CLINGENDAEL
INTERNATIONAL
ENERGY
PROGRAMME

CIEP

ANNUAL REPORT 2013

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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Crumbling and Fracking

In 2013, natural gas was at the centre of many (political) energy discussions. The impact of the American shale revolution on competitiveness of the European industry became a hotly debated issue. Energy intensive industries indicated they would invest in new operations in the US if the difference in the cost of energy would remain as large. The low natural gas and natural gas liquid prices in the US had already led to a revival of the chemical industry, while the oil price differential had boosted the US refining industry. Traditional export markets of European industry were taken over by American companies, while European domestic demand was low due to the economic crisis. Industry began to push for shale developments in Europe, but, with a few exceptions, encountered much opposition. Very often in these discussions it was overlooked that emulation of the shale revolution in Europe would be very difficult due to geology, legislation and ownership of the underground, the size and quality of the service industry, and population density.

The prospect of policy makers lending a positive ear to the industrialists' call for shale gas in Europe encountered a serious push-back, when a campaign, pitching instead for more renewables and emphasizing gas as a fossil fuel, gained traction in some member states. Soon natural gas, which was for long seen as the natural companion of intermittent renewables in a low carbon economy, was politically seen as a less welcome fossil fuel in the fuel mix, which also carried the prospect of a growing import dependence. Instead, coal quietly became the back up fuel for intermittent sources, resulting in higher CO2 emissions rather than less. Coal imports from the US, available because of the switch to gas in the American power sector, increased substantially and gas became more unfavourably placed in the merit order. The shale gas revolution, unlocking vast new reserves of natural gas and potential new supplies from various countries, thus had an opposite effect on the (short-term) role of gas in Europe.

In the Netherlands the shale gas discussion became intertwined with the discussion about the future of conventional gas production when it became clear that production from the Groningen field incurred earthquakes with growing frequency and intensity. Public support for gas production, which had been very high in the Netherlands for decades, declined and also impacted on the shale discussion. Instead, a greater push for renewables, also needed to fulfil the obligations under the 20-20-20 energy and climate policy of Europe was embraced. The Energy Accord, concluded in June 2013, is a concerted effort of stakeholders to increase the share of renewables in the Dutch power mix, improve energy efficiency and remove older electricity generation capacity out of the mix.

The problems of the NW European power sector continued unabated in 2013. The weak economic performance had impacted demand. On the supply side, feed in tariffs and preferential access to the grid continued to undermine the business case for conventional generation. The very low carbon price in the EU ETS allowed coal to gain more prominence when demand for conventional power production needed to be satisfied, while gas power plants were either closed or mothballed due to their place in the merit order. The perversity of the three EU energy policy instruments on their individual effectiveness was slow to be recognised.

With the German elections due in the fall, the number of exemptions for industry to pay the Energie Wende premiums increased, opening a discussion about the affordability of the policy. Households and small and medium sized companies covered the brunt of the costs, while large industries, the instigators of the competiveness discussion as a result of shale gas, were exempted.

At the same time, the power sectors in neighboring countries of Germany were also affected. Due to the new geography of supply and demand and problems to deliver the new supply to southern Germany, on some days, power flowed massively over the borders, shutting in conventional power also there. With the conventional power sector thus under pressure and the costs unevenly divided over consumers, a driver to go 'off the grid' and decentralisation is gaining strength. Such developments may also change the security of supply. With greater uncertainties in the short term supply of energy due to intermittency, investors in 'back-up' fuels are facing greater demand uncertainty. The type of contracts, size of deliveries and infrastructure, including storage, are sized for the energy mix without renewables, while the market system does not offer cost recovery to provide mainly back up services. With increasing shares for renewables the market for fossil fuels is crumbling on most days, undoing the scale benefits of before. Yet, on grey windless days, balancing supply and demand requires the vast capacities of the 'old'system, while the costs of this system cannot be recovered in the market. In light of this, great supply and demand uncertainty, or perhaps we should say regulatory uncertainty, investors are very reluctant to commit capital and future supply security issues are spawned. New business models are developed to overcome the particular difficulties of the NW European power market.

The impact of tight oil production in the US was also felt in the European refining business. Price differentials, but also the fact that US production can only be exported through the refining window, created new competition for European refiners in their traditional lucrative export markets. The European refiners are in the crush zone of changes in the global downstream industry. Export refineries are coming on stream in Asia, the Middle East, in addition to the US. Crimping European refining capacity offered some solace, but more capacity has to disappear for the industry to become healthy again. European governments have already voiced their concern with regard to a switch in security of supply from crude oil to oil products. The unbalance in gasoline production and diesel demand is one of the issues they wish to address. The necessary restructuring of the European refining industry was complicated by the efforts to regulate the type of crude allowed in the product mix. Tar sand oil, tight oil and Arctic oil are targeted, but in a liquid market like the international oil market and the blending done before crude oil reaches refineries, such policies become more complicated when Europe becomes more import dependent on oil products. Nevertheless, European refineries also faced policy uncertainties as long as discussions on the clean fuel directive continued. The fast developments on international crude and oil product markets are often not reflected in the policy debates, due to the fact that these debates run for a long time and originate in a completely different type of discussion.

In the fall of 2013, the political uncertainties in Ukraine were increasing and nervousness about the outcome of the internal process in Ukraine and the impact on energy relations on the European continent increased.

CIEP's research, publications and events in 2013 covered most of the issues raised here.

BOARD OF THE FOUNDATION STICHTING FONDS INSTITUUT CLINGENDAEL IN 2013

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

The Clingendael International Energy Programme (CIEP) is a project of Stichting Fonds Instituut Clingendael (SFIC) since September 2001. The year 2013 is the first of the fourth project period (2013-2016).

CIEP SUPPORTING INSTITUTIONS

The supporting institutions are represented in the CIEP Advisory Board, who meets twice per year, and the CIEP Contact Group, who meets four times a year. In 2013, 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.
Taqa Energy B.V.
Heerema Marine Contractors 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 2013, the CIEP staff comprised the following people:

Coby van der Linde	director	(0.7 fte)
Lucia van Geuns	senior researcher	(0.6 fte)
Christof van Agt	senior researcher	(1.0 fte)
Koen Groot	researcher	(1.0 fte)
Sammy Six	researcher	(1.0 fte)
Luca Franza	researcher	(1.0 fte)
Pier Stapersma	researcher	(1.0 fte)
Wendy Auf dem Brinke	secretary	(0,8 fte)
Marco Blankestijn	fin. administrator	(0.2 fte)

The salaries of CIEP staff are based on BBRA (Bezoldigingsbesluit Burgelijke Rijksambtenaren).

In addition to the core staff, CIEP had in 2013 four fellows and five associate fellows:

Jacques de Jong	senior research fellow	(0.2 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)
Pieter Boot	associate fellow	(project basis)
Martien Visser	associate fellow	(project basis)

During 2013, the following students/interns were connected for at least part of the year to CIEP staff:

Daan Rutten	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 Regieteam Topsector Energie
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 2013 publications, most of which are available on the CIEP website. CIEP (associated) staff also published articles in newspapers, scientific journals and other publications not mentioned here. The publications are a reflection of the research agenda.

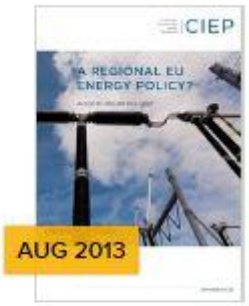
Articles/papers/books

European Power Utilities under Pressure?

FAQ Dutch Disease

US Refining Dynamics

Development Strategies of the Chinese Natural Gas Market



A Regional EU Energy Policy?

Gas in East Africa

In Nederland weten we niets van schaliegas

COLUMNS

The 2013 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 2013. See the list of events below, which is also available on http://www.clingendaelenergy.com/events; select 2013:

28 January 2013	BP Outlook 2030 by Christof Ruhl, chief Economist BP with energy experts
28 January 2013	Masterclass BP Outlook 2030 with Energy Academy Europe
4 April 2013	2 Roundtables on Security of Supply in the post-2020 period
8 May 2013	Presentation ExxonMobil Energy Outlook 2040 by Bill Colton and Joost van Roost
25 June 2013	Presentatie BP statistical Review of Workd Energy 2013 by Richard de Caux
3 September 2013	Ciep Gas day
5 November 2013	Seminar Driving Forces behind world oil markets
13 November 2013	Presentation of World Energy Outlook 2013 by Maria van der Hoeven, Executive director IEA

TRAINING

29 May 2013 – The political and economic impact of the shale revolution

13 November 2013 – EU Energy Policy: Kant meets Machiavelli

3-5 July 2013 – International Energy Policy (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 (30 September – 2 October 2013), and a one-day training for the Diplomatic Institute of the Ministry of Foreign Affairs in Kosovo .

CIEP organised several trainings modules on European Energy policy for the Florence School of Regulation and the Energy Regulatory Regional Association in Budapest.

CIEP also ran a course on Global gas business and European gas supply security at the Energy Master programme of SciecesPo in Paris.

CIEP also contributed with an energy case to the training of Dutch junior diplomats of Institute Clingendael, numerous lectures in other diplomatic training courses of Institute Clingendael, and to training modules of the Energy Delta Institute and Energy Academy Europe in Groningen.

MEETINGS

Gas group: monthly meetings
Oil group: quarterly meetings
Fuelmix group: bi-monthly meetings
Contact Group meetings: 19 March, 11 June, 15 October, 26 november 2013
Advisory Board Meetings: 25 June, 10 December 2013

Board meeting Stichting Fonds Instituut: 28 May, 27 November 2013

LECTURES, SPEECHES, PRESENTATIONS, MEDIA AND WEBISTE

During 2013, 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 2013 gave various radio, television and written media interviews.

WEBSITE

All CIEP publications were posted on the http://www.clingendael.nl/ciep/publications website until 1 May 2013. From 1 May 2013 everything CIEP published from in 2001 onwards, could be found at www.clingendaelenergy.com. Internet is an important communication and information dissemination tool for CIEP.

The new webaddress (and email) required users of the CIEP website to find us again. With google analytics we could analyse the visits in the period May to the end of December 2013. We had 39.566 unique visitors. On the CIEP website we have created a link to the new website of the Clingendael Institute and they have a link to CIEP. However, it is clear that it took some time before visitors found us again. Towards of the end of the year, unique visitors to the website spanned the globe. Only in a few countries they had failed to re-connect with our website.

Pages on this site were viewed a total of 39,566 times

Pageviews	Unique Pageviews	Avg. Time on Page	Bounce Rate	% Exit
39,566	27,127	00:00:58	47.02%	25.04%

Site Content
- Page
- Page Title

Site Search
- Search Term

Events
- Event Category

	Page	Pageviews	% Pageviews
1.	/	9,041	22.85%
2.	/publications	5,127	12.96%
3.	/about_ciep/staff	2,907	7.35%
4.	/about_ciep	1,868	4.72%
5.	/events	1,672	4.23%
6.	/contact	923	2.33%
7.	/publications/publication/european-power-utilities-under-pressure	857	2.17%
8.	/about_ciep/vacancies	801	2.02%
9.	/about_ciep/staff/member/coby-van-der-linde	794	2.01%
10.	/training	748	1.89%

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PROJECTS

In 2013, 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.

In 2013 the project geopolitics and natural gas for Task Force 3 of IGU (international Gas Union) commenced for a new period leading up to the WGC 2015 in Paris. In this project CIEP, together with IFRI of France, will conduct research and prepare papers and meetings for TF 3 of IGU. In 2015 they will jointly present a final report.

For the ministry of economic affairs, CIEP did research on security of supply in the post-2020 period. On 4 april 2013 we organised two stakeholders meetings. Albert Bressand delivered the key note speech for these meetings. In the fall of 2013 a draft report was delivered to the ministry. After the internal process at the ministry is completed, the report will be made available on CIEP's website.

CIEP has in collaboration with the Florence School of Regulation of European University institute, the Regional Energy Research Centre of Corvinus University Budapest en the Centre for European Policy Studies in Brussels done a project "Schengenizing European Energy policy". In 2013 this resulted in a number of workshops at the various institutions and a publication in 2013, "A Regional EU Energy Policy?" and will lead to more publictions in 2014.

FINANCES

In 2013, the first year of the fourth project period 2013-2016, income of CIEP was projected lower than the previous periods. CIEP planned to draw down some on reserves in this project period. The overall financial result for 2013 was minus € 38,308.

FINANCIAL OVERVIEW FOR 2013

	2011	2012	2013
Contribution stakeholders	€810.000	€810.000	€695.000
Project income	€243.957	€215.102	€132.773
Other income (interest/book sales)	€ 17.007	€17.277	€12.537
Staff costs	€712.098	€714.380	€676.944
Deprecation cost	€ 6.557	€5.506	€4.475
Activity costs	€120.223	€44.924	€40.755
Foundation costs	€175.985	€206.902	€156.444
TOTAL RESULT	€ 56,101	€70,667	- € 38,308

ANNEX 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 Energy markets (oil, gas and electricity) and policy-making in the European Union and geopolitics of international energy policy-making and markets.

ANNEX 2 CIEP RESEARCH AGENDA 2013

In the research plan for the period 2013-2016, *Age of Paradox*, the leading theme is managing competing international and national energy interests in two main research areas: *European energy market developments and policy-making* and *Geopolitics of energy policy-making and energy markets.*

In these two themes, both fossil and renewable energies will feature prominently. We will focus on liquid, gaseous and solid fuels, along the entire value chain. The organisation structure of these markets, such as the level of vertical and horizontal integration, investments, trade flows and the intervention in markets by governments, is of particular interest to understand the business models of both International (Oil) Companies (IOCs) and National (Oil) Companies (NOCs) and (European) power and network companies. Moreover, the driving forces of energy policies of key producing and consuming countries are also important to complete the understanding of the complexities of International and European interest seeking. For that reason, the impact on international political and economic relations (and markets) of a more energy self-sufficient United States will be an important part of research in theme two.

In the period 2013-2016, the long-term energy policies, such as the European 2050 Energy Road Map, and the impact on the energy market model and security of supply will be central in the research efforts. In particular, research will focus on how to keep the market attractive for imported (fossil) fuels during the transition to a more renewable energy mix, and the impact this transition has on security of demand and supply (of oil, and natural gas, renewables) and energy diplomacy. The (relative) pricing of energy and externalities and the impact on the merit order in power generation (and investments) will be another important topic, while government instruments to change the energy mix (and fuel mix in the power sector) will feature high on the CIEP agenda. Based on research in the period 2008-2012, we also begin the endeavour to answer the question how transition to a low carbon economy in a mature or stagnating economy is fundamentally different from this same process under the assumption of growing markets (just like liberalisation in a mature energy market is different from liberalisation in a growing energy market). The insights we hope to gain from this more theoretical question will relate to the work of both themes.

The developments in the energy mix of crucial consumer and producer countries (such as US, China, India, Australia, Canada, Middle East and North Africa, Russia) will be an important element in understanding the geopolitics and geo-economics of energy (supply, trade flows, processing, market structure). The impact of the shale gas revolution and other frontier developments on energy policies is another significant factor to consider in the periods research. In both research themes, the international interests and the national interests will be contrasted.

2013 is the first year of this new research agenda.

Research in the first theme 'Europe' is focussed on changing business models of power companies in Europe. First an update of the portfolio of large power companies is on the agenda, followed by a study in how robust incumbent companies have prepared their portfolio's to include low carbon technologies with a view on the changing government incentives on the energy mix. At the same time, CIEP is involved in a study on regional policy cooperation in NW Europe with FSR (Florence),

REKK (Budapest), and CEPS (Brussels). In the Netherlands we collaborate with PBL. This project will be followed by a project on levels of policy-making (regional, at the member state level, EU level) and the proper level of instrumentation in preparation of a study on possible new market designs. These policy questions come forth from a perceived tendency for national energy policy to take (more) precedence over EU policy-making. The competency of the EU member states over the national energy mix in combination with the decarbonisation naturally places the lead in policy-making with national governments. The EU policies and the internal energy market create the framework within which these national policy choices are made. Based on legacy and national (political) preferences, the fuel choices (and shares) and incentives vary among the member states and threaten to re-erect national barriers in the internal energy market. The concentration of wind and solar energy in Germany is, despite the relative small share of these fuels in the total NW European market, already creating problems in transmission and distribution of power, and structurally changing the business models of nuclear, coal and gas-fired power plants. Such concentration of variable fuels was not foreseen in the scenarios, where the growth of fuels is averaged over the member states. Multiple speeds and the bottlenecks they can create have not been studied very thoroughly. The failure of the EU-ETS to produce robust CO2 prices is also creating perversities in the European markets. Another important strand of research will be the role of gas in the power merit order. In 2012 a study on capacity markets was completed, and additional research on the impact of EU and national policy measures with regard to energy efficiency and renewables on the role of gas in the energy system is developed.

Projects on international energy market developments, the second major theme, focus on oil and natural gas, and some extent coal and renewables. In oil, a study is underway on the impact of tight oil on the US oil market, while a study on the changing structure of the international refining industry and oil trade flows has also been started. The US is projected to import less crude oil in the future and at the same time is importing less oil products. This is impacting both international crude and product markets, but could also affect the geopolitics of oil when the US will be importing less from unstable parts of the world, while both Europe, India and China will import more. The importing countries will seek greater security of supply, but it is not certain that they will do so by supporting multilateral governance of their energy relations.

At the time that crude flows are shifting, also the structure of the world oil refining sector is changing, which is the subject of another project. Refining capacity is expanding in the Middle East and Asia, while capacities in OECD countries are shrinking and oil products flows are changing course. In particular, the export of gasoline to the US from Europe is disappearing, while diesel remains a large import for Europe, changing the recent lucrative business models for the European refining sector. In the European domestic market, oil product markets are projected to decline, partly as a result of efficiency gains in transportation and lower economic growth and partly as a result of fuel switching (LNG, electricity). The European refining industry has thus weakened due to declining petrol exports to the US, and relatively high crude oil prices (compared to the US). The efforts to develop a bio-based economy will also impacting the petrochemical industry, further weakening demand for important parts of the refinery slate without many markets to export these particular products to. The market for transportation fuels in Europe is thus changing, partly as a result of mature market, LNG and bunker, electrical vehicles, changing the business models of European companies. New players, in particular NOC's, enter the European market through purchases of processing assets, hoping to secure demand in this market. Europe may not represent a market with

a growth prospective, in a portfolio of an expanding company, it represent a fairly stable market compared to the more risky growth markets in Asia. Moreover, Rotterdam (and Antwerp) also are attractive hubs for producers such as Russia, from where it can reach world markets more easily than from its own harbours and with less geopolitical risk. The importance of oil for world markets (also for pricing LNG in Asia) is evident from the continued substantial share of oil in the world energy mix, and the expected increased competition between Europe and Asia for oil in the next decades.

In world natural gas markets the impact of the shale gas revolution continues to impact European and Asian markets, while also the prospects of, for instance, Russia to monetise its natural gas reserves have changed. Greater demand for natural gas in Asia, in part because of the nuclear accident in Japan and the expected slow decline in the mix and in part because of growing demand in the coastal areas of China, has redirected a large part of the Middle East LNG to Asian markets rather than the Atlantic ones. A study on the development of US and Chinese natural gas markets are underway. Sluggish economic growth and the precarious position of natural gas in the European power merit order, has impacted demand for natural gas in Europe. Competition from cheap coal from the US (where coal is being backed out by cheap gas in the power sector) is further complicating European gas demand, while the prospect of importing relatively cheap US LNG is still uncertain. An update of an earlier study on world natural gas pricing systems has started.

As part of a follow up of the IGU project on Geopolitics and natural gas, a new project has started and a number of shorter publications on 'hot spots', such as the East and South China Sea, the East Mediterranean, is in preparation, while also developments in major producing and consuming countries will also feature in the studies.

Security of delivery (as part of security of supply) similarly needs researching. With more renewables in the energy mix it is unclear how security of delivery is guaranteed without sufficient back-up systems and without a crisis management system. The capacity mechanism study can be seen as the start of a chain of studies that will investigate the complexities of an interrelated energy system with more variable sources. One could argue that wind and solar energy improve security of supply but not security of delivery. It is possible that security of delivery will become more important in policymaking in Europe and that security of supply, still important policy drivers in China and India, will become less important. What will be the implication for policymaking and for Europe's role in IEF, IEA etc. It is possible that such a project could develop in the course of the year on the back of a project for ELI on security of supply. Much will depend on the progress of other studies and the research capacity. If such a project cannot start in 2013, we will definitely include it in the 2014 agenda.

ANNEX 3: AGE OF PARADOX: ENERGY MARKETS AND POLICY-MAKING

CIEP RESEARCH AND ACTIVITY PLAN FOR THE PERIOD 2013-2016

Research focus for the period 2013-2016

In the previous four-year research plan, *Between a Rock and a Hard Place*, CIEP focussed on conflict and cooperation as the leading theme in the three research areas (in short, European energy markets, Security of supply, and renewable energy). In the research plan for the period 2013-2016, *Age of Paradox*, the leading theme is managing competing international and national energy interests in two main research areas: European energy market developments and policy-making and Geopolitics of energy policy-making and energy markets.

In these two themes both fossil and renewable energies will be studied, concentrating on liquid, gaseous and solid fuels, along the entire value chain. The organisation structure of these markets, such as the level of vertical and horizontal integration, investments, trade flows and the intervention in markets by governments, is of particular interest to understand the business models of both International (Oil) Companies (IOCs) and National (Oil) Companies (NOCs) and (European) power companies, while the driving forces of energy policies of key producing and consuming countries are also important to understand the complexity of International and European interest seeking. The impact on international political and economic relations (and markets) of a more energy self-sufficient United States will be an important part of research in theme two.

In the period 2013-2016, the long-term energy policies, such as the European 2050 Energy Road Map, and the impact on the energy market model and security of supply will be central in the research efforts. In particular, research will focus on how to keep the market attractive for imported (fossil) fuels during the transition to a more renewable energy mix, and the impact this transition has on security of demand (of oil, and natural gas) and energy diplomacy. The (relative) pricing of energy and externalities and the impact on the merit order in power generation (and investments) will be another important research area, while government instruments to change the energy mix (and fuel mix in the power sector) will feature high on the research agenda. The developments in the energy mix of crucial consumer and producer countries (such as US, China, India, Australia, Canada, Middle East and North Africa, Russia) will be an important element in understanding the geopolitics and geo-economics of energy. The impact of the shale gas revolution and other frontier developments on energy policies is another important factor to consider in the periods research. In both research themes, the international interests and the national interests will be contrasted.

All studies on oil, gas and renewable markets, and policy-making concerning the energy mix will be bundled in these two research themes. Our main interests are developments in the market for mobility and power generation, while industrial markets and value chain structures are also crucial.

The Gas group, Fuel mix group and Oil group are the main instruments in generating studies for the yearly agendas of the first theme. Theme two is mainly fed from research requests of governments and international institutions, although also the public research agenda cover this theme. Also here, the various brainstorm groups are expected to deliver topics for further research. Research under theme one is often done in smaller research groups, where staff from sponsors complements and/or supports CIEP staff. In theme two, CIEP staff often takes the lead and seek knowledge and discussion from sponsors, often through the brainstorm groups or contact group. Theme one research will have

a greater European (and sometimes Dutch) focus, while theme two will take the global energy scene as its point of departure. The successful formula of the brainstorm groups as the focus of internal discussion for the scope of studies will be unchanged. The composition of the groups gives CIEP a broad sounding board, while cooperation with other institutes prevents CIEP from becoming parochial in its approach. The change from three themes to two is merely a reflection of how integrated the security of supply/demand, environment and markets has become, both from a market and a government perspective.

Explanation new set up of research agenda for the period 2013-2016

In the previous two project periods (2004-2008; 2009-2012) we had subdivided the research into three main themes: the European energy markets; the geopolitics of energy supply and demand (security of supply and demand issues); and the low carbon energy mix. Increasingly, these three themes have become harder to separate from each other in the research projects. In markets for liquid fuels, biofuels have gained more market share in the market for transportation fuels, while in electricity generation, low carbon energy sources, such as hydro and nuclear, have been joined by biomass, wind, solar. In the heating and cooling sector, geothermal is gaining ground. Also in statistical data, renewable fuels are becoming more integrated, which makes it more natural to include all the fuels in the energy mix in our research agenda.

The introduction of these new fuels is policy driven and sometimes also (geo)politically or strategically driven. With the introduction of renewables into the national energy mixes, the role of the government in the energy sector is bound to expand in the coming period. Also, the current era of liberalisation in the OECD countries seems to have come to an end, at least in terms of its drive, also in the energy sector. As such, the emphasis of policy-making is now shifting to how liberalised energy markets can be regulated to allow for the introduction of renewable fuels. This is a main issue in Europe, in other economies, such as the US, the ample supply of natural gas has recently changed the energy landscape radically. Very often renewables are also seen or presented in the context of diversification of the energy mix and as such also part of the security of supply agenda. This very much depends on the domestic renewable potential of economies or regions. Imported renewables do not always create more security of supply, particularly not when the imports originate in one or two exporting countries and when the share of renewables in the energy mix becomes very large. Also renewable markets do not represent the same liquidity as for instance oil or to a lesser extent natural gas and coal, requiring different risk management tools for market participants. The intermittent nature of many of the renewable resources also implies that more complicated balancing services are required and that storage of electricity becomes a critical precondition. The inclusion of more renewables in the energy mix will pose new energy policy challenges that sometimes are underestimated. Availability of water, access to minerals and storage are examples. Connectivity also plays a major role. With European integration currently under stress, there should be concern about the internal market and the assumptions on which many market players have approached the European energy market in the past few years.

The incentives to manage the energy mix are different for various countries, depending on the main energy policy concern. In the US, the incentives to stimulate new fuels into the energy mix are mainly security driven and are focussed on reducing oil import dependency. The prospect of increasing oil imports, the concentration of conventional reserves in the Middle East, and the rising prices

stimulated the development of biofuels. Yet, also other issues influence the choice of governments to stimulate some fuels over others. In the US the agricultural sector faced declining government subsidies, in part because of WTO negotiations and in part because of fiscal concerns. The stimulation of corn-based biofuels can be seen as a way to reintroduce certain farm subsidies for hard-pressed American states. Also political arguments play a role. In general, there is a big difference in main policy drivers among states with and without sufficient fossil fuels resources, and those with renewable potential. The introduction of shale gas in the energy mix of the US has changed the strategic outlook of the country from being increasingly import-dependent to a country with substantial domestic resources, also in a carbon poorer mix. The main concern continues to be oil security, with a different geographical focus.

In China, the main focus is also on security of oil supply and the development of oil prices. Although China is rapidly becoming a main producer of windmills and solar panels, based on relatively cheap labour and the availability of rare earth inputs, the place of coal in the Chinese energy mix will remain very large indeed. Due to the geographical shift in economic (industrial) activity to the Asian economies, carbon and energy intensity of economic growth began to climb again after decades of declining. Given the growing import dependency of China, but also of India and other emerging markets, stimulation of domestic resources, fossil or renewable, will be deemed crucial to manage the balance of payments and the internal economy. The emerging economies have so far prioritised economic growth over sustainability, but this could change in the coming decades. In the coming years, China will still be poised on economic growth and will subsequently have to handle its increasing call on imported energy. Diversification to source and origin and energy efficiency will be the main policy instruments it can deploy, but the concentration of resources and limited access to foreign resources for investment will limit the effectiveness of the diversification policy.

With domestic oil and gas resources maturing or declining, the import dependency will increase. This also played a major role in discussions in the current project period. The dependence on Russian gas became a major (political) issue, not in the least because of the larger dependency of the new member states on one supplier and concentrated transit routes. Where west European countries were able to manage their dependency in gas with LNG supplies, and alternative routes, the east has fewer options. Shale could develop into an important tool of security of supply for this region, but west Europe is less favourably poised to develop this option. The natural gas discussion will continue to be important in the coming years, not in the least that natural gas provides emission advantages that coal with biomass cannot provide and with CCS on a commercial basis some years away. With a relatively declining carbon footprint (because of growing footprints of emerging markets) Europe must carve out a no regret energy strategy, which does not impair its economic competitiveness. A non-fossil strategy in an open world economy is more difficult when other competitors make other choices and the ability to finance such a strategy is constrained. The medium term problems could be too large to leap frog into the envisaged 2050 low carbon world without other main economies making similar commitments. At the same time, the governance costs of international energy may become much higher and geopolitically very different, forcing Europe to make hard choices. The European climate and energy discussion remain crucial for future energy market developments, just like international market developments in oil and gas will remain important drivers.