

CLINGENDAEL
INTERNATIONAL
ENERGY
PROGRAMME

| CIEP

Annual Report 2012



Clingendael International Energy Programme (CIEP)

Affiliated to the Netherlands Institute of International Relations 'Clingendael', CIEP is an independent forum for governments, non-governmental organisations, the private sector, media, politicians and all others interested in changes and developments in the energy sector.

CIEP organises lectures, seminars, conferences and roundtable discussions. In addition, CIEP staff members lecture in a variety of courses and training programmes. CIEP's research, training and activities focus on three themes:

- Regulation of energy markets (oil, gas, electricity) in the European Union;
- International economic and geopolitical aspects of oil and gas markets, particularly with respect to the European Union security of supply; and
- Energy and sustainable development.

CIEP is endorsed by the Dutch Ministry of Economic Affairs, the Dutch Ministry of Foreign Affairs, the Dutch Ministry of Infrastructure and the Environment, BP Europe SE- BP Nederland, Delta N.V., GDF-Suez Energie Nederland N.V., GDF Suez E&P Nederland B.V., Eneco, EBN B.V., Essent N.V., Esso Nederland B.V., GasTerra B.V., N.V. Nederlandse Gasunie, Heerema Marine Contractors Nederland B.V., ING Commercial Banking, Nederlandse Aardolie Maatschappij B.V., N.V. NUON Energy, TenneT TSO B.V., Oranje-Nassau Energie B.V., Havenbedrijf Rotterdam N.V., Shell Nederland B.V., TAQA Energy B.V., Total E&P Nederland B.V., Koninklijke Vopak N.V. and Wintershall Nederland B.V..

CIEP publications and research results are made available primarily through the CIEP website: www.clingendaelenergy.com

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Inhoudsopgave

Clingendael International Energy Programme (CIEP).....	2
A Mixed Energy Year	4
Board of the Foundation Stichting Fonds Instituut Clingendael in 2012	6
CIEP supporting institutions	6
Staff	7
CIEP network	8
Internal organisation	8
CIEP publications	8
Activities	9
Training	10
Meetings	10
Lectures, Speeches, Presentations, Media and Webiste	10
Website	10
Projects	11
Appendix 1: About CIEP	12
Appendix 2: Work plan CIEP 2009-2012	14

A Mixed Energy Year

In 2012 it was clear that in addition to the vast tar sands and the substantial reserves of shale gas in North America, the tight oil reserves could also be commercially exploited. Since 2008, demand for imported natural gas was repeatedly revised downward due to increasing domestic supply. In 2012 it seemed that North America could even develop into a natural gas exporter. Moreover, North American natural gas prices remained very low, particularly when compared to European and Asian prices. The rapid development of tight oil also reversed the outlook for oil imports, and North American oil prices traded at a substantial discount to international oil prices. This was partly due to infrastructure bottlenecks, but flat demand and growing domestic supply also played an important part. These dynamics also impacted the refining industry in North America and in Europe.

Thus in only a few years the North American energy outlook changed drastically. In 2012 discussions surfaced on how this could impact the geo-economic and geopolitical relations in the coming years. The importance of continued integration of North America in international energy markets for international relations is obvious; the discussions focussed on the continuation of US policies to guarantee the free flow of oil and natural gas to international markets.

The ample oil and natural gas supplies in North America are furthermore supplemented by ample coal reserves. Moreover, the biofuel potential is large enough to source the remainder liquid fuel needs from the Atlantic basin, which has a different risk (and cost) profile than supplies from Russia, the Caspian region and the Middle East. The energy security exposure of the US is declining, while that of Europe and Asia is increasing.

The richness in oil and natural gas resources of North America (with the ample Australian resources finding their way mainly to the Asian markets) might be a mixed blessing for Europe. Although it 'frees' up supply for other markets than North America, the US has been crucial in guaranteeing the free flow of oil and gas and generated security of supply for other consuming countries. They did this not only as the main mores setter for the international economy, but also as a geopolitical hegemon. Its military presence around the world and the capacity to intervene has implied that the energy security cost was mainly carried by the US. Since the costs of strategic oil reserves and other emergency policies, as agreed in the IEA, are only part of the total energy security costs, the question was if this would now change.

Europe's energy costs are bound to increase, either through its non-fossil strategy or due to an escalation of security of supply costs or both, since many of the non-fossil options are also imported (biomass, solar panels, components of renewable energy technologies), often from only a few suppliers. China and other Asian countries will be the main competitor for Europe to source its economy with imported energy. The changing energy perspective in North America and the rising import dependency of China will impact the governance of future energy relations. Here the size of and the approach to European energy companies plays a role too, when forced to take on better (politically) capitalised Asian competitors for scarce fossil and non-fossil fuels. Furthermore, the

developments in the Middle East create uncertainty about future supplies. With leadership struggles in some countries and a need to improve the socio-economic position of the population, the export potential could change in the future. In oil, the importance of Iraq is growing as a substantial source of international supplies, while the political stability to deliver on the expectations remains unclear. In 2012, sanctions on Iran were tightened to compel them back to the negotiation table over their nuclear ambitions. International political and economic developments could lead to a European rethink on Russia, where interdependency could keep the relationship on a more even keel than potential other energy relations.

The economic problems in the Euro zone continued unabated in 2012, depressing energy demand. In particular the electricity sector struggled with the new realities of the energy market. Relatively small shares of wind and solar energy reduced the uptime of conventional plants, challenging the commercial viability of particular gas-fired plants in certain parts of the EU energy market. The costs of introducing renewable energy into the market are unevenly distributed, while EU ETS could not produce a CO2 price to benefit lower CO2 emitting electricity plants, such as gas-fired ones. Concerns emerged in earnest about the availability of future back up capacity for renewables, when companies mothballed plants and new investments were put on hold. Member states actively contemplated national capacity mechanisms to remedy the potential shortfall, which would further undermine the internal energy market.

In 2012 it became clear that the 20-20-20 policies of the EU had some unanticipated effects, which were exacerbated by the economic crisis. The growth of renewable capacity in a period of declining demand, reduced the call on traditional capacities more than anticipated, while supply and demand of emission permits was designed for a growing energy market. Developments in the power market in 2012 showed that market dynamics are hard to predict, and that interventions in the market, designed to serve one purpose, can also bring unwanted distortions. For instance, coal imports increased substantially in 2012, creating the strange situation that in the region where climate change policies were pursued, CO2 emissions in some European markets began to increase again. These coal imports were a side effect of the increased use of natural gas in the power sector in the US, where CO2 emissions are declining substantially, creating a larger supply for exports.

The year started off with the EU 2050 energy roadmap fresh on our desks, but the roadmap of 2012 is not a route that many in the energy sector wish to take again. Policymakers have to grapple with the unwanted side effects of international and European developments, while staying on course with their policies. Market players have to renew their understanding of the interplay between market intervention and energy market developments amidst an economic crisis. The year ended with discussions about shale gas and its potential to replicate North America's energy revival here. Europe's energy dilemmas have not shrunk in 2012. Instead it finds itself more and more in a crush zone between the realities of today's markets and the steps it wants to take in energy transition. The discussion about the post-2020 energy priorities will be a challenge to all stakeholders in the coming years, knowing that Europe's rope to divert from international market developments might be limited by the changing competitive positions in the world.

CIEP's research, publications and events in 2012 covered several of the issues raised here.

Board of the Foundation Stichting Fonds Instituut Clingendael in 2012

Drs. G.H.B. Verberg, chairman
Drs. H.D.A. Haks RA, treasurer
Mr. W.O. Russell, member
Ir. R. Willems, member
Mw. Mr. I. L. Van Veldhuizen, member
Mw. drs A. Moons, member (until 03.06.2012)



The Clingendael International Energy Programme (CIEP) is a project of SFIC since September 2001. The year 2012 was the last year of the third project period (2009-2012).

CIEP supporting institutions

In 2012, the following institutions supported CIEP:

Dutch Ministry of Economic Affairs
Dutch Ministry of Foreign Affairs
Dutch Ministry of Infrastructure and the Environment
BP Europe SE- BP Nederland
Delta N.V.
GDF SUEZ Energie Nederland N.V.
GDF SUEZ E&P Nederland B.V.
Eneco
EBN B.V.
Essent N.V.
Esso Nederland B.V.
GasTerra B.V.
N.V. Nederlandse Gasunie
ING Commercial Banking
Nederlandse Aardolie Maatschappij B.V.
N.V. NUON Energy
TenneT TSO B.V.
Oranje-Nassau Energie B.V.
Havenbedrijf Rotterdam N.V.
Shell Nederland B.V.
Total E&P Nederland B.V.
Koninklijke Vopak N.V.
Wintershall Nederland B.V.

These institutions are a cross-section of energy sector stakeholders in the Netherlands and beyond. The companies are major international players in their field of expertise. National energy policy is

largely influenced by European and international developments. The institutions contribute to CIEP's knowledge base and *vice versa*, especially within the CIEP Advisory Board and the Contact Group. Furthermore, staff members from the institutions participated actively in CIEP brainstorm groups, such as the Gas Group, the Oil Group, and the Fuel Mix Group.

Staff

In 2012, the CIEP staff comprised the following people:

Coby van der Linde	director	(0.7fte)
Lucia van Geuns	senior researcher	(0.8fte) (0,6 fte since 01.05.2012)
Christof van Agt	senior researcher	(1.0 fte) (since 01.04.2012)
Koen Groot	researcher	(1.0 fte)
Sammy Six	researcher	(1.0 fte) (since 01.05.2012)
Luca Franza	researcher	(1.0 fte) (since 01.09.2012)
Pier Stapersma	researcher	(1.0 fte) (since 01.11.2012)
Nora Meray	senior researcher	(0.8 fte) (until 31.08.2012)
Matthew Hulbert	senior researcher	(1.0 fte) (until 30.06.2012)
Leonie Meulman	researcher	(1.0 fte) (until 31.08.2012)
Jochem Meijknecht	researcher	(1.0 fte) (until 30.06.2012)
Wendy Auf dem Brinke	secretary	(0,7fte)
Marco Blankestijn	fin. administrator	(0.2fte)

In addition to the core staff, CIEP had in 2012 four fellows and five associate fellows:

Jacques de Jong	senior research fellow	(0.4 fte)
Dick de Jong	senior research fellow	(0.2 fte)
Luc Werring	senior research fellow	(project basis)
Christian Cleutinx	senior research fellow	(project basis)
Aad Correljé	associate fellow	(0.2 fte)
Dirk Bensdorp	associate fellow	(project basis)
Pieter Boot	associate fellow	(project basis)
Martien Visser	associate fellow	(project basis)
Jan Hein Jesse	associate fellow	(project basis)

During 2012, the following students/interns were connected for at least part of the year to CIEP staff:

Bas Percival	PhD candidate (EDGaR project)
Rick Bosman	student intern
Yi Chen	student intern
Jim Stoopman	student intern

Other functions held by CIEP director:

Part-time Professor of Geopolitics and Energy Management,
University of Groningen
Member of the Dutch Energy Council
Member of the Supervisory Board of Wintershall Nederland B.V.
(WINL)
Member of the Supervisory Board of Alliander N.V.
Member of the international advisory board of KAPSARC (King
Abdullah Petroleum Study and Research Center) Saudi Arabia

CIEP network

Many of our activities and studies are conducted in cooperation with partner organisations in the Netherlands and abroad. Over time a wide network of researchers has developed. The intensity of contact depends on the project at hand, but in general many of the contacts continue in other projects. We are also regularly approached to participate in consortia of researchers, and, weighing how the project would fit within the CIEP research agenda for that period, we agree to participate or not. The network of energy researchers is global, and each year new partners join the network. Some relations with research and activity partners have become very close and a variety of interactions take place every year, from keeping in touch on current issues to organising conferences and conducting joint studies.

Internal organisation

CIEP administers the allocation of staff and budgets to the different activities, research projects and other activities. CIEP uses time registration (BigBen software), which facilitates prioritising time and assets.

CIEP publications

The following overview highlights a selection of 2012 publications, most of which are available on the CIEP website. CIEP (associated) staff also published articles in newspapers, scientific journals and other formats that are not mentioned here.



Articles/papers/books

The Changed Geopolitics of Energy and Climate and the Challenge for Europe: a geopolitical and European perspective on the triple agenda of competition, energy security and sustainability, Albert Bressand, December 2012

Capacity Mechanisms in Northwest Europe: between a rock and a hard place?, Leonie Meulman and Nora Meray, November 2012

The Scramble for Resources: Things that Never Happen, Christof van Agt, Atlas, September 2012

China, the EU and sustainable energy: cooperation, competition or conflict?, Bram Buijs and Lucia van Geuns in: Jan Wouters et al: China, the European Union and Global Governance . Cheltenham, Edward Elgar, 2012

A New EU Gas Security of Supply Architecture?, Jacques de Jong e.a. in: European Energy Journal 2(3), July 2012

International Gas Union, 25th World Gas Conference, Kuala Lumpur (final report), Coby van der Linde and Dick de Jong, CIEP, June 2012

The changing oil value chain: implications for security of supply; European policy brief, June 2012

A New EU Gas Security of Supply Architecture?, Jacques de Jong, June 2012

Demand reduction during low wind periods: why demand response has only limited potential to reduce the necessary long-term back-up capacity for wind power, Nora Méray, CIEP Briefing Paper, May 2012

POLINARES working paper n. 43: part I; current trends and strategies, CIEP, April 2012

POLINARES working paper n. 44: part II; future world images and energy and mineral markets, CIEP, April 2012

"A Cinderella Story?": Restructuring of the European refining sector, Jochem Meijknecht, Aad Correljé en Bart van Holk April 2012

Energiediplomatie nieuwe stijl: publiek-private samenwerking in het buitenland, Joep Sweyen, CIEP Briefing Paper, april 2012

Energieautonomie: een geval van politieke overmoed, Matthew Hulbert, in: Internationale Spectator 66(4), april 2012

Europe 2050: a long way from home, Matthew Hulbert, CIEP, March 2012

China and the Future of New Energy Technologies, Bram Buijs, March 2012

Natuurlijke hulpbronnen, Christof van Agt en Lucia van Geuns in: Continuïteit en onzekerheid in een veranderende wereld. Clingendael Strategische Monitor', 2012

Germany's Energiewende: Redefining the Rules of the Energy Game, Rick Bosman, CIEP Briefing Paper, 15 February 2012

Iranian Game: Multiple Layers, Matthew Hulbert, CIEP Briefing Paper, 10th February 2012

Harvesting Transition? Energy Policy Cooperation or Competition around the North Sea, Leonie Meulman, Pieter Boot, Coby van der Linde, Jacques de Jong and Luc Werring, January 2012

The oil industry: a dynamic patchwork of approaches?, Aad Correljé en Lucia van Geuns, in: International Handbook of Network Industries: The liberalization of Infrastructures"?, October 2011, published 2012

A new EU Gas Security of Supply Architecture, Jacques de Jong, CIEP, January 2012

Columns

The 2012 columns in Energie Actueel are written by: Coby van der Linde, Pieter Boot and Aad Correlje (<http://www.clingendaelenergy.com/columns>) .

Activities

CIEP organised numerous activities (meetings, training programmes, conferences, etc.) during 2012. A listing is given below and is available on <http://www.clingendaelenergy.com/events> go to 2012

10 December 2012 CIEP/NL-Agency Seminar on Smart Grids

15 November 2012 IEA Presentation of the World Energy Outlook

30 October 2012 CIEP Conference 'Schengenisation of Energy Policy'

29 October 2012 CIEP Workshop 'Modelling CBA of Infrastructure Investment'

29 October 2012 CIEP Workshop 'Capacity Mechanisms'

6 September 2012 Ciep Gas Day

20 August 2012 Wind and Gas: Back-up or Back-out, That is the Question

5 July 2012 CIEP Roundtable International Offshore Market

2 July 2012 CIEP Roundtable Caspian Oil and Gas

28 June 2012 CIEP Seminar: “Energy Roadmaps in NW Europe”

26 June 2012 CIEP Lecture: BP Statistical Review of World Energie 2012

21 June 2012 IEA lecture: Golden Rules for a Golden Age of Gas

23 April 2012 ExxonMobil Outlook for Energy - A View to 2040

4 April 2012 CIEP Seminar: “European Refining Industry: A Cinderella Story?”

Training

29 May 2012 - Geopolitical trends in international energy markets: wrestling among giants

13 November 2012 - Shaping the post-2020 EU energy policy; Berlin or Brussels?

11-13 July 2012 – International Energy Politics (For the Ministry of Foreign Affairs)

CIEP also facilitated a two day training programme for the Diplomatic Institute to the Ministry of Foreign Affairs of the Republic of Bulgaria in Sofia (18 and 19 September 2012) and a energy training day for Dutch Secondary School students (YES! studiedag, 11 April 2012)

Meetings

Gas group: monthly meetings

Oil group: quarterly meetings

Fuelmix group: bi-monthly meetings

Contact Group meetings: 12 March, 19 June, 16 October, 3 December 2012

Advisory Board Meetings: 26 June, 13 December 2012

Board meeting Stichting Fonds Instituut: 15 May, 15 November 2012

Lectures, Speeches, Presentations, Media and Webiste

During 2012, CIEP staff members gave numerous lectures, speeches, and presentations or chaired sessions during training courses, conferences and seminars. Also CIEP staff in the course of 2012 gave various radio, television and written media interviews.

Website

All CIEP publications were posted on the <http://www.clingendael.nl/ciep/publications> website, which as of 1 May 2013 be found at www.clingendaelenergy.com . Internet is an important communication and information dissemination tool for CIEP.

In 2012, the Clingendael site recorded many successful hits: 1.250.631 (238.950 from unique IP addresses). Of the CIEP part of the Clingendael website, the ‘news’ and ‘publications’ pages were the most visited.

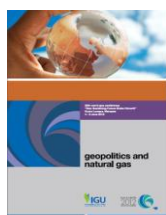
The CIEP reports “China and the Future of New Energy Technologies / Bram Buijs (maart 2012) and “Wind and Gas. Back-up or Back-out “That is the Question” / Nory Méray (december 2011)” were among the 25 most downloaded reports from the Clingendael/CIEP website.

Projects

In 2012, CIEP engaged in a project ‘envoy’ with the Ministry of Economic Affairs, in which Mr. R. van der Linden, among others, participated on behalf of the Ministry of Economic Affairs.



2012 was the final year of the Polinares project. CIEP produced its Workpackage 3 reports, a policy brief and participated in work of other work packages, an overview publication, and the final conference in Brussels in November 2012. Work of the entire project can be found on www.polinares.eu; the CIEP parts of the project are also available on www.clingendaelenergy.com/publications (2011 and 2012).



In 2012 the project geopolitics and natural gas for Task Force 3 of IGU (international Gas Union) was also concluded with a final report and a presentation (see www.clingendaelenergy.com publications 2012) and discussion at the World Gas Conference 2012 in Kuala Lumpur. In the fall, CIEP was asked to participate in the follow up project on geopolitics and natural gas of Task Force 3 under the France presidency of IGU. This project will run from 2012 until 2015 when the next World Gas Conference will be held in Paris.

CIEP also participated in the Strategic Monitor project of Institute Clingendael.

Appendix 1: About CIEP

Introduction

In September 2001, the Netherlands Institute for International Relations, 'Clingendael', launched the *Clingendael International Energy Programme* (CIEP). Supported by twelve institutions from the public and private sectors, CIEP participates in and seeks to make significant and substantive contributions to the public debates on national and international developments in the energy sector. After the initial period 2001-2004, CIEP continued largely on the same footing as the previous years based on the plan and estimated budget as described in the document *CIEP 2005-2008, Towards a European Forum* and agreed upon by the Board of Stichting Fonds Clingendael and seventeen participating institutions.

The main reasons for initiating CIEP were:

1. The need for a forum to discuss developments in the European energy markets, e.g. the liberalisation of the European energy market, which will impact the organisation of the market, government energy policies and strategies of companies operating in the energy sector. These changes in the internal European market take place against the backdrop of an expanding European Union, increased dependency on imported fossil fuels and efforts to address environmental concerns;
2. The concerns raised in public debates about security of supply and a growing import dependency, not only for European Union member states but also for other major consumer regions. These concerns will influence the policy options and choices of both consumers and producers. The political and economic developments in, for instance, the United States, Russia, the Middle East, the Caspian Sea region, and Asia, are therefore important in assessing the developments in the European energy situation.

Mission

Through research, the publication of studies, information releases (particularly through the media and internet) and the organisation of courses and training programmes, CIEP makes a fundamental contribution to the public debate on international politics and economic developments in the energy sector (oil, gas and electricity).

Objectives

- To serve as an independent forum for governments, non-governmental organisations, the business community, politics, the academic world, the media and other stakeholders or interested parties.
- To gather and develop information and knowledge about international political and economic developments in the energy sector on the basis of research, supported by a documentation system.
- To propagate information and knowledge about international political and economic developments in the energy sector by means of seminars, conferences, lectures, courses, publications and information releases via the media.

- To initiate discussions about current events and future developments relevant to the energy sector, energy policy, legislation and the relationship between the government and the private sector.

Research and activities

CIEP's research and activities focus on three main subject areas:

- A. Regulation of energy markets (oil, gas and electricity) in the European Union;
- B. International economic and geopolitical aspects of the oil and gas markets, mainly with respect to the security of oil and gas supply in the European Union, in the context of an increasing dependence on imported energy; and
- C. Energy and sustainable development.

The staff of the Clingendael International Energy Programme, in conjunction with the staff of the Institute at large, develops courses and training programmes on the above-mentioned themes. CIEP publications and research results are made available primarily through the CIEP website (www.clingendael.nl/ciep), which forms part of the Clingendael website.

Appendix 2: Work plan CIEP 2009-2012

Energy: between a rock and a hard place, the growing mismatch between long term energy and climate change visions and short term market developments

CIEP is predominantly a network organisation with a strong public dimension. The success and recognition of CIEP is based on the combination of certain qualities, such as its independence, the provision of timely analyses from an international economic and geopolitical perspective, a focus on pre-competitive knowledge and an integrated view on the three pillars of energy policy – the *environment*, *market regimes* and *security of energy supply*. This formula offers CIEP a unique position, not only in the Netherlands, but also internationally, especially within Europe.

Modes of operation

FORUM

As an independent organisation, CIEP is able to function as a forum for the stakeholders in the energy sector. The forum function is shaped by the coordination of a variety of activities with participants and invitees from governmental agencies from different countries, the private sector, NGOs, scientists and representatives of supranational organisations, in which energy and climate change issues are discussed in an open and informal setting, typical for meetings under the Chatham House rule.

Representatives of different stakeholders groups also participate in CIEP research activities. The CIEP advisory board and contact group, with representatives from the supporting institutions, are an important part of the CIEP forum function. CIEP underpins sector-wide initiatives and facilitates meetings and conferences. The Forum function of CIEP in the Netherlands and EU is well established. Across Europe but also in Moscow and Washington, CIEP staff is involved in debates about a wide range of energy and related climate change issues.

THINK-TANK

As a think-tank on energy issues, CIEP operates from an international economic and geopolitical perspective. Research is characterised by an integrated approach to energy policy, a focus on pre-competitive issues and executed from the assumption that ‘energy is politics’. CIEP is independent in formulating its research agenda. Results from CIEP research are intended for the public domain and published accordingly on the CIEP website. CIEP conducts researches according to academic standards, but its publications are aimed at public and policy issues. CIEP also conducts research for others, as long as the work fits within the research agenda and the results can be made public. In the capacity of a think-tank, CIEP also advises government agencies, companies and NGOs. Already well-respected in the Netherlands, CIEP is also internationally recognised as a leading knowledge organisation on a wide range of energy issues ranging from security of energy supplies, market developments and geopolitics to future fuels.

KNOWLEDGE TRANSFER

By active transfer of knowledge, CIEP works to increase public understanding of energy and to inform the quality of public debates. In addition to research outputs, other key modes of knowledge dissemination have been through the media, short courses/modules, lectures, consultations with specific focus groups, and participation in the activities of other organisations.

With our base in The Hague, it is natural that CIEP’s knowledge transfer functions will maintain a strong focus on the Netherlands, but increasingly participants from elsewhere in Europe find their

way to CIEP modules and finds CIEP going to elsewhere to offer short courses and presentations. Together with EDI and other partners, CIEP will be involved in a Gas Business Master's programme.

SOCIETY

CIEP staff are involved in various councils, advisory boards and panels such as the International Gas Union's Wise Person group, the Dutch energy council, the board of WEC NL, the supervisory board of Rotterdam Clinton Climate Initiative, the editorial board European Energy Review, etc.

CIEP organisation

CIEP is a project in the Stichting Fonds Clingendael, and thus financially and organisationally separate from Institute Clingendael. Stichting Fonds has its own board and governance structure. CIEP also has an Advisory board and contact members group to ensure exchange of information with participating organisations and guard the CIEP public agenda.

In content, CIEP work is related with some of the core themes of Clingendael, mostly in the geopolitical/strategic and European sphere, although Clingendael does not cover the economic approaches to these themes, which limits the overlap. In the Asia Studies programme, CIEP and Instituut Clingendael continue to cooperate in a joint project. CIEP also cooperates with other research institutions both in the Netherlands and abroad.

Research Themes and Focus in the coming period

LONG TERM VISIONS AND SHORT TERM BOTTLENECKS

The European ambitions for a more sustainable energy system have taken shape with the Commissions proposals of 10 January 2007 (SEC) 12, 2007, and the Councils' acceptance of the main thrust of the proposals (Feb. 2007). The catchphrase '20-20-20 in 2020' (20% more energy efficiency, 20% share of sustainables in the energy mix and a 20% reduction of CO₂ emissions by 2020) reflects the Commission's ambitions to make a serious step towards a low carbon economy. These ambitions must be achieved in a European market environment, of which the contours have been further defined in the Commissions' 19 September 2007 package. At the same time, security of oil and gas supply is an important precondition for the smooth transition to a lower carbon economy. The three pillars of energy policy, price, security and environment, must not only be integrated into one consistent policy approach but is now at the core of the proposed 'new industrial revolution'.

With the clarity on where the energy system must go in the longer term, the short and medium term problems, however, are dauntingly short of a solution. The recent publication of the IEA World Energy Outlook 2007 is more somber than it was ever before, about oil price developments, investment needs in oil and gas value chains, structure of markets, demand outpacing supply, and meeting climate targets. The emergence of new fast growing economies, such as India and China, has driven demand for fossil fuels to new heights and production has difficulty keeping up. The stresses and strains appear in all parts of the energy value chains, evidenced by both cost-push and demand pull inflation. Marginal cost has increased to high levels indeed, and is expected to increase further when more marginal oils, such as from the Arctic, oil sands, oil shales, and biofuels, have to be exploited, while the pace of development of medium cost oil remains disappointing. This medium cost oil is located predominantly in OPEC countries and Russia. The income of oil producing countries is now successfully generated through the oil price rather than through selling volumes, which has increased their reluctance to invest in new production capacities. With international oil companies locked out of the medium cost oil developments by national governments, and the unlevel playing field in African developments with national companies from consumer countries such as China, only the most expensive options are left for international oil companies. Yet, these same companies are the backbone of the world oil trading system, offering their oil to the highest bidder.

At the same time, many consumers are shielded from the price developments through government subsidies, fueling demand growth in the producing countries and China. The large monetary

surpluses of these countries, in oil producing countries due to the transfer of wealth as a result of higher oil prices and in China by hoarding labor productivity gains at the government/state level, imply that these countries can subsidise energy for some time to come. They command their share of resources, using both international markets and bilateral agreements to realize this. Simultaneously, oil fields are being developed with the articulated intention of generating a bilateral oil flow, rather than a flow destined for world markets, undermining the global oil trade system. The oil trade system could, if more oil is diverted away from world markets into two parallel systems, where price is no longer the only tool of distributing scarcity. Instead (geo)politics can develop into a separate tool of distribution.

There is one source of new oil production that can change the current rules of the game; Iraq. Iraq has large onshore medium cost oil reserves that have not been exploited intensely. Production could increase with another 4-6 mb/d with the proper investment climate and in a situation of political stability. For the global oil market, and thus the OECD countries that are wedded to the availability of oil through the world oil trading system, it is increasingly important that this lower cost Iraqi oil becomes available in order to buy some more time to fend off the worst effects of the supply-constrained world. The political situation is however not promising. Neighbouring countries will be reluctant to share the oil income pie, particularly not when they are set on a course of further divorcing cost of production and price.

It is obvious that the transition to a less carbon intense economy is going to be far from smooth. The dilemma of course is that transiting to a different energy system can only be pursued under a certain strain of scarcity and/or geopolitical constraints, otherwise incentives to change are limited. Furthermore, solutions to one problem can easily bring forth new ones, evidenced by the current expansion of biomass production that clashes with the stock of nature and food production.

The new but alarming tone of the IEA started with its 2005 publication, and since then the worries have increased to the point where the earlier staunch belief that markets could resolve any concerns about climate and security has been traded for a mixed approach where government intervention has gained ground. This intervention should focus on disciplining the energy system into a more efficient and low carbon direction. Yet, at the same time, the ongoing concentration of oil and gas supplies, triggers countries into favouring coal and nuclear for electricity generation for security of supply reasons. In order to meet climate policy goals, coal must be revolutionised into 'clean coal' through the rapid development of sequestration technologies, while the thin border between nuclear energy for civic and strategic use causes concerns with more countries seeking a solution for their rising electricity demand in this direction.

In the past decade, the oil and gas markets have changed from a buyers' to a sellers' market. In the past, the outlook was that eventually this process would be reversed, as happened from the mid-1980s onward and that the boom-bust cycles would continue to repeat themselves. In this thinking, the current sellers' market would in time be reversed into a buyers' market. The issue is that the price level at which the next fossil fuel buyers market might occur, is deemed to be much higher than in previous decades due to a more structural shift in costs and demand. For a complexity of reasons, geological, technical, economic and political, the consensus is now that structural supply constraints have brought the era of cheap fossil energy to an end. With traditional fossil fuel costs rising and costs of new fuels not declining fast enough (both a function of technology and the availability of the new fuels), the short and mid term outlook leaves the world with dearer energy, and no guarantee that bottlenecks in both the traditional energy markets and the new energy markets can easily be solved.

On the one hand, dearer fossil energy will reduce the cost between the 'old' and 'new' fuels and lowers the transition threshold to a low carbon economy, while on the other hand, the risks of mismatches in timing of replacing fuels and its infrastructure increase the risk of a transition crisis

and the subsequent suboptimal solutions that might be pursued. The terms of availability of energy, including ownership issues, market structure, national interests, in an ever growing international market will be an important factor in shaping the future geopolitical and economic relations because energy is also power in geo-economic and geopolitical terms. Already we are witnessing more bilateral relations between producer and consumer countries in an attempt to reduce uncertainty of demand and supply. Also in the market, joint-ventures between NOC's and IOC's reflect the new organisation structure, where both national and commercial interest are newly bundled. The new structure will bring new winners and losers and is by no means a guarantee for a peaceful but competitive change to a next generation energy system. When the distribution of military power, economic power, political power and energy power is in flux, conflicts can easily derail the likelihood of an evolutionary transition.

MARKETS AND GOVERNMENTS

The maturity of the OECD conventional oil and gas reserves seriously undermine the options for diversification away from certain producer countries (for reasons of politically and economically instability or geopolitical reasons), while climate change policies reduce the options to diversify to coal and unconventional oil, unless larger scale carbon storage can be realised soon at reasonable costs and with manageable risks.

Yet, the path to the realisation of the low carbon economy is still long and fraught with both internal and external political and economic dilemmas. Governments and companies in the OECD will struggle with:

- the short term nature of energy markets and the longer term process of balanced change (as opposed to change as a result of a crisis) in the fuel mix;
- economic efficiency in a world market where public interests such as environmental and security externalities are not or not sufficiently priced in;
- national optimisation of energy production (f.i. depletion policies, macro-economic stability, etc.) and consumption viz. international optimisation;
- variations in prioritising public interests among countries, including among the EU member states;
- fossil energy intense development viz. sustainable development;
- rent-seeking behaviour in the fossil and sustainable energy value chain by both private companies and governments;
- competition for scarce resources viz. cooperation;
- energy diplomacy and the growing importance of energy (and water) on the foreign and security agenda;
- public viz. private ownership of the energy value chain;
- bilateral or multilateral energy markets or politicised viz. economised markets;
- structural import dependence viz. structural energy income dependence;
- negotiated climate change policies or race to the top type of policies;
- etc.

These dilemmas and other will occupy policy-makers and company managers in the next years in a world where the balance of power in the world is shifting and where national and international public interests will be redefined. The outcome of this struggle between national and international energy interests is uncertain. Already, some states have decided to take firmer control over their energy industries in an attempt to merge the political and economic interests of the state in energy, while other states attempt to break up the power of companies through regulatory controls.

The combination of long term goals for structural change of the (energy) economy on the one hand, and more emphasis on short term efficiency in the market environment is both a theoretical and practical challenge. The protection of the environment and security of supply policies are public interests that, when pursued, complicate the organisation of already incomplete (international)

markets for energy. Bottlenecks in capital allocation, long lead times, the long life of infrastructure and production sites, locked-in fuel choices, but also foreign policy and market organisation orientations and high barriers to entry and exit impact on the completeness of the market for energy. But energy is also about power, the political-strategic and economic position in the world system. States without access to energy cannot develop into modern economies, nor into powerful geostrategic players. The energy sector, because it is a basic input in our economy, has always been a mixed sector where economic and political interests convene. The low carbon economy is both about genuine concerns about the impact of CO₂ missions on the world climate system and about the reduction of structural import dependency, but it is also about getting the better of rival states. Political competition is concerned with a different type of efficiency than market efficiency, and market efficiency is less concerned with long term environmental efficiency. In addition, there is also a struggle among consumer countries for scarce energy resources. Already we see the emergence of a bilateral or national economy driven trade and investment system that could lower the liquidity of world oil markets.

As much as governments are challenged to safeguard the public goods, environment and energy security, companies will be challenged to internalise the changing political and economic context of energy and the environment, and transform these in commercially attractive company strategies and products. Much will depend on the governments' ability to define the market space and ability to create, amidst change, sufficient investor certainty to invest. The dilemma for existing companies is to respond to both the short term demands of capital markets (and activist investors) and the long term government demands of moving into a low carbon economy. OECD governments will employ a mixture of incentive based policies with increasing norms for energy and environmental efficiency. It is unclear whether these norms and incentives can and will be implemented throughout the various energy value chains. This depends on the level of consensus and cooperation (or the lack thereof) in the international political arena. At the same time, companies are bound by policies of their host governments (and their specific national interests and position in the balance of power) and international competition. It is likely that boundaries between certain sectors of the economy will fade (in agriculture for instance) and that new competitors will encroach on the vested interests of traditional energy companies. Loosening the ties between natural endowment and fuels of choice can change the distribution of rents among companies and governments. Both companies and governments are not only addicted to oil and gas but also to the economic rents that they can capture. It is yet uncertain if the new fuels will be as attractive from a rent-seeking point of view.

The changing market structure of oil and gas markets, both as a result of demand from emerging economies and new economic and energy strategies of governments, will greatly impact the organisation of the energy sector and its players. Consolidation, mergers and acquisitions, break ups of traditional companies and reorganising them in a different setting in the value chain belong to a period of structural market change. Companies will face many dilemmas of which the current dilemma of access to energy resources and markets is but one. The biggest challenge for existing companies will be to select fuels, technologies and government alliances.

Challenges to the CIEP agenda for 2009-2012

The challenge for CIEP will be to understand the underlying political and economic forces that shape the future government and company strategies. The three themes of research (European energy markets; security of supply and sustainable development) offer sufficient legroom to be the foundation for another period of research and activities under these headings. Like in the previous periods, shifts in emphasis within these three themes on a year to year basis have allowed CIEP to both develop a broad knowledge base as well as an ability to change gear within and between themes. In the coming period, we expect to be involved in fuel mix choice discussions, forcing us to include more research on coal and nuclear, but also on biomass, in addition to oil and gas. We also expect that energy trading routes will become more important and that policy orientations of major

consuming and producing countries will shape both the energy debate and the environmental negotiations. The work on Europe, Russia, China, other Asian countries, the Caspian Sea region, the Middle East and increasingly the US, will be expanded to include developments in Africa and South America.

In the period 2009-2012, new international climate negotiations but also supply constraints will shape the debates and policies. The market structure will have undergone profound changes as the rate of reserve replacement of international oil and gas companies and market access of national companies will impact the strategies. CIEP should therefore not only focus on the changing context of energy markets and government policies but also invest in understanding company strategies. The aim is thus to develop a more complete understanding of the developments in the international energy and environment sector.

Research Themes

THEME A DEVELOPMENT OF EUROPEAN ENERGY MARKETS

The European Union has been involved in a long process of liberalisation (and privatisation). Liberalisation was, however, not the panacea to solve all the energy policymakers problems, such as the public interests security of supply and environmental problems. The switch from a buyers to a sellers market challenged the political promise of policy makers that energy prices would decline as a result efficiency gains. Moreover, the regulatory burden and the cost of organisational change pushed these gains elsewhere in the economy, while investor uncertainty resulted in bottlenecks in the system. Also, although many risks were privatised to the level of the consumer, information and instruments to reduce these risks are wanting, creating a backlash in some countries to not 'go the whole nine yards' in liberalisation and instead promote national champions to improve the negotiation position with large third country transport and supplier companies. Despite the much heralded advantages of liberalisation, it was also clear that governments could never leave fuel choice to the market alone, nor to the Commission as evidenced by the Chairman's conclusions of March 2006, if they were serious about their environmental and other policies. The 20-20-20 policy the European Commission is advocating has a profound impact on the market space and available companies choices, while the nascent external energy policy has impacted the energy relationship with Russia and other producers.

CIEP will focus both on the development of the internal energy market, and increasingly also the markets for alternative fuels, also in the context of world markets.

B. THE INTERNATIONAL ECONOMIC AND GEOPOLITICAL ASPECTS OF ENERGY MARKETS, MAINLY WITH RESPECT TO THE SECURITY OF ENERGY SUPPLY IN THE EUROPEAN UNION, IN THE CONTEXT OF AN INCREASING DEPENDENCE ON IMPORTED energy.

In the next 25 years, the import dependency of the European Union will continue to increase, while at the same time the supply of oil and gas on the international market will become more concentrated. There will be similar developments in the United States and Asia. Competition for oil and gas will intensify, with consequences for the political and economic relations with these regions. The long term goal of moving away from fossil fuels (and their import dependency), and the short term supply bottlenecks and higher prices will seriously challenge the security of supply agenda.

Security of energy supply is increasingly becoming an integral part of the foreign policy agenda, also in the EU, although development of these policies (and external energy policy) is excruciatingly slow. The member states have difficulty coping with their asymmetric exposure to security of oil and gas supply risks, and are pursuing their own national policies. The policy toolbox of the EU and the individual member states remains incomplete to deal with the new challenges, such as instability in key producing regions and competition for resources with main consumer countries. Europe's soft power is often trumped by countries such as China. Furthermore, the existence of asymmetric risks

may require a much more regionalised tailor-made response, which could run counter to the attempts of the Commission to develop common tools and one market.

In a supply-constrained world, policy competition and strategic relations can easily undermine the current international trade and investment system. Geopolitical and geo-economic competition to divide international wealth and the resources to produce this wealth pose a challenge to the organization of the international system. CIEP's research on security of energy supply can be best posed in terms of the recently published Shell scenarios: can the world opt for Blueprint or does the world of Blueprint either run through Scramble or is unattainable in the current international setting? This question also ties in the third research theme, the low carbon economy.

THEME C: TOWARDS A LOW-CARBON ECONOMY

Alarming UNFCCC reports, Al Gore's film "An Inconvenient Truth", Hurricane Katrina: these are just a few examples of the many events that have recently drawn the world's attention to the dangers and urgency of the climate change problem. The present fossil fuel-based global energy sector, with its large CO₂ emissions, is one of the key identified causes of global warming. There is a growing international consensus, particularly among OECD countries, that a transition to a low-carbon energy sector within several decades is imperative, if only to make room for Asia's economic development. This insight is also fraught with diverging interests, because economic wealth also generates international political power, and leadership and/or persuasion power is lacking to move the world into a more sustainable direction.

CIEP is not involved with climate change science as such, but rather aims to examine the international political and economic drivers, or the lack thereof, and consequences of the envisaged global energy transition. Questions relevant to CIEP's research into energy transition are, for instance: What does a low-carbon energy transition mean for international relations with and between oil and gas producing countries? What are the links between countries' negotiating positions on climate change issues and the structures of their energy sectors and how will the development of new energy technologies in the fields of renewables and energy efficiency affect existing energy relations between countries?

There is much more to the question of energy transition than climate change alone. At present and predicted future energy demand levels, the eventual depletion of fossil fuels is certain. Nevertheless, its exact timing and international consequences are still being heavily debated. How many new reserves will be found? Will global demand for energy continue to grow? Will the depletion of fossil fuels coincide with international climate change measures or not, and how will this affect international relations, for instance with main energy producing countries or with competing consuming countries, or how will it impact the current trade and investment system? These questions, as well, are relevant to CIEP's research into a global energy transit.

