricity from its coal bed methane gas site in northwest England. The gas should ultimately be passed into the local distribution network.<sup>30</sup>

### **3.4 Development aid**

#### **3.4.1 Emerging Africa Infrastructure Fund**

The Emerging Africa Infrastructure Fund (EAIF) is a Public Private Partnership able to provide long-term denominated debt or mezzanine finance on commercial terms to finance the construction and development of private infrastructure in Africa. EAIF was initiated by the Private Infrastructure Development Group (PIDG), whose founding members are the UK Government's Department for International Development (DFID), the Netherlands Ministry of Foreign Affairs (DGIS), the Swiss State Secretariat for Economic Affairs (SECO) and the Swedish International Development Corporation Agency (SIDA). These PIDG members provide equity to EAIF through the PIDG Trust. Senior and subordinated debt is provided by commercial lenders and Development Finance Institutions (DFIs, amongst others the Dutch FMO).<sup>31</sup>

- **Eleme Petrochemicals**

Country: Nigeria

Type of support: loan from the Emerging Africa Infrastructure Fund of DFID

Amount of support: US\$ 20 million (€ 15,8 million)

Period/Contract date: The project was signed in February 2007

Objective: This project forms part of Nigeria's privatisation programme support. EAIF has committed a US\$ 20 million loan to support the privatisation of this petrochemical plant as part of a total financing package of US\$ 160 million. The project will contribute significantly to the rehabilitation of Nigeria's infrastructure, including through import substitution, privatisation demonstration effects and a community programme bringing power to an area of 50,000 people.

### 3.4.2 CDC Group

CDC Group is a UK state-owned investment company for economic development. CDC invests in Africa, Asia and Latin America. We found the following companies in the oil- and gas industry supported by CDC, but we did not find the actual amounts of investments:

- **Kosan Crisplant**

Type of support: equity participation via Central Africa Growth Fund SICAR, Cameroun

Amount of support: unknown

Period/Contract date: unknown

Objective: Kosan Crisplant is active in gas storage and distribution

- **LMKR Holdings**

Type of support: equity participation via Actis South Asia Fund 2

Amount of support: unknown

Period/Contract date: unknown

Objective: LMKR Holdings provides information management solutions to the oil and gas industry in Pakistan

### 3.5 Coal Investment Aid

The Government's intention to offer Coal Investment Aid (CIA) was announced on 3 March 2003. CIA was launched on 16 June 2003, with a budget of up to £ 60 million to be allocated in three application periods and spent by 31 December 2008.

**Table 6 Total UK spending on Coal Investment Aid<sup>32</sup>**

<b>Colliery</b>	<b>Total spent 2003-2008</b>
Daw Mill	£10,860,000
Eckington	£ 176,171
Ellington (Mine is closed)	£ 849,620
Energybuild/Aberpergwm	£ 3,501,977
Harworth	£ 4,201,556
Hay Royds	£ 135,842
Kellingley	£ 9,500,653
Maltby	£ 5,148,254
Rossington (Mine is closed)	£ 2,687,075
Thoresby	£ 4,973,923
Tower	£ 2,991,764
Welbeck	£ 7,785,898
<b>All projects</b>	<b>£ 52,812,733</b>
<b>Total in euros</b>	<b>€ 75,273,670</b>

### 3.6 Summary

Table 7 provides a summary of the British public money investments that have been made in the production and primary processing of fossil fuels in the last five years.

**Table 7 Overview of British public money in 2004-2008 for subsidies in the oil and gas sector, in millions.**

	2004	2005	2006	2007	2008	Year not specified	Total
<b>R&amp;D subsidies</b>	€ 4.1	€ 6.4	€ 2.2	€ 1.2	-	-	€ 13.9
<b>Investment subsidies</b>	-	-	-	-	-	€ 75.2	€ 75.2
<b>Export guarantees<sup>1</sup></b>	€ 375.9	€ 122.7	€ 64.1	€ 19.4	-	-	€ 582.1
<b>Tax rebates and reduction</b>	-	-	-	-	-	-	-
<b>Development aid</b>	-	-	-	-	-	€ 15.8	€ 15.8

<sup>1</sup> For the year 2004 we used the list of 2003-2004, for the year 2005 the list of 2004-2005 and so on.

## Chapter 4 European Union

### 4.1 R&D subsidies

#### 4.1.1 Carbon Capture and Storage (CCS) projects

We found the following projects receiving a subsidy on carbon storage project development:<sup>33</sup>

- **C3-CAPTURE**

Coordinator: Universität Stuttgart

Partners: Alstom, Cemex, Endesa, Poludniowy Koncern Energetyczny, and 7 research institutions.

Type of support: subsidy within the 6<sup>th</sup> Framework Programme (FP6)

Amount of support: € 1.8 million

Period: 2005-2008

Objective: development of a dry CO<sub>2</sub> capture system for atmospheric and pressurized fluidized bed boilers. The atmospheric option will be developed towards a pilot plant application.

- **CACHET**

Coordinator: BP Exploration Operating Company

Partners: 28 organisations including the following large companies: ENI, Chevron, Technip, Suncor Energy, Shell, Petrobras, Norsk Hydro, ConocoPhillips, Alstom, Endesa, E.ON, and Siemens.

Type of support: subsidy within the 6<sup>th</sup> Framework Programme (FP6)

Amount of support: € 7.5 million

Period: 2006-2009

Objective: development of technologies to significantly reduce the cost of CO<sub>2</sub> capture from natural gas with H<sub>2</sub> production.

- **CAESAR**

Coordinator: Energy Research Centre of The Netherlands

Partners: BP Exploration Operating Company, Politecnico di Milano, Air Products PLC, and SINTEF.

Type of support: subsidy within the 7<sup>th</sup> Framework Programme (FP7)

Amount of support: € 2.26 million

Period: 2008-2011

Objective: building on work performed in the CACHET project. Aims at reduction of energy penalty and costs of the Sorption Enhanced Water Gas Shift (SEWGS) CO<sub>2</sub> capture process through optimization of sorbent materials, reactor- and process design.

- **CAPRICE**

Coordinator: TNO

Partners: Vattenfall, E.ON, Dong Energy Generation, IFP, and 7 research institutions.

Type of support: subsidy within the 6<sup>th</sup> Framework Programme (FP6)

Amount of support: € 0.4 million

Period: 2007-2008

Objective: international cooperation and exchange in the area of CO<sub>2</sub>-capture using amine processes with the long-term aim to contribute to the implementation of these technologies on a large scale. The overall objective is to be achieved through cooperation between a core-team from the on-going CASTOR Integrated Project and a Canadian consortium linked to the International Test Centre on CO<sub>2</sub>-capture at the University of Regina in Canada.

- **CASTOR**

Coordinator: Institut Français du Pétrole (IFP)

Partners: 30 organisations including the following large companies: Vattenfall, BASF, Alstom, Statoil, Siemens, Repsol, Gaz de France and RWE.

Type of support: subsidy within the 6<sup>th</sup> Framework Programme (FP6)

Amount of support: € 8.5 million

Period: 2004-2008

Objective: capture and storage of CO<sub>2</sub> associated with cleaner fossil fuel plants.

- **CO2GeoNet**

Coordinator: British Geological Survey

Partners: 13 research institutions, no (energy) companies involved.

Type of support: subsidy within the 6<sup>th</sup> Framework Programme (FP6)

Amount of support: € 6 million

Period: 2004-2009

Objective: research activity in the area of geological CO<sub>2</sub> storage to integrate, strengthen, and build upon the momentum of previous and existing European R&D.

- **CO2REMOVE**

Coordinator: TNO

Partners: 26 organisations including the following large companies: Vattenfall, Total, Statoil, and BP.

Type of support: subsidy within the 6<sup>th</sup> Framework Programme (FP6)

Amount of support: € 8.3 million

Period: 2006-2011

Objective: development of: 1) Methods for base-line site evaluation, 2) New tools to monitor storage and possible well and surface leakage, 3) New tools to predict and model long term storage behaviour and risks, 4) A rigorous risk assessment methodology for a variety of sites and time-scales, 5) Guidelines for best practice for the industry, policy makers and regulators This will encourage wide-spread application of CO<sub>2</sub> geological storage in Europe and neighbouring countries.

- **CO2SINK**

Coordinator: GeoForschungsZentrum Potsdam

Partners: E.ON, Verbundnetz Gas, RWE, Shell, Statoil, Det Norske Veritas, Vattenfall, Siemens, and 8 small companies and research institutions.

Type of support: subsidy within the 6<sup>th</sup> Framework Programme (FP6)

Amount of support: € 8.7 million

Period: 2004-2009

Objective: gaining more understanding of the science of CO<sub>2</sub> capture by injection of CO<sub>2</sub> into an onland saline aquifer underneath the city of Ketzin near Berlin. It involves intensive monitoring of the fate of the injected CO<sub>2</sub> using a broad range of geophysical and geo-chemical techniques.

- **DECARBIT**

Coordinator: SINTEF

Partners: 16 organisations including the following large companies: Shell, Air Liquide, Alstom, Enel, and Siemens.

Type of support: subsidy within the 7<sup>th</sup> Framework Programme (FP7)

Amount of support: € 10.2 million

Period: 2008-2011

Objective: development in advanced pre-combustion capture techniques to be used in large scale carbon capture and storage (CCS) plants.

- **ENCAP**

Coordinator: Vattenfall

Partners: 33 organisations including the following large companies: Linde Group, Alstom, Public Power Corporation of Greece, RWE, Statoil, Siemens, and Mitsui Babcock.

Type of support: subsidy within the 6<sup>th</sup> Framework Programme (FP6)

Amount of support: € 10.7 million

Period: 2004-2009

Objective: development of new pre-combustion CO<sub>2</sub> capture technologies and processes for power generation. It aims at technologies which meet a target of at least a 90% CO<sub>2</sub> capture rate and a reduction in the cost of capture of 50% compared to present. The results from ENCAP will enable power companies to decide to launch a new design project by 2008-2010 aimed at a large demonstration plant with the potential for wide commercial exploitation in the horizon of 2015-2020.

#### **4.1.2 Transport**

We found one project receiving a subsidy on research regarding transport of gas mixed with hydrogen:<sup>34</sup>

- **NATURALHY**

Coordinator: Nederlandse Gasunie

Partners: 39 organisations including the following large companies: Total, Shell, Statoil, GDF Suez, and BP.

Type of support: subsidy within the 6<sup>th</sup> Framework Programme (FP6)

Amount of support: € 11 million

Period: 2004-2009

Objective: to investigate the performance and safety limits for mixing hydrogen with natural gas and distributing the mix in existing local gas pipeline networks.

#### **4.2 Tax rebates and reductions**

As the EU does not levy tax from companies, there are no tax rebates and reductions to oil, gas and coal production, distribution and primary processing companies.

#### **4.3 Development aid**

We did not find any EU development aid provided to oil, gas and coal production, distribution and primary processing companies.

#### **4.4 Other**

##### **4.4.1 Loans provided by the European Investment Bank**

The European Investment Bank (EIB) is the long-term lending bank of the European Union. The EIB provides loans to companies and projects. Table 8 lists the loans provided by the EIB to oil, gas and coal producers, transporters and primary processors since 2004.

Almost all of the loans are provided to gas-related activities, mostly for the construction of pipelines and transmission grids.

**Table 8 EIB lending to oil, gas and coal producers, transporters and primary processors (2004-2009)<sup>35</sup>**

<b>Date signed</b>	<b>Recipient</b>	<b>Country of recipient</b>	<b>EIB Loan amount (€ million)</b>	<b>Objective</b>
<i>pending</i>	National Grid	United Kingdom	+/- 400	Rehabilitation & improvement of National Grid's gas distribution network covering four gas distribution networks
<i>pending</i>	Gasunie	Netherlands	125	Expansion and de-bottlenecking of Dutch gas transmission system, comprising laying of 300 km of gas pipelines and construction of two compressor stations
Dec '08	Fluxys	Belgium	+/- 500	Upgrade of Fluxys' gas transmission grid
Dec '08	Enagás	Spain	350	Upgrading and extension of gas transmission network in Spain
Dec '08	Northern Gas Networks Limited	United Kingdom	181	Expansion and upgrading of gas distribution network in north-east England
Nov '08	E.ON	Germany	500	Investment in new and existing underground natural gas storage facilities in north-west Germany (Epe and Etze) and Upper Austria on German border
Oct '08	Galp Energia	Portugal	50	Construction of natural gas-fired industrial cogeneration plant on site of Porto refinery
Oct '08	EGAS & GASCO	Egypt	250	Extension of national high-pressure gas transmission network with 835 km of pipelines
July '08	Vopak & Gasunie	Netherlands	142	Construction of LNG terminal at port of Rotterdam
June '08	Gasunie	Netherlands	375	Expansion and de-bottlenecking of Dutch gas transmission system, comprising laying of 300 km of gas pipelines and construction of two compressor stations
April '08	STEG	Tunisia	60	Development of Tunisia's natural gas transmission and distribution network
March '08	National Grid	United Kingdom	183	Third phase of development of LNG import terminal on Isle of Grain
Dec '07	DEPA	Greece	65	Expansion of Greece's natural gas network
Nov '07	ENI	Italy	185	Expansion of capacity of Transmed gas pipeline connecting Algeria to Italy via Tunisia
Nov '07	CORES	Spain	66	Construction and operation of storage tanks for strategic oil reserves



<b>Date signed</b>	<b>Recipient</b>	<b>Country of recipient</b>	<b>EIB Loan amount (€ million)</b>	<b>Objective</b>
July '07	Plinacro	Croatia	190	Expansion and upgrading of gas distribution network in Croatia
July '07	Galp Energia	Portugal	58	Construction and operation of gas-fired cogeneration plant on site of oil refinery in Sines
Feb '07	National Grid	United Kingdom	558	Upgrading of national gas transmission network in south Wales and north-east England
Dec '06	GASCO	Egypt	50	Construction of gas transmission pipeline between Abu Qurqas and Asyut in south of Egypt
Dec '06	Republic of Ghana	Ghana	75	Construction of pipeline system for transporting natural gas from Nigeria to Ghana, Togo and Benin
Dec '06	Bord Gáis	Ireland	250	Construction of a gas pipeline linking Ireland to Northern Ireland; extension and renovation of gas distribution networks in both countries
Feb '06	DEPAS	Greece	23	Expansion of liquefied natural gas terminal on Revithoussa island
Feb '06	DEPAS	Greece	22	construction and operation of an 85-km long gas transmission pipeline that will link the Greek and Turkish national gas systems
Dec '05	Dong Energy	Denmark	100	Development of Ormen Lange subsea gas field (off coast of Norway), gas production and transport to receiving terminal in Easington (UK)
Dec '05	ENI	Italy	185	Renewal and expansion of gas distribution infrastructure of Italgas, a ENI subsidiary
Nov '05	National Grid	United Kingdom	177	Second phase of development of liquefied natural gas import terminal on Isle of Grain
Nov '05	Companhia Moçambicana de Gasoduto	Mozambique	35	Gas field development and construction of gas pipeline from Mozambique (Secunda) to South Africa
July '05	GASCO	Egypt	50	Construction of two natural gas pipelines between El Tina and Abu Sultan and between Dashour and El Kureimat
Dec '04	Neste Oil	Finland	150	Technical upgrading of Porvoo refinery in south east of country
Dec '04	British government	United Kingdom	500	Gas production in Norway and importation of Norwegian gas to United Kingdom ("Britpipe")
Oct '04	Companhia Moçambicana de Gasoduto	Mozambique	10	Development of two gas fields in Mozambique and construction of gas pipeline from field area to Secunda in

Date signed	Recipient	Country of recipient	EIB Loan amount (€ million)	Objective
Sept '04	Dong Energy	Denmark	67	South Africa Interconnection of Danish and Dutch natural gas transmission networks in the North Sea
Aug '04	ENI	Italy	300	Development of indigenous Italian gas resources in the Adriatic and Ionian seas
June '04	Enagás	Spain	450	Upgrading and extension of gas transmission network throughout Spain
June '04	EGAS	Egypt	100	Construction of a 393 km south-north gas pipeline across Jordan (Aqaba to Rehab)

#### 4.4.2 European recovery plan

On 20<sup>th</sup> of March 2009 the European Council agreed on a € 5 billion European recovery plan, which was under heavy discussions within the last months. The available funds will be committed in the years 2009 and 2010. About € 1.02 billion will be invested in broad band internet connections and rural development measures. The majority of the money, € 3.98 billion, will be spent on energy projects, including over € 1.25 billion for CCS projects, € 890 million for key strategic interconnections in the power grid, and € 565 million for offshore wind projects.

Possibly the Nabucco gas pipeline (through the Caspian Sea) is on the list of projects to be financed by the recovery plan. About € 180 million is reserved for CCS projects in the Netherlands, including the already mentioned storage project of Shell in Barendrecht.<sup>36</sup>

#### 4.5 Summary

Table 9 provides a summary of European public money investments that have been made in the production and primary processing of fossil fuels in the last five years.

**Table 9 Overview of EU public money for fossil fuel production (2004-2009, in millions)**

	2004	2005	2006	2007	2008	Planned	Total
<b>R&amp;D subsidies<sup>1</sup></b>	€ 44.9	€ 1.8	€ 15.8	€ 0.4	€ 12.5	-	€ 75.4
<b>Tax rebates and reduction</b>	-	-	-	-	-	-	-
<b>Development aid</b>	-	-	-	-	-	-	-
<b>Loans by the EIB</b>	€ 1,577	€ 547	€ 420	€ 1,122	€ 2,591	€ 525	€ 6,782
<b>European recovery plan</b>	-	-	-	-	-	€ 1,250	€ 1,250

<sup>1</sup> For the year 2004 we list the projects that started in 2004, for the year 2005 the projects that started in 2005 and so on.

## Chapter 5 Conclusions

### 5.1 R&D subsidies

In Table 10 we have summarized the R&D subsidies for the production and primary processing of fossil fuels per country.

**Table 10 R&D subsidies to fossil fuels in the European Union and three member states (2004-2008, in millions).**

	2004	2005	2006	2007	2008	Total
<b>France</b>	-	-	€ 3.2	€ 4.2	€ 4.8	€ 12.2
<b>Netherlands</b>	€ 22.9	€ 19.7	€ 20.8	€ 50.8	-	€ 114.2
<b>United Kingdom</b>	€ 4.1	€ 6.4	€ 2.2	€ 1.2	-	€ 13.9
<b>European Union</b>	€ 44.9	€ 1.8	€ 15.8	€ 0.4	€ 12.5	€ 75.4

It is remarkable that in total the R&D subsidies of the Netherlands are highest, even more than those provided by the European Union. Most of this public money is spent on research on “clean fossil fuels” and on the technology of Carbon Capture and Storage (CCS).

All countries and the European Union invest in CCS, now often the main objective for R&D subsidies. In the United Kingdom programmes for maximising oil and gas recovery are also an important part of R&D subsidies.

### 5.2 Export credits and guarantees

In Table 11 we have summarized the export credits and guarantees granted by each country to support exports of equipment and supplies for the production and primary processing of fossil fuels. The European Union does not provide export credits and guarantees.

**Table 11 Export guarantees by three member states to fossil fuel production (2004-2009, in millions)**

	2004	2005	2006	2007	2008	Total
<b>France</b>	€ 230.2	€ 11.2	€ 119.7	€ 31.6	-	€ 392.7
<b>Netherlands</b>	€ 126.1	€ 160.2	€ 22.5	€ 26.4	€ 126.4	€ 461.6
<b>United Kingdom</b>	€ 375.9	€ 122.7	€ 64.1	€ 19.4	-	€ 582.1

In France, the Netherlands and the United Kingdom we mainly found export guarantees, no export credits.

Some of the major projects to which the export guarantees are provided are:

- the P52 platform off-shore of Brazil, one of the world’s largest floating oil platforms (€ 64.1 million);
- the Baku-Tbilisi-Ceyhan oil pipeline (BTC) passing through Azerbaijan, Georgia and Turkey (€ 204.5 million);
- Yemen LNG Project (€ 119.7 million); and
- the South Pars Gas Field stage 9 & 10, located in the Persian Gulf (€ 215.0 million).

### **5.3 Tax rebates and reduction**

We only found a tax reduction programme in the Netherlands. This tax relief programme gives a direct financial advantage to Dutch companies that invest in energy-saving equipment and sustainable energy. Oil and gas producing companies also profit from this programme.

Both in the Netherlands and the United Kingdom tax relief can be expected the next years for mine companies that invest in marginal oil fields in the North Sea.

Fiscal agreements with individual companies probably exist, but no specific information could be found.

### **5.4 Development aid**

Development funds are hardly invested in the production and primary processing of fossil fuels. In France the aim of energy projects of the French development bank AFD is to develop rural areas with for example solar energy or hydropower. Both the Netherlands and United Kingdom ministries responsible for development aid are involved in the Emerging Africa Infrastructure Fund, who provided a loan for the privatisation of a petrochemical plant in Nigeria. And also the Dutch Development Finance Institute FMO is involved in this fund.

Besides that FMO stimulates investments of Dutch companies in emerging markets. As a result it participates in the Vietnam Fund, which invests in the oil and gas sector of Vietnam and in project company Artumas, active in Tanzania where it is developing a fully integrated energy project.

The amounts of investments we found are marginal, making the role of development aid in the fossil fuel production negligible.

### **5.5 Other investments**

The Dutch government purchases emission reduction rights via the Joint Implementation (JI) and Clean Development Mechanisms (CDM) of the Kyoto Protocol. Partly these emission reduction rights are acquired from oil and gas companies.

Public money of the European Union is mostly spent through loans of the European Investment Bank. For the period 2004-2009 loans with a total amount of € 6,257 million were provided to the production and primary processing of fossil fuels. Almost all of the loans are provided to gas-related activities, mostly for the construction of pipelines and transmission grids. Besides that there are planned investments in the energy sector (€ 2,140 million) within the European recovery plan that came into being very recently on 20 March 2009.

A major part of the public money to the fossil fuel sector in the United Kingdom is spent through the Coal Investment Aid and represents € 37.0 million in the period of 2004-2008.

### **5.6 Overview**

The following table presents an overview of public money spent in the oil and gas sector from 2004 until 2009 by France, the Netherlands, United Kingdom and the European Union.

**Table 12 Public money in European Union and three member states for fossil fuels in 2004-2008, in millions.**

	R&D subsidies	Export guarantees	Tax rebates and reduction	Development aid	Other	Total
<b>France</b>	€ 12.2	€ 392.7	-	-	-	€ 404.9
<b>Netherlands</b>	€ 114.2	€ 461.6	€ 29.5	€ 54.5	ERU 1.4 <sup>1</sup>	€ 659.8
<b>United Kingdom</b>	€ 13.9	€ 582.1	-	€ 15.8	€ 75.2 <sup>2</sup>	€ 687.0
<b>European Union</b>	€ 75.4	-	-	-	€ 8,032 <sup>3</sup>	€ 8,107.4

As the table shows, export guarantees are the most significant form of public expenditure of the individual countries to the production and primary processing of fossil fuels. The Netherlands show a remarkable high expenditure on research and development, of which most is spent on new technologies as Carbon Capture and Storage and clean fossil fuels. Loans provided by the European Investment Bank are the most significant form of public expenditure of the European Union to the production and primary processing of fossil fuels.

## 5.7 Companies

A lot of different companies are mentioned in this report and some of them more than others. The companies Technip and Amec Spie profit from the advantages of French export guarantees very often. In the United Kingdom Pipeline Tube and Casing and Capital Valves are also mentioned more than others. The company Overgas has often applied the Dutch carbon credit programme to its projects.

Many large oil companies are involved in projects where public money is invested in: BP, ENI, GDF Suez, Petrobras, Repsol, Shell, Sonatrach, Statoil, and Total. These companies are mostly involved in R&D projects, as partners of (public) research institutes. This does not mean that R&D investments flow directly to these companies. It is even possible that companies invest in the project themselves. However, eventually the companies will probably benefit from the results of the research.

In the following table we present an overview of companies that benefit from public money, direct and indirect.

**Table 13 Overview of subsidies for major oil companies, in millions**

	Direct subsidies	Indirect subsidies <sup>4</sup>	Total subsidies
BP	€ 120.5	€ 60.1	€ 180.6
ENI	€ 670.0	€ 7.5	€ 677.5
GDF Suez	-	€ 42.2	€ 42.2
Petrobras	-	€ 105.7	€ 105.7

<sup>1</sup> Carbon Credits programme. An Emission Reduction Unit (ERU) is equivalent of one tonne of CO<sub>2</sub> reduced

<sup>2</sup> Coal Investment Aid

<sup>3</sup> Loans provided by the European Investment Bank (EIB) and the projected investments of the European Recovery Plan

<sup>4</sup> These numbers are often a sum of different research projects in which the company participates, with partners varying from 2 to 39

	<b>Direct subsidies</b>	<b>Indirect subsidies<sup>4</sup></b>	<b>Total subsidies</b>
Repsol	-	€ 8.5	€ 8.5
Shell	€ 30.0	€ 38.9	€ 68.9
Sonatrach	-	€ 53.1	€ 53.1
Statoil	-	€ 47.2	€ 47.2
Total	-	€ 142.7	€ 142.7

## Appendix 1 References

- 1 Website Agence Nationale de la Recherche ([www.anr.fr](http://www.anr.fr)), Viewed in February 2009.
- 2 ADEME Annual Report 2007, ADEME, Angers, November 26, 2008.
- 3 Website BGRM ([www.brgm.fr](http://www.brgm.fr)), Viewed in February 2009.
- 4 Website CNRS (<http://www2.cnrs.fr/en/8.htm>), Viewed in February 2009.
- 5 IFP Annual Report 2007, IFP, July 2008.
- 6 Website Agence Nationale de la Recherche ([www.anr.fr](http://www.anr.fr)), Viewed in February 2009; Website IFP ([www.ifp.fr](http://www.ifp.fr)), Viewed in February 2009.
- 7 Website BRGM (<http://www.brgm.fr/brgm//CO2-en/national.htm>), Viewed in February 2009.
- 8 Quarterly reports Coface on export credit guarantees, Coface, Paris.
- 9 BTC Signs Project Finance Agreements, Press Release BTC Co., 3 February 2004; BTC: Pipeline politics, Project Finance Magazine, London, March 2004.
- 10 BTC Signs Project Finance Agreements, Press Release BTC Co., 3 February 2004; BTC: Pipeline politics, Project Finance Magazine, London, March 2004.
- 11 Middle East Syndicated Loans - news in brief: Yemen, Euroweek - Issue: 1048, London, 4 April 2008.
- 12 PriceWaterhouseCoopers, Monitoring publiek gefinancierd Energieonderzoek 2007, August 2008.
- 13 De Volkskrant, René Didde, Franse energiewinner slaat CO<sub>2</sub> op in onderzeese reservoirs, 12 March 2005.
- 14 Het Financieele Dagblad, Jorinde Schrijver, Miljoenen voor twee projecten CO<sub>2</sub>-opslag, 28 November 2008.
- 15 Het Financieele Dagblad, Jorinde Schrijver, Miljoenen voor twee projecten CO<sub>2</sub>-opslag, 28 November 2008; Limburgs Dagblad, Opslag kooldioxide onder steenkool, Geleen, 28 November 2008.
- 16 Annual reports on the EKV facility, Atradius, Amsterdam.
- 17 Website EVD ([www.evd.nl](http://www.evd.nl)), Viewed in March 2009.
- 18 Letter to the parliament, Financiële maatregel marginale gasvelden, 16 December 2008.
- 19 Website FMO ([www.fmo.nl](http://www.fmo.nl)), Viewed in March 2009.
- 20 Website Emerging Africa Fund ([www.emergingafricafund.com](http://www.emergingafricafund.com)), Viewed in March 2009.
- 21 Website SenterNovem ([www.senternovem.nl](http://www.senternovem.nl)), Viewed in March 2009.
- 22 Modern Power System Magazine, BP gives up on UK's CCS effort, December 23, 2008; Website BERR on CCS (<http://www.berr.gov.uk/whatwedo/energy/sources/sustainable/ccs/ccs-demo/page40961.html>), Viewed in February 2009.
- 23 Website ET ([www.energytechnologies.co.uk/](http://www.energytechnologies.co.uk/)), Viewed in February 2009.
- 24 Annual Report and Accounts 2007-08 Department for Business, Enterprise and Regulatory Reform, TSO, Norwich, 21 July 2008.
- 25 Website Technology Strategy Board ([www.technologyprogramme.org.uk](http://www.technologyprogramme.org.uk)), Viewed in February 2009.

- 26 Website UK Research Councils' Energy Programme (<http://www.epsrc.ac.uk/ResearchFunding/Programmes/Energy/Funding/TSEC/CarbonManagementAndRenewables.htm>), Viewed in February 2009; Website CCS consortium ([www.ukccsc.co.uk](http://www.ukccsc.co.uk)), Viewed in February 2009.
- 27 Annual reports on export credit guarantees, ECGD, London.
- 28 Project Finance Magazine, European Oil & Gas Deal of the Year 2004 - BTC: Controversial but concrete, February 2005.
- 29 BBC News, Brown doubles North Sea oil tax, December 05, 2005; The Scotsman, Smaller oil firms benefit as Shell sells off share in North Sea fields, January 18, 2003.
- 30 European Daily Electricity Markets, Island Gas closer to coal bed methane gas production, January 21, 2009
- 31 Website Emerging Africa Fund ([www.emergingafricafund.com](http://www.emergingafricafund.com)), Viewed in March 2009.
- 32 Website BERR on coal (<http://www.berr.gov.uk/whatwedo/energy/sources/coal/investment-aid/index.html>), Viewed in February 2009.
- 33 Website European Commission, DG Research (<http://ec.europa.eu/research/fp6/projects.cfm>), Viewed in February 2009; Website CORDIS (<http://cordis.europa.eu>), Viewed in February 2009.
- 34 Website European Commission, DG Research (<http://ec.europa.eu/research/fp6/projects.cfm>), Viewed in February 2009; Website CORDIS (<http://cordis.europa.eu>), Viewed in February 2009.
- 35 EIB Statistics List v4. CEE Bankwatch, Prague, 2008; Website European Investment Bank ([www.eib.org](http://www.eib.org)), Viewed in February 2009; Website Gate Terminal ([www.gate.nl](http://www.gate.nl)), Viewed in February 2009.
- 36 EWEC 2009 - EU recovery plan vital for energy sector. Mark Venables, EWEC, Marseille, 18 March 2009; Minister Van der Hoeven blij met EU-subsidies voor CO<sub>2</sub>-opvang en windenergie, Website Ministerie van Economische Zaken ([www.minez.nl](http://www.minez.nl)), Viewed in March 2009; Eu Leaders Agreed On Economy Recovery Plan. 5 billion Euro to boost European economy, Website Central Europe ([www.central2013.eu](http://www.central2013.eu)), Viewed in March 2009.