

EUCERS Newsletter

Newsletter of the European Centre for Energy and
Resource Security (EUCERS)

Issue 57, September 2016

Introduction

Dear readers and friends of EUCERS,

It is my great pleasure to welcome you to this special edition of the EUCERS newsletter.

In this edition, we present you with speeches that were given at the recent EUCERS/KAS/ISD Energy Talk that marked the end of this years' cycle on the "Future of Fossil Fuels".

We are proud to publish the speeches of Mechthild Wörsdörfer, Director for Energy Policy at the European Commission's Directorate-General for Energy, on "The future of fossil fuels in the era of climate change" and Mark Howard, Professor at the University of Cardiff, on "the consequences of peak demand".

Additionally, you will find the background article by José A. Bolanos for the conference in this issue.

Over the following issues of the EUCERS newsletter, we will continuously return to the presentations of this event and juxtapose them with research articles in the usual format.

If you were not able to participate in our great event, please do send us your comments and questions regarding the positions and ideas represented in the event contributions. And feel free to keep us informed about your research projects and findings as we look to remain at the forefront of new knowledge and innovative ideas.

Thank you for your interest in EUCERS and for being part of our community.

Yours faithfully,
Thomas Fröhlich

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ARTICLES

The future of fossil fuels in the era of climate change

By Mechthild Wörsdörfer

This is the speech given by Ms Mechthild Wörsdörfer at the EUCERS/KAS/ISD Energy Talk on 22 September 2016. Check against delivery.

Ladies and Gentlemen, I am pleased to be here and to see so many participants. Thank you to The European Centre for Energy and Resource Security, together with the Konrad Adenauer Stiftung in London and the Institute for Strategic Dialogue for organising this workshop.

I am very pleased to provide some introductory remarks on the future of fossil fuels in the era of climate change.

Recalling our decarbonisation objectives

Since 2007, the EU has set ambitious climate and energy objectives, with in mind the long term goal of reducing domestic greenhouse emissions by at least 80% by 2050. In particular, the 2030 Climate and Energy Framework calls for reducing GHG emissions by at least 40%, while increasing the renewables share to at least 27% and increasing energy efficiency with at least 27% (to be reviewed by 2020, with 30% in mind), all of this by 2030.

The transition towards a low-carbon economy will have significant implications on the production and use of fossil fuels in the EU over the coming decades.

The Energy Union Strategy sets out that we have to move away from an economy driven by fossil fuels.

However, as any long term transition, it will take time and fossil fuels will continue to have an important role in our energy system at least in the short to medium term.

Even more importantly, this transition will need to take place in the broader context of the Energy Union Strategy, considering also the objectives of competitiveness and security of supply.

In the Commission, we are always looking for evidence to understand what this transition will mean and how best to address it. One of the elements we use to assess our policy options is to use modelling scenarios.

The EU Reference Scenario 2016 was recently published.

Mechthild Wörsdörfer is the Director for Energy Policy at the European Commission's Directorate-General for Energy. Prior to joining DG Energy Ms Wörsdörfer was a career civil servant in the DG Enterprise & Industry. She studied Economics at the University of Heidelberg and the University of Montpellier and completed her studies with a Master in European Economics at the Free University of Brussels.

It is an opportunity to observe in details potential trends regarding fossil fuels in Europe based on the current set of policies:

- First, the overall declining trend in EU production of fossil fuels is confirmed;
- Still, without additional policies, oil would continue to satisfy about one third of overall energy demand, from now until 2050; this is notably because of limited substitution options in the transport sector, where oil would still be used to meet more than 90% of transport demand by 2050;
- Gas demand would stabilise, increasing in the power generation sector in the coming years (as ETS prices and demand for flexible generation increase, making gas more competitive than coal), while decreasing in the residential sector due to energy efficiency improvements;
- Meanwhile, gas imports would increase (from 310 bcm in 2020 to 370 bcm in 2050) as EU domestic production decreases faster than demand;
- The share of coal in the energy mix would steadily decrease (from 15% in 2030 to 5% in 2050), notably due to the role of ETS in reducing emissions in the power generation sector. No CCS development is expected in absence of additional policies.

Obviously, the vision projected by the Reference Scenario is only a starting point, as we know we need to do more to meet our 2030 and 2050 objectives. Hence, the need to draw additional lessons from more ambitious decarbonisation scenarios.

- In the transport sector, the European Strategy for low-emission mobility, adopted in July this year, shows different pathways to reduce emissions in the transport sector. Such pathways would all lead to a downward pressure on oil demand (about -10% in 2030 compared to Reference Scenario, and -50% in 2050!), for instance due to ambitious EU policies, such as Regulations on CO₂ emissions for cars and vans, or initiatives promoting the production and use of advanced biofuels; the decarbonisation of the transport sector will also be

affected by technological progress, such as lower battery costs for electric cars;

- Additional energy efficiency measures will lower gas demand, in particular in the residential sector (-10% in 2030 and -50% in 2050). Still, by 2030, net imports would remain stable, compared to today's levels, as domestic production reduces and gas remains needed as a source of flexible generation in the power sector;

- Under such decarbonisation scenarios, the future of coal would be associated with CCS developments. Without CCS, coal would disappear from the electricity mix; It is difficult to anticipate with any certainty the future of CCS in Europe, but still, it currently seems to be the only option, in the long run, to continue decarbonising the electricity sector while keeping coal as an energy source (in our scenarios, CCS represent about 15% of the electricity mix in 2050);

- The Commission strives to achieve such decarbonisation efforts on the basis of cost-effective policies, which can reduce the costs of the energy transition for those sectors negatively affected while freeing up resources for low-carbon technologies to emerge. In that respect, the phasing out of fossil-fuel subsidies, while taking account of wider socioeconomic and competitiveness effects, remains an important condition to facilitate this transition.

The need for fossil fuels will not disappear overnight

As I mentioned before, this transition is not going to happen overnight.

Our 2030 and 2050 objectives are ambitious, but in the medium term we are still expected to maintain our net gas imports (from 300 bcm in 2015 to 310 bcm in 2030 in a scenario with 27% energy efficiency; around 280 in a scenario with 30% energy efficiency) and transport will still be dependent on oil.

Therefore, we have in place a series of policies to improve our infrastructure and the functioning of our internal market, to increase competition and the range of suppliers, and to improve our resilience in the face of future market shocks.

About oil:

Focusing on oil, as long as oil remains in the energy mix, security of oil supply remains an important goal, considering that today we import 88% of the oil we use in the EU.

Yet, when supply is abundant and prices are low, we tend to focus less on security of oil supply. Even if we see no significant disruptions today, geopolitical risks remain and

possible supply disruptions can tighten the global oil market and jeopardize the affordable and uninterrupted supply of oil.

For such situations our first line of defence is our system of emergency oil stocks. The oil stocks directive was revised relatively recently, in 2009, with the intention of improving the availability of stocks and harmonizing the system with the IEA regime.

Let me also mention our work related to the refining sector. The European refining sector is facing a number of challenges: decreasing regional demand resulting in overcapacity, aggravated by high costs and regulatory burden. As a result, a number of refineries have been closed. With our long term decarbonisation plans that trend is likely to continue but refining remains crucial to our security of supply: we believe that retaining a competitive refining industry in Europe is important to avoid over-dependence on imported refined petroleum products.

To address this issue, the Commission set up a dedicated EU Refining Forum to maintain a close dialogue with stakeholders on the impact of EU legislation on the sector.

The Commission has also carried out a fitness check of the sector which looked at the cumulative impact of EU regulation on the costs and competitiveness of the European refineries. The exercise proved to be useful, in particular in terms of the data which was produced and analysed as part of it, and which would continue to be used in future impact assessments of relevant regulatory proposals.



About gas:

Regarding gas, as mentioned before, we expect an important role for gas during the transition to a low-carbon energy system, by complementing intermittent renewables and by replacing more polluting fuels such as coal in power generation.

Because EU gas imports are likely to stay stable even if demand will diminish, it justifies our continued efforts to diversify sources and suppliers.

Our objective is to ensure that, while we make the transition to a low-carbon economy, the gas supplies that we continue to need are secure and competitive.

The EU is the biggest importer of natural gas in the world. In 2015, the gas import bill was about 70bn € for the EU as a whole. Diversification of supply sources is therefore paramount both for energy security as well as for competitiveness. Ensuring that all Member States have access to liquid gas markets is a key objective of the Energy Union.

Therefore, building on the stress tests carried out in 2014, the Commission also tabled a proposal for a new security of gas supply regulation, putting forward a shift from national approach to a regional approach when designing security of supply measures. Furthermore, the proposal introduces a solidarity principle among Member States to ensure the supply of households and essential social services, such as healthcare, in case their supply was affected due to a severe crisis.

As the Commission, we look at the gas market from a European perspective but, given the increasing globalisation of the gas market driven by the expansion of LNG trade, it is of key importance to see and to understand the global developments, as well as the interactions of gas with the rest of the energy system.

Indeed, what happens in the LNG market will inevitably affect Europe. We saw this already after the Fukushima accident and we see it today, when the new wave of LNG projects, coupled with the slowdown in Asian gas demand, triggered a steep fall in prices and made Europe a more attractive destination for LNG supplies. Not only does increasing LNG trade provide new supply sources (LNG imports increased by 5% in 2015 and now represent about 13% of total gas imports), improves security of supply of Europe but also increases competitive pressure on gas markets, including in Europe. For instance, LNG prices significantly decreased over the last three years, from 28.5 €/MWh to 20.5 €/MWh, creating downward pressure gas prices imported from pipelines.

We believe that the dynamic development of the global LNG market provides a major opportunity in this respect. As cargoes of LNG are available from a wide variety of different supplier countries worldwide, LNG can give a real boost to the EU's diversity of gas supply and hence greatly improve energy security. The increasing competition among the producers is also expected to

induce the use of more competitive and flexible market pricing mechanisms in gas contracts.

Some considerations on global trends and on the impacts of the Paris Agreement

I have talked so far mostly about Europe. But for such a sector, global market developments are obviously essential to pay attention to.

At a global level, fossil fuel developments will be affected by the level of ambition and implementation of climate change policies across countries, and therefore on the implementation of the Paris Agreement.

The Commission's Joint Research Centre has recently published its 2016 Global Climate and Energy Outlook. It shows that implementing the Intended Nationally Determined Contributions (INDCs) put forward by countries throughout 2015 would result in a stabilisation of oil and coal markets, while the gas, nuclear and renewables market would continue growing.

More specifically, oil demand would slightly increase, but not much less than in a world without climate policies, while gas demand would continue to increase significantly. The larger change compared to a scenario without climate policies concerns coal demand, which would significantly decrease.

We also know that the INDCs put forward by countries before Paris do not put yet on a trajectory compliant with the objective of limiting to 2°C, or even 1.5°C above industrial levels. The JRC therefore also analysed a scenario in line with the 2°C objective. Moving towards a below 2°C world would see all fossil fuel markets contract significantly, first and foremost coal but also oil and gas to a lesser extent. By 2050, oil demand would reach its 1990 level, while gas demand would correspond to 2010 level. Coal demand would be below 1990 level already in 2040.

Such results also highlight that the degree of ambition in climate and energy policies, and their impact on demand, could be the key factor driving fossil fuel markets and price formation in the future, as opposed to the historical role played by supply on such markets; this would have direct implications on future global fossil fuel investment needs and opportunities.

Ladies and Gentlemen, thanks a lot for having listened to me and I look forward to today's discussions.

The Consequences of Peak Demand.

By Mark Howard

This is the speech given by Professor Mark Howard at the EUCERS/KAS/ISD Energy Talk on 22 September 2016. Check against delivery.

I want to talk about Peak Oil – remember that from around 15 years ago? But of course, these days, it's not about a peak in supply capability, it's about peak demand, and when that might happen.

Recent industry outlooks, for example BP's or OPEC's, show oil demand continuing to increase out to 2035 and beyond, with perhaps 15-20 mbd of growth in the next 25 to 30 years. And it's likely that we have an abundant resource of affordable oil to meet such demand. But I want to mention three factors – areas of tension really – that could influence future demand, and maybe change the outcome for when oil demand in reality peaks and starts to decline.

1. Evolving carbon budgets and political/societal will to combat climate change

The IEA's 450ppm Scenario (50% chance of limiting to 2C) limits remaining carbon budget to ~1000 Gt CO₂ between 2015 and 2100, although the IEA's data visualisation actually shows ~925 Gt from 2015 to 2050. Achieving this requires emissions to peak soon – i.e. in the next few years – and then start declining at 2-3% pa.

Of course, it is apparent that projections based on what I will call 'current reality', are wholly inconsistent with this level of reduction. For example, CO₂ emissions in the reference case in the BP 2016 Outlook are some 75% higher than the IEA's 2C scenario by 2035. Indeed, there is now some scientific opinion that, due to the time lag effect in Global Warming, the 1.5C aspiration may already be impossible.

It is also important to realise that this 'CO₂ budget', if we call it that, is not a precisely known number. If one looks at some of the relevant, recently computed, Threshold Avoidance Budgets, they actually show a range of outcomes from as little as 470 Gt to as much as 1270 Gt from 2015. So don't be surprised if by, say 2020, when one might think the remaining budget could

Dr. Mark Howard is a Visiting Professor at Cardiff University's School of Chemistry and at the Faculty of Engineering and Physical Sciences at the University of Surrey. Prior to his academic appointments he was Vice President, Conversion Technology, at BP.

be ~750 Gt, its actually changed by 200-400 Gt, in either direction.

So there is a possibility that societal and political pressures could become much more intense in the next few years.

2. Underlying growth in demand for mobility, versus displacement of liquid fuel demand by electrification and other structural changes

Light duty vehicle numbers are growing by 3-3.5% pa. Heavy duty transport grows more or less with GDP, again around 3%-3.5%pa. In both cases, vehicle efficiency improvements are expected to accelerate, in some cases supported by regulation, offsetting perhaps 2%pa of the potential growth in fuel demand – leaving 1-1.5% net growth in fuel demand in the absence of other changes.

But demand from light duty vehicles, and a small proportion of demand from heavier vehicles (like buses, urban delivery systems, refuse lorries etc.) – totalling around 30mbd globally – is vulnerable to displacement by electrification and indeed other structural changes.

Global sales of plug-in electric vehicles are running at approximately 1 million units in 2016, with the majority now pure electrics not plug-in hybrids, which represents annual growth approaching 60%. Now, such growth rates can't possibly be sustained indefinitely, but how this will play out is extremely hard to predict. Battery costs reportedly fell by 35% in 2015, and some studies predict that EVs will be truly cost competitive sometime in the first half of the next decade – Bloomberg says 2022. Some car manufacturers are now rapidly increasing their focus on battery electrics – for example VW is suggesting that roughly a quarter of their production could be EVs by the mid 2020s. Global penetration of 25% sales seems feasible sometime in the second half of the next decade – which is sufficient to more than offset any growth in fuels demand from this

sector (20-25% is enough to tip demand for liquid fuels into decline). 50% penetration would lead to demand shrinking by more than 0.5mbd each year.

It's not just electrification that may impact transport fuel demand. Other potentially disruptive changes include collectivisation (fleets of autonomous 'Uber' vehicles for example – quite likely to be electric), greater public transport infrastructure (especially in developing cities), or perhaps virtual reality technology will finally allow us to work from home more often. It's very hard to estimate how significant potential structural changes such as this might be, but here is another factor that might increase the downward pressure on oil demand.

But some market sectors and regions will inevitably be more resistant to fundamental change; not all LDV demand will go electric – at least not for a very long time. Heavy duty transport will take longer to change. The types of aircraft flying in, say, 2050 are either already in production or development – liquid fuel demand is bound to increase from that sector in my view. And marine doesn't feel easy to electrify either to any significant extent, although liquefied gas might become important. And of course non-transport demand is also growing – in total about 35% of oil demand. Some of this will surely be displaced by renewable energies, but bulk chemicals, for example, will have an ever increasing need for feedstocks.

Of course, in addition to electrification, the other way to displace oil demand in transport, and indeed petrochemicals and industrial uses, is to use biomass feedstocks. Which brings me to the third tension.

3. The scale and cost of sustainable biomass supply for 'carbon neutral' liquid fuels and feedstocks

Liquid fuels derived from sugar, starch and natural oils are already significant, roughly 1.5 mbd of oil equivalent (2015 from BP Statistical Review) – although so far with rather disappointing environmental credentials. These do have some expansion capacity – for example sugar based ethanol might double, and if recovering and recycling used natural oils becomes highly efficient, we might see another 1-2 mbd bio derived diesel.

But a really material impact requires the use of ligno-cellulosic feedstocks, and in ways that are close to

carbon neutral. And here the issues are of course conversion cost (which means technology) and the cost and availability of truly sustainable feedstocks. So what would it take to make a really important contribution to liquid fuels and chemical feedstocks?

The US DOE has just issued the first volume of its 2016 'Billion-Ton Report' which looks at delivered costs for biomass resources in the US. At a delivered cost that would contribute ~\$40/bbl to a liquid hydrocarbon product (actually \$93/te biomass) – base case availability is ~425 million tonnes in 2040, ~750 million tonnes in a high yield scenario. At an ambitious 30% yield, this is enough to make the equivalent of 2.6 and 4.5 mbd of oil products respectively – but of course there would be competing uses of this biomass, particularly for heat and power, and we are still awaiting publication of volume 2 on the sustainability of such resources.

So on this basis, getting the required, sustainable biomass resources together for 10-20 mbd of oil equivalent product is going to be really challenging – but I would suggest it may be essential if we are going to meet our aspirations to mitigate climate change.



DISCLAIMER

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ACTIVITIES

EUCERS/KAS/ISD Energy Talk 4/2016

The Future of Fossil Fuels in the Era of Climate Change and Renewables

An introduction by José A. Bolanos, KAS Energy Security Fellow 2015-16 at EUCERS.

Oil has become such an inherent part of human life that many persons even get a small sense of fear when their car's fuel indicator goes to 'empty'. Whilst perhaps not to the same extent, other fossil fuels such as gas and coal have also become embedded in the very fabric of modern society. This becomes all the more meaningful when considering the fact that, as shown in figure 1, energy demand has typically grown along population; and world population is set to continue to grow to about 11 billion by 2100. So forth, all evidence indicates that energy demand will continue to place pressure on our energy systems.

The challenge faced by oil and fossil fuels is then not per se a question of whether there will be demand for energy. The real question is whether oil and fossil fuels will continue to be part of the solution and if so, to what extent. This question currently preoccupies energy analysts and practitioners across the globe. It also is a source of great concern in the energy industry. For example, one of the most recent oil industry gatherings culminated with rather bleak forecasts about the future that oil will have to face, with some of the top actors in the industry forecasting a decade-long crisis.²

There are, on the one hand, many considerations that seem to indicate an absolute need for fossil fuels. You

¹ UN, "World Population Prospects: The 2015 Revision," DVD Edition (New York, NY: Department of Economic and Social Affairs, Population Division, United Nations (UN), 2015); EIA, "Total Energy - Total Primary Energy Consumption (Quadrillion Btu)," *Washington, DC: U.S. Energy Information Administration (EIA)*, 2016, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=44&pid=44&aid=2&cid=ww,&syid=1980&eyid=2012&unit=QBTU>; BP, "BP Energy Outlook 2016 Edition – Outlook to 2035 [Dataset]," Dataset (London, U.K.: BP plc, 2016).

² A Hoffmann et al., "The Oil Industry Got Together and Agreed Things May Never Get Better," *New York, NY: Bloomberg.com*, 2016, <http://www.bloomberg.com/news/articles/2016-02-12/the-oil-industry-got-together-and-agreed-things-may-never-get-better>.

would be hard-pressed to find a policy agenda that intends to decrease growth.³ Moreover, whilst decoupling of economic growth and energy demand growth in some areas of the world has led to a stagnation of energy demand in the past few years,⁴ existing statistics conceal the failure to provide satisfactory access to energy to the world's poor. Once we consider the desire for universal access to energy, a goal compatible with UN's Millennium Development Goals,⁵ it becomes clear that energy demand should theoretically continue to grow for the time being.

Forecasts agree. The consensus is that even if countries were to fully accomplish their climate change goals, all

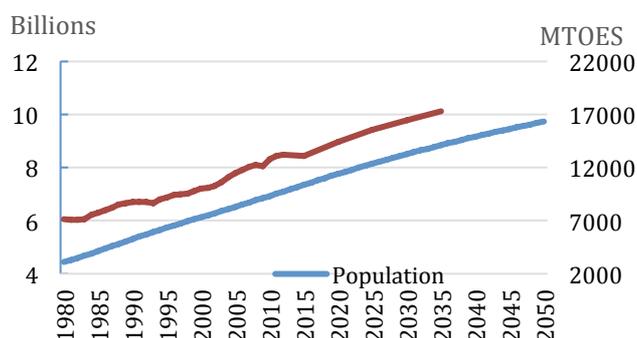


Figure 1: Population & Energy Demand (1980-2050).

Sources: UN, EIA, BP.¹

types of fuels will see an increase in total consumption until 2030. For example, in a recent report about energy and climate change, the IEA forecasts oil to grow to a peak consumption of 99 million barrels per day (9% above today) by 2030.⁶ Some even suggest a more oil-intensive future. The scenarios laid out by the WEO

³ Barring man-made and/or natural catastrophes this author can only think of one trend that could be used to justify a future of diminished energy demand. It is a theory called 'de-growth' that advocates for a managed reduction of consumption across all spheres of human activity. However, at the moment it is an extremely marginal trend that is not driving any type of decision making.

⁴ cf. Enerdata, "Global Energy Trends: Towards a Peak in Energy Demand and CO2 Emissions?" (Paris, France: Enerdata, 2016), 15.

⁵ UN-Energy, "The Energy Challenge for Achieving the Millennium Development Goals," *New York, NY: UN-Energy Knowledge Network*, 2016, <http://www.un-energy.org/publications/50-the-energy-challenge-for-achieving-the-millennium-development-goals>.

⁶ IEA, "Energy Climate and Change (World Energy Outlook Special Report)" (Paris, France: International Energy Agency (IEA), 2015), 39.

2015, for instance, expects 2040 demand to be around 103 to 117 million barrels per day – exception made of the 450 scenario (which is not a forecast but an aspirational guide) that puts 2040 demand at around 74.1 million barrels per day.



And yet, many trends seem to want to decidedly pull the world away from oil and fossil fuels. Efforts to diversify the energy mix, which date back to the late 70s, now include a wide variety of technologies that span across the fossil / non-fossil spectrum. Whilst traditionally limited to electricity generation, hopes of diversification now abound in the transportation sector. Gas, hybrids, battery-powered, and hydrogen transportation technologies currently raise the hopes of many. In addition, civil society movements such as divestment have shown themselves to be strong vehicles for collective action against fossil fuels. The divestment campaign has achieved victories as significant as enlisting two of the three biggest foundations associated with the Rockefeller family. One of them even singled out ExxonMobil, the largest survivor of the breakup of John D. Rockefeller's Standard Oil's monopoly, as morally reprehensible.⁷ It can also not be ignored that the US and China, the two largest economies in the planet, recently decided to ratify the Paris Agreement. This will make it harder for any future US government to back down from it and thus gives the Agreement the chance of a promising start.

These are, however, only a few of the factors that push the world in and out its relation with oil and fossil fuels.

⁷ T Wade and A Driver, "Rockefeller Family Fund Hits Exxon, Divests from Fossil Fuels," *London, U.K.: Reuters*, March 24, 2016, <http://www.reuters.com/article/us-rockefeller-exxon-mobil-investments-idUSKCN0WP266>.

As such, whilst it may be clear that this relation is unlikely to change in the very short term, it is harder to foresee what will happen on the medium and long term. But it for policies and strategies to happen, policy makers and practitioners need an idea of what the future may bring. The exercise of analysing the future of oil and fossil fuels is thus prerequisite for any strategy for or against the role of oil and fossil fuels.

ANNOUNCEMENT

EUCERS is delighted to launch the newest EUCERS Strategy Paper written by Research Director, Dr Frank Umbach and Research Associate, Dr Ka-ho Yu. The eleventh EUCERS Strategy Paper evaluates the strategic implications of China's expanding overseas coal power industry. China is the world's largest coal producer, providing more energy to the world's economy than all of Middle Eastern oil production. It is also the largest energy and coal consumer, using nearly as much coal as the rest of the world combined.

EUCERS Strategy Paper No.11 can be downloaded from our website www.eucers.eu.

EUCERS ON THE ROAD

Our team represents EUCERS at various conferences and events all over the world. This section gives a regular update and overview of conferences and interview contributions by EUCERS Director Professor Dr Friedbert Pflüger, Research Director Dr Frank Umbach and Associate Director Dr Adnan Vatansever, as well as by our Research Associates.

30.09.2016 Berlin, Germany	Friedbert chaired and spoke at the 78 th Energy Talk at the German Reichstag (Energiegespräche am Reichstag) on "After the Paris Climate Agreement – How is the World Implementing It?" with a keynote by Dev Sanyal, CEO Alternative Energy and Executive Vice President Regions at BP plc.
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28.09.2016 Oberammergau, Germany	Frank gave two presentations on “Global Energy Megatrends” and “Regional Energy Security Developments in Asia, the Middle East, and Eastern Europe Energy” at NATO’s annual “Security Strategic Awareness Course”.
25.09.- 27.09.2016 Bydgoszcz, Poland	Frank gave a presentation on “Global Energy Security – Mega-Trends, Challenges and Implications for NATO” and Consultancy as the official “Subject Matter Expert” on natural resource competition for NATO’s annual “Strategic Foresight Analysis”, Fourth Interim Update Workshop.
21.09.2016 Leipzig, Germany	Frank gave a presentation on the “Future Energy Supply Without Fossil Fuels? – National Emission Reduction = Global Climate Protection?” at the VGB Congress « <i>Power Plants 2016: New Horizons-Navigating the Power Industry in Times of Change</i> ».
28.08.2016 Belfast, Northern Ireland	Research Associate Slawomir Raszewski gave a presentation at the ‘UK-China workshop on shaping low-carbon future’ hosted at Queen’s University Belfast.
11.07.2016 Tehran, Iran	Slawomir was invited to give the keynote speech at the ‘International Conference on Optimisation of Upstream Oil & Gas Contracts’ organised by Allameh Tabataba’i University.
09.06.2016 London, United Kingdom	Slawomir spoke at the ‘Brazil and the Global Energy Outlook’ panel discussion organised by the Brazilian Chamber of Commerce in Great Britain.

SOCIAL MEDIA



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PUBLICATIONS

Umbach, Frank “Die EU-Zentralasienstrategie und ihre energiepolitische Dimensionen. Konfliktreiche EU-Russland-Beziehungen und Chinas Rolle in der Region“ („The Central Asia Strategy of the EU and its Energy Dimensions. The Conflict-Prone EU-Russia Relations and China’s Role in the Region“), in Politische Studien (hrsg. Von der Hanns-Seidel-Foundation, Munich), September-Oktober 2016, pp. 73-87 (in German).

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