

CLINGENDAEL
INTERNATIONAL
ENERGY
PROGRAMME

| CIEP

ANNUAL REPORT 2016



May 2017

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 other parties 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 also contributes to international and European debates on energy by actively participating in numerous international conferences and expert workshops – where research findings are disseminated and inputs for further research are gathered. CIEP’s research, training and activities focus on economic and geopolitical dimensions of international energy and energy transition.

As of 2016, CIEP is endorsed by The Netherlands Ministry of Economic Affairs, The Netherlands Ministry of Foreign Affairs, The Netherlands Ministry of Infrastructure and the Environment, BP Europe SE-BP Belgium/ BP Europe SE-BP Nederland, Coöperatieve Centrale Raiffeisen-Boerenleenbank B.A. ('Rabobank'), Delta N.V., ENGIE Energie Nederland N.V./ ENGIE E&P Nederland B.V., Eneco Holding N.V., EBN B.V., Essent N.V., Esso Nederland B.V., GasTerra B.V., N.V. Nederlandse Gasunie, Heerema Marine Contractors Nederland B.V., ING Wholesale Banking N.V., 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., Wintershall Nederland B.V.

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POST-PARIS NEW BUSINESS IS USUAL

The year began with a flurry of suppositions about the implications of the Paris agreement. Most commentaries declared the age of fossil fuels over. This may be true in some economies where the share of renewables is increasing rapidly and where renewables have radically changed domestic markets for power generation. But power is only a share of our energy consumption, and mobility and heating at all sorts of temperatures still rely largely on fossil fuels. With the Paris agreement in hand, these sectors of energy consumption will also begin to adopt new energy technologies, as the energy transition is getting deeper.

At the same time, looking at world demand in any 2°C scenario, fossil fuels still contribute substantially in the world energy mix, although the share in the global mix will decline. Economic and demographic growth drive the increase in energy demand. In particular, the rise of middle classes in developing countries is set to greatly impact demand growth. Much of this growth will translate in demand for new energy technologies, as current investments already show, but substantial volumes of fossil fuels will stay in the global mix. As a matter of fact, the potential decline in oil demand in a 2°C scenario, is outpaced by the depletion of current oil fields, requiring substantial investments in new oil fields to satisfy lower oil demand compared to today. In the public discussions, these insights are often misunderstood, and lead to unrealistic projections of the future transition path and investment requirements.

Decisions on new energy investments must also be weighed against the objective of eradicating energy poverty. In order to guarantee energy access to a wider share of the world's population, investments in conventional energy sources may therefore have to complement investments in renewables in developing countries. Much will depend on the development of the energy systems in countries and the ability to integrate new technologies.

Indeed, the growth of investments in solar and wind outpace those in crude oil, natural and coal. The cost of solar and wind projects showed again spectacular declines everywhere and capacities in China, the United States and Europe continued to grow. The expansion of investments in renewables is partly due to the attraction of renewables as an alternative for imported fuels, partly the government support schemes, and partly the poor investment climate in oil and gas since 2014, when markets became oversupplied. Another interesting issue in energy investments is that, apart from China, the post-Paris investments have not led to a renewed interest in nuclear.

The low oil and gas prices greatly impacted the producing countries and are perhaps an indication of the pressing need in these countries to diversify their economy away from oil and natural gas as the only source of income and become less vulnerable to price and volume fluctuations. The management of growing and declining energy industries is going to challenge international energy relations, because sufficient investments are needed to guarantee their availability at reasonable prices during the long global transition. Yet, we also know from past transitions that managing such changes smoothly over time is incredibly difficult and bound to exacerbate boom and bust cycles. To be sure, we still do not fully understand the impact of new energy technologies in our markets, nor do we really understand the socioeconomic drivers of accepting new energy technologies beyond a certain share. From previous transitions, we learned that both the comfort level of the new energy technology and its affordability matter.

In January 2016, oil and gas prices hit new lows, challenging all the producers. More than 350.000 jobs were lost worldwide since mid-2014, before OPEC announced in November 2016 to support the oil price with production cuts in 2017. Most of these jobs were lost in oil and gas service companies that are still waiting for a resumption in upstream investments. We already see some workers being retrained for work in the offshore wind industry. If oil and gas prices pick up, and investments return, it will be hard to draw back labour into the industry in some countries. In the United States, the period of low oil and gas prices has led to substantial efficiency gains in the shale industry. From relatively high cost oil and gas, they managed to position themselves lower on the cost curve, and indications are that shale production will be resumed ahead of costlier offshore projects. Another benefit of shale in the US is the much shorter investment cycle and the ability to hedge on markets. This has changed the dynamics of international oil and gas markets. With the capacity of the US to export LNG and the abolition of the crude oil export ban, shale oil and gas is more directly connected to international markets. Oversupply in natural gas markets will take some time to be worked away by the market, and during this phase, EU security of supply concerns will be less prominent. However, relying on markets for delivering security of supply will prove more complicated in tighter market conditions.

Apart from new energy technologies, the developments in the power-trains in the car industry is also making itself felt. The number of electric or hybrid vehicles is growing and diesel and gasoline are less likely to maintain their monopoly in this market segment in the future. This will, together with the IMO ruling on fuel oil quality for ocean-going vessels, greatly impact the refining sector. At the same time, refining capacity in the Middle East is still growing and upgraded elsewhere, adding to the competitive pressures of traditional refining strongholds. In the EU, substantial capacities have been transformed already in either storage or other functions. The exit costs can be substantial, but the pressure to improve carbon and energy efficiency is also mounting for refiners in the EU. Efforts to improve the carbon and energy efficiency of refineries by connecting them to waste heat systems and/or CO₂ capture and storage systems may help to sustain refinery capacity in important clusters where refineries and petrochemical plants are integrated. The increasing capacity of onshore wind in the Netherlands is also opening new energy system integration potential in the form of so-called e-products, where electricity is transformed in chemicals and help to balance supply and demand (through storage/energy carrier concepts) in the entire energy system. Particularly economies that are based on processing and transporting energy in the form of molecules are looking at these possibilities, while economies that had large nuclear sectors are already more electrified. The lay-out of the electricity grids is heavier than in the 'molecule oriented economies' and the cost of expanding electricity grids on the one hand, and available capacity in pipeline grids on the other, may become an important element in deciding the transition route or path of a country.

Post-Paris had a substantial impact on the long-term outlook of international energy markets and made new business is usual a reality.

Most of the developments mentioned above have been the subject of CIEP papers and events in 2016 and will continue to be key elements of the new energy agenda for the fifth project period (2017-2020) of CIEP.

BOARD OF THE FOUNDATION: STICHTING FONDS INSTITUUT CLINGENDAEL (SFIC) IN 2016

Drs. G.H.B. Verberg, chairman (until 30 June 2016)
Drs. H.D.A. Haks, treasurer (until 31 May 2016)
Mr. W.O. Russell, member
Ir. R. Willems, member
Mw. Mr. I. L. Van Veldhuizen, member
Ir. J.M. van Roost, member
Dr. R. Roborgh, member
Drs. G.J. Lankhorst, chairman (from 1 July 2016)
J. van Hoof, RA, treasurer (from 1 September 2016)

The Clingendael International Energy Programme (CIEP) is a project of Stichting Fonds Instituut Clingendael (SFIC) since 1 September 2001. Each project period lasts four years. The year 2016 is the fourth and last year of the fourth project period (2013-2016). In 2017 a new (fifth) project period starts.

CIEP SUPPORTING INSTITUTIONS

In 2016, the following institutions supported CIEP:

BP Europe SE- BP Nederland
Coöperatieve Centrale Raiffeisen-Boerenleenbank B.A. ('Rabobank')
Delta N.V.
Dutch Ministry of Economic Affairs
Dutch Ministry of Foreign Affairs
Dutch Ministry of Infrastructure and the Environment
EBN B.V.
Eneco
Essent N.V.
Esso Nederland B.V.
Havenbedrijf Rotterdam N.V.
Heerema Marine Contractors Nederland B.V.
GasTerra B.V.
ENGIE Energie Nederland N.V.
ENGIE E&P Nederland B.V.
ING Commercial Banking
Koninklijke Vopak N.V.
Nederlandse Aardolie Maatschappij B.V.
N.V. Nederlandse Gasunie
N.V. NUON Energy
Oranje-Nassau Energie B.V.
Shell Nederland B.V.
Taq Energy B.V.
TenneT TSO B.V.
Total E&P Nederland B.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. 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.

CIEP STAFF

In 2016, the CIEP staff comprised the following employees:

Coby van der Linde	director	(1.0 fte)
Pier Stapersma	senior researcher	(1.0 fte)
Luca Franza	researcher	(1.0 fte)
Daan Rutten	researcher	(1.0 fte)
Maurits Kreijkes	researcher	(1.0 fte)
Michiel Nivard	researcher	(1.0 fte)
Nora Meray	researcher	(0.3 fte) from 15/1/2016-1/9/2016
Diederik Klip	researcher	(1.0 fte)
Iulia Pisca	researcher	(1.0 fte)
Wendy Auf dem Brinke	assistant	(0.8 fte)
Marco Blankestijn	fin. administrator	(0.2 fte)

In addition to the research staff, CIEP had in 2016 three fellows, two senior associate fellows and four associate fellows:

Jacques de Jong	senior fellow	(0.2 fte)
Dick de Jong	senior fellow	(0.2 fte)
Maria van der Hoeven	senior fellow	
Luc Werring	senior associate fellow	
Christian Cleutinx	senior associate fellow	
Aad Correljé	associate fellow	(0.15 fte)
Pieter Boot	associate fellow	(project basis)
Martien Visser	associate fellow	(project basis)
Robbert van den Bergh	associate fellow	(project basis) until 1/3/2016

During 2016, the following students/interns contributed to the activities of CIEP:

Tristan Wanders	student intern (from 8-8-2016- 31-3-2017)
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Other functions held by CIEP director:

- Member of the Wise Person group of the IGU (since 2004)
- Member of Regieteam Topsector Energie
- Member of the Supervisory Board of Wintershall Nederland B.V. (WINL) and Wintershall Noordzee B.V. (since fall 2015)
- 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 IS NOW 15 YEARS OLD

It is also worth noting that CIEP celebrated its 15th anniversary in 2016. All work of the past 15 years is available on the CIEP website. Browsing through the work, it becomes clear that CIEP has consistently been striving for exploring topical issues of the time, always aiming to stay ahead of the curve. For 15 years, this work has relied on the efforts of young researchers in conjunction with more experienced fellows and crucial input from leading experts affiliated to sponsor and partner organisations. In the course of 15 years the extended CIEP family has grown substantially and many former employees are working in areas connected to their original research at CIEP.

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, in which CIEP decides to participate on a case by case basis depending on the relevance of the project for its outstanding agenda. 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. In November 2016, for instance, we jointly organised an international oil workshop with OIES and Kapsarc in Oxford.

INTERNAL ORGANISATION

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

CIEP PUBLICATIONS

The following overview highlights a selection of 2016 publications, most of which are available on CIEP's website (www.clingendaelenergy.com/publications). CIEP (associated) staff also published articles elsewhere, which are listed under the tab "other work" (www.clingendaelenergy.com/otherwork). In 2016 CIEP published 6 research papers and 5 briefing papers.

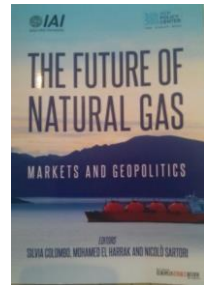
CIEP PAPERS

- Robbert van den Bergh, Maurits Kreijkes and Michiel Nivard, **Long-Term Prospects for Northwest European Refining**, CIEP, April 2016
- Iulia Pisca, **Outlook for EU Gas Demand and Import Needs to 2025**, CIEP, September 2016;
- Luca Franza, **Outlook for Russian Pipeline Gas Imports into the EU to 2025**, CIEP, September 2016;
- Luca Franza, **Outlook for Gas Imports from New Suppliers Into the EU to 2025**, CIEP, September 2016;
- Luca Franza, **Outlook for LNG Imports into the EU to 2025**, CIEP, CIEP, September 2016;
- **Prospects For Sustainable Diversification of the EU'S Gas Supply**, CIEP, , September 2016.

BRIEFING PAPERS

- Marie-Claire Aoun and Daan Rutten, **EU Security of Gas Supplies: Solidarity Runs through the Pipeline**, CIEP/IFRI, May 2016
- Katarina Kertysova, **The Paris Climate Negotiations**, CIEP, April 2016
- Daan Rutten, **The Energy Union**, CIEP, March 2016

- Daan Rutten, The EU ETS Reforms, CIEP, March 2016
- Luca Franza, Developments in Gas Supplies to Europe, CIEP, March 2016



OTHER PUBLICATIONS

- The Future of Gas: The Transition Fuel?, Luca Franza, Dick de Jong and Coby van der Linde, in: **The Future of Natural Gas, Markets and Geopolitics**, Silvia Colombo, Mohamed El Harrak and Nicolo Sartori (eds.), Institute Affari Internazionali (IAI), OCP Policy Center, Lenthe/ European Energy Review, Hof van Twente, The Netherlands. http://www.iai.it/sites/default/files/iai-ocp_gas.pdf, 29 October 2016
- Luca Franza and Coby Van Der Linde, Geopolitics and the Foreign Policy Dimension of EU Energy Security, in: **Energy Union: Europe's New Liberal Mercantilism?**, Svein S. Andersen, Andreas Goldthau, Nick Sitter (eds.)
- Europa: Fattibilità della diversificazione dell' offerta di gas naturale, Luca Franza, in: *Revista Energia (RIE)* 4/2016. <http://www.clingendaelenergy.com/files.cfm?event=files.download&ui=C85B0C02-5254-00CF-FD0389F4C6307511>

COLUMNS

The 2016 columns of Coby van der Linde (<http://www.clingendaelenergy.com/columns>), Pieter Boot, Aad Correlje, and Martien Visser appeared at *Energieforum* (www.energieforum.nl).

EVENTS/ACTIVITIES

CIEP organised various events (meetings, training programmes, conferences, etc.) in 2016. See the list of events below, which is also available on <http://www.clingendaelenergy.com/events>; select 2016:

9 February 2016	Presentation Ministry of Economic Affairs of the <i>Energierapport 2015</i>
10 March 2016	Roundtable 'towards 2030', with ECN
15 April 2016	Scenarios for the Dutch Electricity Supply System, presentation by Frontier Economics
12 May 2016	Developments in International Refining
28 June 2016	CIEP Energy lecture; BP Outlook 2030 and Statistical Review 2016 by Spencer Dale, BP
8 September 2016	CIEP/Nogepa Gasday
17 November 2016	Presentation of IEA The World Energy Outlook 2016, Tim Gould (IEA)
12 December 2016	Video presentation of 'The End of Fossil Fuels' by Dieter Helm

TRAINING

31 May 2016	International Oil and Gas Markets
7 December 2016	European Energy Markets and Policy-making

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 (26-27 September 2016; Jacques de Jong and Pier Stapersma).

Coby van der Linde and Luca Franza also taught the course 'International and European Gas Markets' in the Energy Master programme of SciencesPo in Paris in January-March 2016.

CIEP also contributed to training programmes directed to government officials, diplomats, personnel of international organisations and energy professionals, organised among others by the Clingendael Institute and the Energy Delta Institute. (EDI).



CIEP MEETINGS

Board Stichting Fonds Instituut Clingendael

30 May 2016

1 December 2016

Advisory board

23 June 2016 & 12 December 2016

Contact group

8 March 2016

14 June 2016

11 October 2016

6 December 2016

Gas group

9 February 2016

26 April 2016

7 June 2016

29 November 2016

Fuelmix group

15 April 2016

14 June 2016

13 September 2016

11 October 2016

15 November 2016

Oil group

7 September 2016

6 December 2016

LECTURES, SPEECHES, PRESENTATIONS, MEDIA

During 2016, CIEP staff members gave numerous lectures, speeches, and presentations or chaired sessions during training courses, conferences and seminars. CIEP staff in 2016 also gave various radio, television and written media interviews.

EXTERNAL LECTURES/PRESENTATIONS

27 February 2016 Presentation Uniper (Daan Rutten)

1 March 2016 'From South Stream to Turk Stream' at the Netherlands Royal Society of Engineers (KIVI), The Hague (Luca Franza)

1 March 2016 EU refining forum, Brussel (Michiel Nivard & Maurits Kreijkjes)

8 March 2016 Offshore Energy Stakeholders Meeting, Rotterdam (Coby van der Linde)

17 March 20-16	5th GasNaturally Member States Gas Forum under the NL Presidency patronage (Panel – Coby van der Linde)
12 April 2016	Master Class on European Security of Gas Supply to Members of the Dutch Parliament, energy, (project for Publieke Zaken)
20 April 2016	Lecture on long-term gas contract clauses and pricing mechanisms for the Energy Delta Institute's course on the natural gas value chain, Amsterdam (Luca Franza)
27 May 2016	Launch of the book chapter 'The Future of Gas: The Transition Fuel?' in the IAI-OCP International Seminar and Book Presentation 'The Future of Natural Gas: Markets and Geopolitics', Rabat, Marocco (Luca Franza)
5 June 2016	Egmont Conference, Brussel (Jacques de Jong)
16 June 2016	CEPS RT Regional SEE Policy, Brussel (Jacques de Jong)
16 June 2016	Master Class on European Security of Gas Supply to Members of the Dutch Parliament (foreign affairs) – The Hague, project for Publieke Zaken (Daan Rutten, Luca Franza, Coby van der Linde)
5 July 2016	Seminar maatschappelijk verantwoord beleggen (BMO Global Asset Management) (Coby van der Linde)
7 July 2017	Penta Expert Stakeholders meeting (Jacques de Jong)
18 August 2016	Groningen Energy Summer School 2016 (Coby van der Linde)
14 September 2016	ING meeting on energy issues, presentations (Coby van der Linde and Pier Stapersma)
27 September 2016	KAPSARC workshop LNG Markets in Transition: The Great Reconfiguration, Washington DC (Coby van der Linde)
29 September 2016	Lecture 'Basics of Energy' organised by Energy Academy Europe for students of the Hanze UAS and the University of Groningen, Groningen (Luca Franza)
6 October 2016	Oil & Gas Workshop ING, Scheepvaart Museum Amsterdam (Coby van der Linde)
13 October 2016	Presentation of the Paper Series 'CIEP Perspectives of EU Gas Market Fundamentals', EDF Annual Stakeholders Meeting, Milan (Luca Franza)
20 October 2016	Presentation of gas studies at IGU meeting, Amsterdam (Coby van der Linde)
25 October 2016	Presentation on the Outlook for LNG Imports into Europe by 2025 at the 2016 Offshore Energy Conference (session on gas fuelled offshore vessels) – Amsterdam (Luca Franza) and presentation at Offshore Energy Industrial Panel (Coby van der Linde)
1 & 2 November 2016	International Energy Dialogue, Riyadh followed by IAC Meeting Kapsarc, Riyadh (Coby van der Linde)
16 November 2016	DNV-GL Energy Event, Brussel (Pier Stapersma)
25 November 2016	OIES one day seminar ' Navigating the Oil Market's Rebalancing: Setting the stage for the next price spike', Oxford (Coby van der Linde, Jan-Hein Jesse)
28 November 2016	Presentation on the Outlook for gas supplies to Europe by 2025 at the ERRA Training on Principles of Natural Gas Market Regulation, Budapest (Luca Franza)
15 December 2016	Presentation at meeting of ING Board with representatives of the energy service industry, Amsterdam (Coby van der Linde)
16 December 2016	Presentation of research findings on future gas market fundamentals to members of the Global Resources team of ING Bank, Amsterdam (Iulia Pisca and Luca Franza)

OTHER EXTERNAL MEETINGS

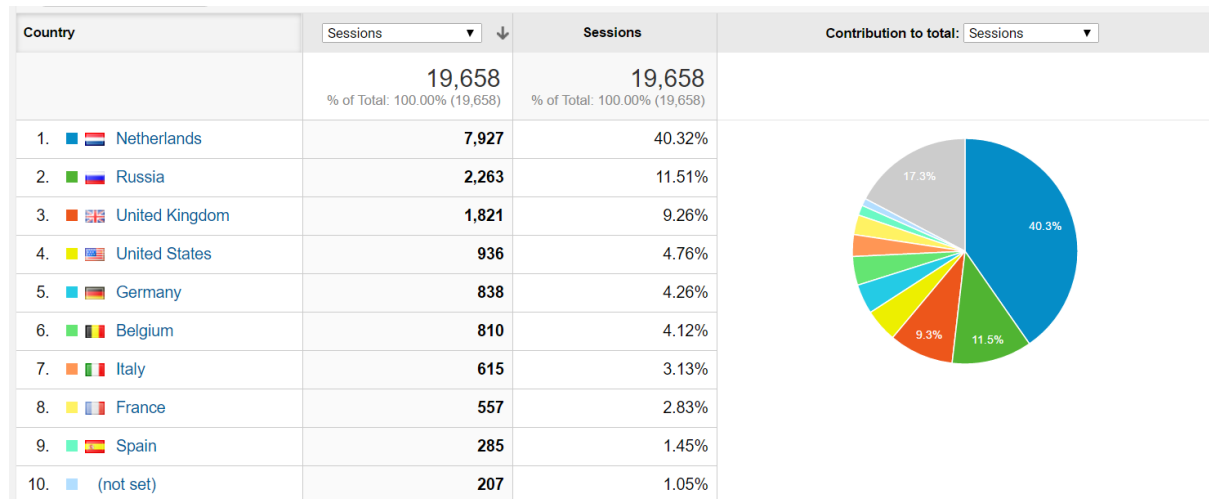
28 – 30 March 2016 Energy Workshop Series on Utilities of the Future, KAPSARC New York

	(Pier Stapersma & Coby van der Linde)
8 April 2016	Energie efficiency in de industrie/ISPT (Jacques de Jong)
14 April 2016	Future Power Market Platform 4th Workshop 2016, Parliament – Huys Clingendael, The Hague (Daan Rutten – Jacques de Jong)
26 April 2016	Oil Seminar Brussel (Michiel Nivard)
2 May 2016	Ministry of Economic Affairs – Berenschot; Workshop ‘Toekomst beleidsonderzoek duurzame energie en ECN’ (Coby van der Linde)
25 May 2016	OIES Brainstorm XXVII, Edingburgh (Coby van der Linde)
22 June 2016	Berenschot/Quintel - verbindingsovereenkomst energietransitie (Pier Stapersma)
27 & 29 June 2016	CEPS, Brussel (Jaques de Jong)
29 June 2016	Brussels EU ETS meeting (Daan Rutten)
22 September 2016	Neyenrode, Micro MBA Energy transition (Daan Rutten & Maurits Kreijkes)
27 September 2016	Eurelectric Conference, Brussel (Jacques de Jong)
27 September 2016	Meeting Fuels Europe, Brussels (Michiel Nivard & Maurits Kreijkes)
5 & 6 October 2016	EPEX Power Market Conference, Brussels (Jacques de Jong)
20 October 2016	Energy and Climate Outlook, Friends of Europe, Brussels (Daan Rutten)
31 October 2016	TU Delft oil workshop, Rotterdam (Maurits Kreijkes)
5-6 December 2016	Egmont Conference, Brussel (Jacques de Jong)
13-14 Decemer 2016	G-20 Energy transition workshop, Munich (Pier Stapersma)
14 December 2016	IEA-IEF-OPEC Seminar on Gas & Coal Markets, Paris (Luca Franza)

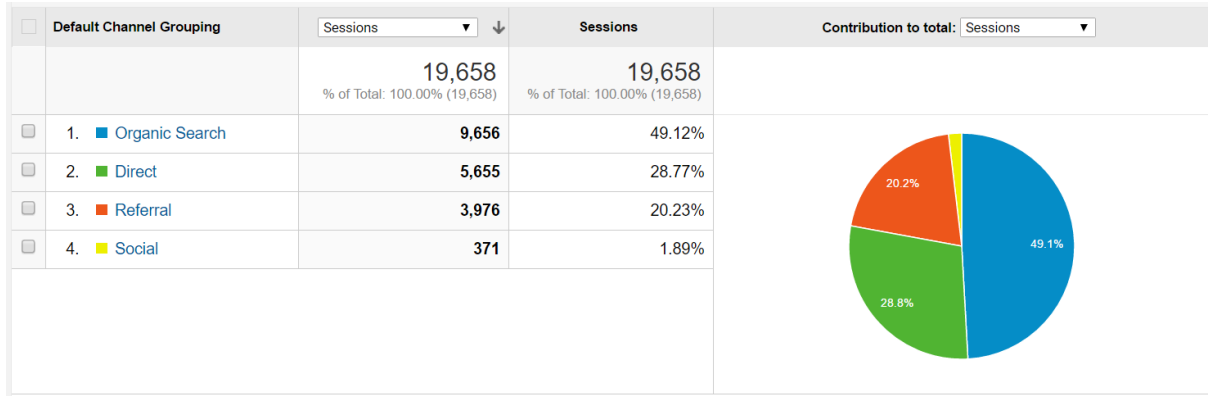
WEBSITE

Everything CIEP published or organised from 2001 onwards, could be found at www.clingendaelenergy.com. Internet is an important communication and information dissemination tool for CIEP.

This is where our visitors came from in 2016:



This is how they reached us:



Unique page visits to our publications in 2016:

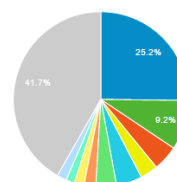
		9,747 % of Total: 17.95% (54,303)	9,747 % of Total: 17.95% (54,303)
1.	/publications/publication/long-term-prospects-for-northwest-european-refining	2,543	26.09%
2.	/publications/publication/long-term-gas-import-contracts-in-europe	842	8.64%
3.	/publications/publication/from-south-stream-to-turk-stream	665	6.82%
4.	/publications/publication/outlook-for-eu-gas-demand-and-import-needs-to-2025	539	5.53%
5.	/publications/publication/the-new-dimensions-of-geopolitics	484	4.97%
6.	/publications/publication/prospects-for-sustainable-diversification-of-the-eus-gas-supply	357	3.66%
7.	/publications/publication/solar-pv-in-a-strategic-world	330	3.39%
8.	/publications/publication/outlook-for-russian-pipeline-gas-imports-into-the-eu-to-2025	326	3.34%
9.	/publications/publication/crude-oil-markets-in-2015-the-battle-for-market-share	296	3.04%
10.	/publications/publication/transition-what-transition	260	2.67%
11.	/publications/publication/outlook-for-lng-imports-into-the-eu-to-2025	253	2.60%
12.	/publications/publication/outlook-for-gas-imports-from-new-suppliers-into-the-eu-to-2025	229	2.35%
13.	/publications/publication/the-north-seas-offshore-grid	229	2.35%
14.	/publications/publication/the-changed-geopolitics-of-energy-and-climate	211	2.16%
15.	/publications/publication/why-energy-per-carbon-matters	171	1.75%
16.	/publications/publication/russias-oil-export-strategy-two-markets-two-faces	145	1.49%
17.	/publications/publication/the-energie-wende-and-germanys-industrial-policy	137	1.41%
18.	/publications/publication/study-eu-energy-supply-security-and-geopolitics	123	1.26%
19.	/publications/publication/natural-gas-in-the-netherlands—from-cooperation-to-competition-2003	100	1.03%
20.	/publications/publication/security-of-supply-in-the-run-up-to-the-post-2020-period	81	0.83%

Unique page visits for events in 2016:

		2,424 % of Total: 4.46% (54,303)	2,424 % of Total: 4.46% (54,303)
1.	/events/event/ciepnogepa-gas-day	1,184	48.84%
2.	/events/event/developments-in-international-refining	250	10.31%
3.	/events/event/presentation-of-the-2016-world-energy-outlook	193	7.96%
4.	/events/event/ciep-energy-lecture-by-spencer-dale-chief-economist-bp	124	5.12%
5.	/events/event/dutch-energy-policy-frontier-economics-scenarios-for-the-dutch-electricity-supply-system	79	3.26%
6.	/events/event/roundtable-towards-2030	73	3.01%
7.	/events/event/ciep-training-european-energy-markets-and-policy-making-	69	2.85%
8.	/events/event/ciep-training-international-oil-and-gas-markets	61	2.52%
9.	/events/event/presentatie-over-energie-rapport	55	2.27%
10.	/events/event/presentation-of-the-2015-iea-world-energy-outlook	46	1.90%
11.	/events/event/ciepnogepa-gas-day-2015	37	1.53%
12.	/events/event/ciep-gas-day	33	1.36%
13.	/events/event/global-energy-markets-us-shale-china-rebalancing-and-eu-energy-security	25	1.03%
14.	/events/event/looking-back-looking-forward-bp-statistical-review-2015-and-bp-outlook	25	1.03%
15.	/events/event/energy-transitions-across-europe—the-future-challenge-for-utilities-and-governments	22	0.91%
16.	/events/event/ciep-training-european-energy-union-more-than-the-national-parts	21	0.87%
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Unique page visits ‘overall’ in 2016:

		40,509 % of Total: 100.00% (40,509)	54,303 % of Total: 100.00% (54,303)
1.	/	9,922	25.19%
2.	/publications	2,552	9.18%
3.	/publications/publication/long-term-prospects-for-northwest-european-refining	2,258	4.68%
4.	/about_us	1,476	3.28%
5.	/about_us/staff	1,000	4.79%
6.	/events	993	3.80%
7.	/events/event/ciepnogepa-gas-day	991	2.18%
8.	/about_ciep/staff/member/coby-van-der-linde	878	1.80%
9.	/publications/publication/long-term-gas-import-contracts-in-europe	790	1.55%
10.	/training	764	1.80%



PROJECTS

In 2016, CIEP continued with the ‘envoy’ project with the Ministry of Economic Affairs and also contributed in kind to the master class project of Publieke Zaken (for members of parliament)

FINANCES

2016 was the last year of the fourth project period (2013- end 2016). Income was lower and costs were higher compared to 2015. In 2016, the public research and activities agenda for the project period needed to be completed, leaving little time for projects. As a matter of fact, some of the work on this agenda will run over into the first year of the fifth project period. The positive result of

€98.807 of the public agenda will be used to fully complete the work in 2017. The overall financial result for 2016 was -€151.141.

	2014	2015	2016
Contribution stakeholders	€715.000	€715.000	€715.000
Project income	€191.841	€101.202	€53.341
Other income	€ 3.769	€4.762	€612
Staff costs	€651.853	€544.277	€730.443
Deprecation cost	€4.723	€4.728	€5.014
Activity costs	€51.588	€37.299	€55.385
Foundation costs	€206.078	€165.625	€122.828
Taxes		€32.732	€6.424
TOTAL RESULT	- €36.364	€62.273	-€151.141



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

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 efforts 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 covers 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 as 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 are sometimes 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, other issues also 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 considered 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 of energy sources and geographical origin, alongside energy efficiency, will be the main policy instruments it can deploy. However, 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, 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. Whereas Western European countries have been able to manage their gas import dependence thanks to LNG supplies and alternative routes, the East has fewer options. On the other hand, shale could develop into an important tool of security of supply for this region, while Western Europe is less favourably poised to develop this option. The natural gas discussion will continue to be important in the coming years, as natural gas provides emission advantages that coal with biomass cannot provide and as CCS on a commercial basis is some years away. With a relatively declining carbon footprint (because of growing footprints in 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.

ANNEX 3

POST-PARIS NEW BUSINESS IS USUAL

CIEP RESEARCH AGENDA FROM 2017 TO 2021

After a long period of convergence of international energy markets, where coal, oil, natural gas, hydro and nuclear contributed to the national energy mixes, new energy technologies are now transforming both national and international energy markets and energy policy-making. At the global level, the share of these new energy technologies is still small, but at some national and regional levels these shares are expanding rapidly. Changes are both fast and slow, depending on the level of analysis (world or national), the type of demand (heat, cooling, mobility) and the ability to (technically and economically) serve the various types of demand. As a result, the interaction between the various parts of the energy system, for instance in the energy value chains but also across various types of energy conversion technologies, is changing too. This offers challenges and opportunities in sustaining energy system stability.

The new technologies are currently mainly focussed on the electricity sector where, in some countries, they already have a large impact on the **organisation of the market**. The intermittency of some of the generating technologies and the lack of sufficiently economically viable storage technologies create markets where traditional and new energy technologies must co-exist, and where market forces and government policies compete. The change from commodity-oriented markets to more capital intensive ones, with government or consumer guaranteed payments, is one of the issues facing policy-makers and investors. The cost of capital, the availability of land and acceptance may become more prominent issues in the coming years.

In emerging economies, often with more state-oriented energy markets, renewables are also beginning to impact the organisation of the energy sector, particularly where subsidies on traditional fuels are being reduced and new technologies are being introduced. In many countries, the organisation of the market is becoming more hybrid, emphasising the renewed importance of government policies and regulation.

Moreover, the new energy technologies will not only impact the energy and/or power mix, but will also change the specialisation of certain fuels to serve **demand in other sectors**. It is for instance likely that oil products, which now have a near monopoly in the global demand for mobility, will be increasingly challenged by other energy technologies (such as biofuels, LNG, electricity) and the development of new appliances. In heating, electrical solutions will compete with natural gas and oil products. Depending on the energy mix choices of countries and the availability of new appliances, some countries may develop into an energy economy with a larger share for electricity (due to electrification), while others may remain focussed on (low carbon) liquids and gases. The latter group could be countries with a variety of energy technologies and infrastructures, where liquids and gasses are used more intensely across the industrial and residential sectors. Interestingly, the economic structure of countries and the energy technology solution spaces or optionality may show much **more variation across countries** than before. Such a development could also impact energy trade flows and the security of demand for producing countries of natural gas, crude oil and coal.

It is clear that the changing demand for energy in the coming years will impact the **energy value chains**. On a global scale, demand is expected to grow substantially, despite energy efficiency gains. Growth of energy demand, however, will be unevenly distributed over economies, but also across sectors. In the OECD countries, energy demand is expected to be relatively flat, implying that new energy technologies come at the expense of traditional fuels, while in emerging markets, both new and traditional energy technologies can grow. In the refining business we already see the influence of changing end-consumer markets and investments by IOCs and NOCs along the value chain, challenging the market model of various market refineries.

Technology is playing an increasingly important role in the development and composition of the energy mix. The idea that ‘the era of cheap oil/energy is over’ was proven wrong by the emergence of light tight oil in North America. Moreover, the idea that cheap energy is over is also vindicated by the **rapid decline in production costs** of solar and increasingly also of wind energy. In oil and natural gas, innovation unlocked previously stranded oil and gas assets at a cost below the price of many deep offshore projects and other more conventional resources, which had until 2008 held the promise of being the ‘next game in town’. But also the development of the solar value chain may hold some surprises. The development of production methods, tailor-made production runs, the efficiency of the panels and the **focus on promoting domestic production** by many governments may change the concentration of production in China to a more distributed model of production. At the same time, the gas value chain is rapidly globalising, with more LNG coming on stream, connecting the previous regionally organised gas markets. The challenge for gas is to develop new markets both in power generation and mobility, while competing with various other energy technologies in heating markets. The price of gas and the cost of gas production capacities is crucial here, particularly when markets are re-designed to favour other technologies. Currently the qualities of gas, such as flexibility, energy per carbon emitted, and other pollutants, are not properly valued in commodity markets nor in government policies, and due to the geopolitical nature of some gas trade, may never be properly valued at a global level. Nevertheless, natural gas could become the flex fuel of the electricity sector in many economies, as a companion of intermittent energy technologies, while being challenged by new heat technologies in the industrial and residential sectors. Nuclear has potential to grow in energy intensive emerging markets, but new investments are difficult in the current low price markets. The coal industry is looking at India as its last large potential market, but prospects to grow in the longer term are slim, unless CCS or other abating technologies become economically available. Understanding the drivers of government policies and international market developments are crucial elements in future investment and trade opportunities and international energy relations.

The development of the various energy value chains has always been strongly linked to demography and economic growth. The prospect of a period of **lower global economic growth**, but also (increased) decoupling of energy demand growth from economic growth is another large uncertainty for investors in energy. New industrial production methods and organisation of production could impact substantially on the demand for energy. Moreover, in a low economic growth environment, energy demand and supply will also grow less buoyant, particularly when government policies are at the same time biased towards an increased share for certain energy technologies and not others. In the post-Paris era, this may change the inter-fuel dynamics, boosting growth of new energy technologies to the detriment of more traditional (imported) fuels. Much depends on translating the intended national climate change policies of Paris into execution of the plans. The cost of capital, the

availability of (abatement) technology, access to energy resources and the ability of consumers to adopt new energy products and services will determine the pathways for certain fuels in certain economies.

The uncertainties related to the speed of transition, the cost of energy, the development of new energy technologies, the impact of government policy-making could be deepened by the growing **geopolitical conflicts** in, for instance, the Middle East and Europe, where energy investments, production and trade could easily become snarled into these conflicts. Security of demand for producers of coal, oil and natural gas could become a serious issue, and could lead to social-economic unrest when these economies have to adjust to new international energy markets before they have fully monetised their reserves. The speed with which economies are able to adopt to new energy technologies and at what socio-economic cost will be as important in determining the **future international energy relations** as the ability to access energy in freely traded international markets. For instance, tensions in Asia could hinder development of more integrated energy markets and re-orient policy-making on security of supply issues rather than market developments and climate change policies.

CIEP research will continue to focus on these developments across energy value chains and economies with the dynamics of new energy technologies impacting investments, demand, supply and policy-making always in mind. Both the international and the European developments in markets and policy-making will be key, depending on the topic. We will continue to research developments in international and European natural gas and oil markets, and intensify efforts to analyse the impact of new energy technologies on various international markets and government policies.