

# EUCERS Newsletter

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## Introduction

Welcome to the 49<sup>th</sup> edition of the EUCERS Newsletter.

We are pleased to introduce our KAS Fellow 2015/16, Dr Chunping Xie, in this edition. Following Chunping introduces her research on global natural gas.

The second article is a piece by Ilgar Gurbanov on Post-sanctions Iran and the implications for the Southern Gas Corridor and opportunities for Azerbaijan.

In our Activities section you will find a detailed report of our event on global gas markets in Singapore, which EUCERS hosted at the end of October in cooperation with the Konrad Adenauer Stiftung's regional project on energy security and climate change in the Asia-Pacific region, the Energy Studies institute (ESI) of the National University of Singapore (NUS) and the Atlantic Council of the U.S..

The fourth and final EUCERS/ISD/KAS Energy Talk will be on the 30<sup>th</sup> of November on the topic of "Iraq as Re-Emerging Energy Superpower". Please find details in the Announcements section.

In EUCERS on the Road we continue to inform you about conference participation and presentations of our members, as well as their latest publications.

I hope you will enjoy the newsletter!

Carola Gegenbauer  
*Operations Coordinator at EUCERS, King's College London*

## In this Month's Edition:

- **Introduction**
- **Newsletter articles**
  - Global Natural Gas: The pricing mechanism and development. *By Chunping Xie*
  - Post-sanctions Iran: Implications for the Southern Gas Corridor and Opportunities for Azerbaijan. *By Ilgar Gurbanov*
- **Activities**
  - EUCERS/KAS/ESI/ACUS workshop in Singapore 28-30.10.2015
- **Announcements**
  - EUCERS/ISD/KAS Energy Talk on Iraq as Re-Emerging Energy Superpower 30.11.2015
- **EUCERS on the Road**
- **Publications**
- **Contact EUCERS**
  - EUCERS on Facebook and Twitter
- **EUCERS Advisory Board**
- **Acknowledgements**
  - EUCERS Partners and Sponsors

## ARTICLES



We are pleased to introduce Chunping Xie, one of our two new KAS Fellows at EUCERS in 2015/16.

Chunping Xie holds a PhD in Energy Economics and has vast experience in the economic study related to energy policies. During her year as KAS Fellow at EUCERS Chunping will focus on the topic of “Global natural gas”. In the following piece she is introducing her research.

### Global natural gas: pricing mechanism and development

*By Chunping Xie*

#### Energy use: we don't have much choice

It is believed that any energy policy is a 3-sided triangle: security of supplies, sustainability (combating climate change) and affordability (competitiveness), which leaves limited choices of energy use. Fossil fuels, which we are heavily relying on, are unsustainable due to the exhaustibility and carbon emission generated from their combustion. However, the complete transition to renewables is unlikely to happen in the next decades, considering supply security and affordability of renewable energy sources. As a result, as the “cleanest” fossil fuel, natural gas, has gained increasing attention.

#### Natural gas: is it really ‘better’ than coal?

According to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, natural gas combustion produces almost half the carbon dioxide emissions compared to coal (Coefficient of carbon dioxide emissions by natural gas: 56100 kgCO<sub>2</sub>/TJ; Coefficient of carbon dioxide emissions by coal: 94600-10700 kgCO<sub>2</sub>/TJ)<sup>1</sup>. But this is not the full story when taking into consideration methane emissions. As the primary component of natural

<sup>1</sup> Data source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories

gas, methane is reported as the second most prevalent greenhouse gas emitted in the United States, up to 84 times more powerful than carbon dioxide in the first two decades after its release (Steven Hamburg, chief scientist in Environmental Defense Fund)<sup>2</sup>. In 2011, the first estimate of greenhouse gas of shale was made by Howarth, co-authored with Santoro and Ingraffea<sup>3</sup>, suggesting that natural gas may be worse than coal from a climate perspective. Their results showed that 3.6% to 7.9% of methane from shale-gas production escapes to the atmosphere in venting and leaks over the lifetime of a well. Before, EPA (United States Environmental Protection Agency) estimated methane emission rates from the drilling process to be much lower. It seems the methane pollution level of so-called clean gas has been largely underestimated. However, it is too early to reach a conclusion since different results are gathered, based on different estimation methods. For instance, Cathles et al. (2011)<sup>4</sup> made a commentary on the estimation of Howarth, arguing that their analysis is seriously flawed in that they significantly overestimate the fugitive emissions associated with unconventional gas extraction, and suggesting shale gas has a GHG footprint that is only half and perhaps a third that of coal.

What's more, the report 'Greenhouse Gas Emissions Data from Large Facilities' released by EPA in Sep. 2014 observed methane emissions from hydraulically fractured natural gas wells have fallen by 73 percent since just 2011<sup>5</sup>. EPA expects to see further emission reductions as the agency's 2012 standards for the oil and gas industry become fully implemented. As a result, no matter what the actual number it is, methane emissions from natural gas production has been reduced significantly in recent years.

<sup>2</sup> <https://www.edf.org/methane-other-important-greenhouse-gas>

<sup>3</sup> Robert W. Howarth, Renee Santoro, Anthony Ingraffea, 2011, Methane and the greenhouse-gas footprint of natural gas from shale formations A letter, Climatic Change, DOI 10.1007/s10584-011-0061-5.

<sup>4</sup> Lawrence M. Cathles III, Larry Brown, Milton Taam, Andrew Hunter, 2011, A commentary on “The greenhouse-gas footprint of natural gas in shale formations” by R.W. Howarth, R. Santoro, and Anthony Ingraffea, Climatic Change, DOI 10.1007/s10584-011-0333-0.

<sup>5</sup> <http://yosemite.epa.gov/opa/advpress.nsf/bd4379a92ceceac8525735900400c27/58d0225b6c4023ea85257d63005ca960!OpenDocument>

## The role of natural gas

In a short or medium term, natural gas is often promoted as a bridge fuel that will allow society to continue to use fossil energy over the coming decades while emitting fewer greenhouse gases than from using other fossil fuels such as coal and oil. Currently oil is the dominant source of energy in the world's energy mix, with a share of 40.5% in total energy consumption in 2012, followed by natural gas of 15.2%<sup>6</sup>. Use of natural gas is growing rapidly as it is increasingly seen as a good alternative to oil. Nevertheless, it is not the situation in developing economies that regarding economic development as their primary goal and relying heavily on cheaper energies. Different from OECD countries where natural gas consumption took up 19.8% in total final consumption in 2012, the number was merely 5.6% in China. China's energy structure is now dominated by coal, with a proportion of 70.6% in total final consumption in 2012<sup>7</sup>. However, with the West-East Gas Pipeline as well as foreign-connected gas pipelines being put into operation, China's natural gas consumption in recent years has grown rapidly. Its average annual growth rate reached 7.46% from 1980 to 2011, while the figure from 2002 to 2011 was as high as 16.08%<sup>8</sup>. Under the country's Clean Development Strategy, natural gas will probably be the major energy source that substitutes coal consumption in the coming years.

In the very long term, natural gas is likely to continue acting as a contributor to low carbon solutions. Due to its flexibility, natural gas is able to complement the variations in renewable sources like wind-generated electricity or solar heating. It's easy to access natural gas when we need it, through well-established networks of pipelines that bring natural gas reliably and safely into our homes and office.

## Geopolitical impact of global gas development

Geopolitical, political and economic trends should be taken into consideration when referring to the future

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<sup>6</sup> Data Source: IEA (International Energy Agency) Key World Energy Statistics 2014

<sup>7</sup> Data Source: China energy statistical yearbook 2013

<sup>8</sup> Data Source: China energy statistical yearbook 2013

global gas development. Some dramatic changes have taken place in recent years.

First of all, rapid development of unconventional gas in north American changes the strategic picture for this region and makes United States a possible exporter of natural gas to European and Asian-pacific markets, since a large amount of their unconventional gas are now commercially viable. The shale gas revolution has a dramatic effect in United States, and has reverberated across the globe, making the future of global gas development even more unpredictable. The increasing possibility that North American may export liquefied natural gas (LNG) to European and Asian-pacific gas markets will lead to strategic shifts, for example weaken Russia's dominance in European natural gas market. In the meanwhile, the achievement of energy independence in United States is likely to strengthen its impact to global energy price, as it can produce an effect on the supply of global gas market. What's more, other countries in the world, such as in Europe and Asia-pacific, are being catalysed to explore their domestic shale gas resource. The oil-indexed paradigm for gas pricing may be challenged due to the increasing amount of unconventional natural gas supply.

Secondly, the centre of gravity of the global natural gas market is shifting to emerging markets, especially in Asia-pacific region driven by its fast growing energy demand. As the fastest-growing natural gas market worldwide, Asian gas market is estimated to become the world's second-largest natural gas market by 2015, with 790 billion cubic metres of natural gas demand. Natural gas imports by China, Japan and South Korea added up to 230.2 billion cubic metres, almost as a quarter of the world's total natural gas import. This shifting from Europe to eastwards will change the global natural gas flows and have further impact on trade patterns of global natural gas market in the future.

## Natural gas pricing mechanism

The IGU (International Gas Union) summarized conventional natural gas price formation mechanism worldwide as the following types: Gas-on-Gas Competition (GOG), Oil Price Escalation (OPE), Regulation: Social and Political (RSP), Regulation: Cost

of Service (RCS), Regulation: Below Cost (RBC), Bilateral Monopoly (BIM), No Price (NP). In 2014, Gas-on-Gas Competition is the dominant price mechanisms for traded gas with a share of 43%, totalling around 1,495 bcm (billion cubic meters), dominated by North America at 936 bcm, followed by Europe at 292 bcm. The share of Oil Price Escalation (also called oil indexation) takes up 17%, and totals around 610 bcm, dominated by Asia Pacific at 230 bcm<sup>9</sup>.

Different from Gas-on-Gas Competition and Oil Price Escalation (together take up 60%) which are aiming at a competitive gas market, there are around 35% using regulated price in a monopoly gas market, including regulation social and political mechanism (17%) in the Middle East dominated by Iran, Saudi Arabia and the UAE, regulation cost of service mechanism (11%) mainly in Russia and China, and regulation below cost (7%) in 13 countries, mainly Kazakhstan, Turkmenistan and Africa. Due to the lack of a market-based approach, the low level of regulated gas price may probably hurt the natural gas industry and become an inhibitor to market development. Further reform on natural gas pricing mechanism is inevitable, in order to bring in competition to improve energy use efficiency and to promote healthy development of natural gas market.

### Future research at EUCERS

My research at EUCERS will mainly look at natural gas prices, and analyses the following issues related to gas prices: the influencing factors of the global gas price; comparing the gas pricing mechanism of different countries; building economic models to calculate the subsidy scale of gas markets on different countries in Asia and Europe; considering possible approach for gas pricing mechanism reforming and quantify the corresponding impact on the economy based on the results of subsidy analysis; prediction on China's natural gas demand in the future and its impact on the global gas market; and the



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possible approach for promoting low-carbon development.

### Post-sanctions Iran: Implications for the Southern Gas Corridor and Opportunities for Azerbaijan

*By İlgar Gurbanov*

On July 14, 2015 Iran and the P5+1 countries<sup>10</sup> agreed on a Joint Comprehensive Plan of Action concerning Iran's nuclear programme, according to which Iran is obliged not to develop and acquire nuclear weapons. In return, the international community committed to remove sanctions, as the JCPOA stipulates the sanction relief from the "import/export and transport of Iranian oil/gas products and technologies; participation in joint ventures and investment for the oil/gas sectors; purchase, acquisition, sale, transportation or marketing of oil/gas from Iran."<sup>11</sup> The removal of sanctions will pave the way of Iran's natural gas export to Europe. Therefore, Iran is eager to attract the investment and technologies of European energy companies into the country that have left its energy sector since the imposition of sanctions in 2005. The key question to be reviewed in this article is whether post-sanction Iran will reduce Azerbaijan's strategic significance. Latter is considered a sole and reliable gas supplier for the Southern Gas Corridor as well as a transit country for Central Asian gas. Iran can host the pipelines to transport Central Asian gas, notably Turkmen gas to Turkey and Europe and can potentially shelve the Trans-Caspian Pipeline. The removal of

<sup>9</sup> IGU (International Gas Union): Wholesale Gas Price Survey - 2015 Edition- A global review of price formation mechanisms, [http://www.igu.org/sites/default/files/node-page-field\\_file/IGU%20Whole%20Sale%20Gas%20Price%20Survey%20Report%20202015%20Edition.pdf](http://www.igu.org/sites/default/files/node-page-field_file/IGU%20Whole%20Sale%20Gas%20Price%20Survey%20Report%20202015%20Edition.pdf)

<sup>10</sup> Permanent members of the UN Security Council (UK, China, France, Russia, the U.S) + Germany

<sup>11</sup> "Joint Comprehensive Plan of Action", Vienna, 14 July 2015, [http://eeas.europa.eu/statements-eeas/docs/iran\\_agreement/iran\\_joint-comprehensive-plan-of-action\\_en.pdf](http://eeas.europa.eu/statements-eeas/docs/iran_agreement/iran_joint-comprehensive-plan-of-action_en.pdf)

sanctions from Iran's oil and gas sector, however, spells a business opportunity for Azerbaijan.

### Iran's participation in the Southern Gas Corridor

Previously, the Iranian government has reiterated that it is ready to ship gas to Europe, originally envisaged via the Nabucco pipeline. One branch of Nabucco had been proposed to start from the border between Iran and Turkey, as initially Iranian and Turkmen gas was also considered for Nabucco along with Azeri gas. However, the US and EU imposed sanctions on Iran caused the withdrawal of European energy companies from the country and made Nabucco partners refrain from not only receiving Iranian gas but also Turkmen gas via Iran. Nabucco could be realized with additional Iranian and Turkmen gas, if Iran was not excluded from the project. Therefore, the EU would not lobby for Trans-Caspian Pipeline<sup>12</sup>. Due to US opposition, the Shah Deniz Consortium also sidelined Iranian gas. But, Iran was still represented in the Consortium with 10% through Naftiran Intertrade Company (NICO), a subsidiary of National Iranian Oil Company. Therefore, the sanctions on Iran raised concerns on the implications for the Shah Deniz project. However, active lobbying of the EU and UK managed to keep the Shah Deniz field exempted from the sanctions<sup>13</sup>. According to the "Iran Threat Reductions Act" adopted by the US Congress "exceptions for certain natural gas projects" can exist, including "the development of natural gas and the construction and operation of a pipeline to transport natural gas from Azerbaijan to Turkey and Europe", which provide their "energy security and energy independence from Russia"<sup>14</sup>.

Iran has several options to deliver its gas to Europe: to Greece via Turkey using a [potential] Iran-Turkey-Europe pipeline and an interconnector between Turkey-Greece-Italy; or via the Trans-Anatolian Pipeline and

Trans-Adriatic Pipeline (including TAP's branches: Greece-Bulgaria interconnector and the Ionian-Adriatic Pipeline); to Bulgaria via the BOTAŞ pipelines and the former Nabucco-West pipeline or existing interconnectors in Southeast Europe.

Azerbaijan's SOCAR has not excluded the participation of Iran in TANAP (after lifting sanctions) by selling part of its shares in the project, as well as bringing Iranian gas into the pipeline.<sup>15</sup> SOCAR can secure at least a 51% stake (control package) in TANAP and sell some 7% out of its 58% to new shareholder. The Ambassador of Iran to Baku, Mohsun Pakayin, said that "Iran is interested in TAP and TANAP and the country can boost its shares in the Shah Deniz Consortium."<sup>16</sup> TANAP's annual capacity is planned to expand from initial 16 bcm up to 24 bcm by 2023 and to 31bcm by 2026, while the capacity of TAP is to expand from 10 to 20 bcm. Moreover, the EU Commission's decision has left 50% of TAP's total capacity for third party access to expansion capacity, in the case that there will be sufficient gas demand and gas supply from non-Shah Deniz sources<sup>17</sup>. The expansion capacity of both TANAP and TAP might enable Iran to deliver its gas therefore by joining the projects with its NICO.

It is therefore likely that Iran was offered to take part in the Southern Gas Corridor jointly with Azerbaijan by the EU and the US in exchange of removing sanctions, to provide the viability of the SGC against Russian supply<sup>18</sup>. Because, both the EU and Azerbaijan comprehend that the SGC currently is backed up with the reserves of

<sup>12</sup> Thanos Dokos & Theodoros Tsakiris, "A Strategic Challenge: The role of Greece in Europe's Southern Gas Corridor Strategy", Hellenic Foundation for European & Foreign Policy, February 2012, <http://www.eliamep.gr/wp-content/uploads/2012/02/policy-paper.pdf>

<sup>13</sup> "BP confident Shah Deniz project to remain exempt from sanctions on Iran", Trend.az, February 2012, <http://en.trend.az/business/energy/1984521.html>

<sup>14</sup> "Iran Threat Reduction Act of 2011", Open Congress, 2011, <https://www.opencongress.org/bill/hr1905-112/text>

<sup>15</sup> "SOCAR: Иран может войти в азербайджанский газовый проект", Day.az, April 2015, <http://news.day.az/economy/568413.html>

<sup>16</sup> "Iran Şahdəniz-də payını artırmaq niyyətini açıqladı", Caspian Barrel, August 2015, <http://caspianbarrel.org/?p=33125>

<sup>17</sup> "Commission Decision on the exemption of the Trans Adriatic Pipeline from the requirements on third party access, tariff regulation and ownership unbundling", European Commission, September 2013, [https://ec.europa.eu/energy/sites/ener/files/documents/2013\\_tap\\_decision\\_en.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/2013_tap_decision_en.pdf)

<sup>18</sup> "Geopolitical implications of the Turkish stream for Iran", Iran.ru, January 2015, [http://eng.iran.ru/news/analytics/186/Geopolitical\\_implications\\_of\\_the\\_Turkish\\_stream\\_for\\_Iran](http://eng.iran.ru/news/analytics/186/Geopolitical_implications_of_the_Turkish_stream_for_Iran)

Azerbaijan only<sup>19</sup>. Given the amount Russia currently supplies to Europe and potentially with Turkish Stream, Azeri gas alone cannot be an alternative to gas from Russia. Without Iran's presence in the SGC, project might face serious problems regarding source of additional gas in the future.

### Challenges of Iranian gas supply to the Southern Gas Corridor and to Europe

Nevertheless, there are several challenges for Iran's presence in the Southern Gas Corridor:

- Even if the EU Commission left the 50% of TAP's total capacity for third party access, 100% of the initial capacity of TAP, as well as that of TANAP, are secured by 25-year long-term agreements to pump Azeri gas.<sup>20</sup> Azeri gas has already found its consumers while Iranian gas hasn't yet. Thus, there is still not a certain legal framework to transport Iranian gas to Europe.
- Iran's participation in TANAP does not imply transportation of Iranian gas via TANAP once it joins the Consortium. As Iran is represented in the Shah Deniz Consortium, it enables Iran to participate in the transportation of Azeri gas only for the initial capacity of TANAP/TAP.
- Meanwhile, SOCAR's President Rovnag Abdullayev said that SOCAR-Turkey-Energy would buy 7% out of SOCAR's 58% stake in TANAP<sup>21</sup>. Along with Italian Snam Rete, Turkey's BOTAS, which holds 30% in TANAP project, is interested in buying the Statoil's 20% stake in TAP project<sup>22</sup>.
- In case Iran plans to deliver a huge amount of gas to Europe in the expansion capacity of TANAP/TAP, its potential customers will need relevant interconnectors with relevant capacities. Thus, Iran

can revive the Nabucco-West pipeline (initial capacity - 20 bcm/a).

- Given the damages caused by sanctions on Iran's energy sector and the delays in the development of its gas fields in the Persian Gulf, Iran needs at least 5-6 years to prepare its exports to Europe, for the construction of new pipelines and development of new fields.
- Iranian gas, exported to Turkey, costs \$490 per 1000 m<sup>3</sup>, which is more expensive than the Russian (\$425) and Azeri (\$335) gas prices<sup>23</sup>. In this regard, the gas price and transit fee renders the price of Iranian gas for European consumers vague for the time being.
- Most of the gas production in Iran at the initial phase will go into the domestic market (domestic consumption; reinjection of gas into oil fields; utilization of gas in power generation; for natural gas-fuelled vehicles etc.), rather than into export.<sup>24</sup>
- In order to access Europe, Iran currently has to rely on Turkish soil only. However, there is an absence of financial commitment and lack of necessary infrastructure connection/capacity, the new pipelines system within Iran (from South to North), as well as between Iran and Turkey.<sup>25</sup> Failure of implementation of the planned Iran-Turkey-Europe Gas Pipeline project<sup>26</sup> and technical incapacity of Iran-Turkey pipeline<sup>27</sup> deepen this problem.
- Given the geopolitical instability in the neighbourhood of Iran (in Turkey, Iraq and Syria), the European route of gas export through Turkey or (planned) Iraq-Syria-Mediterranean makes the LNG

<sup>23</sup> "Turkey and Iran's Natural Gas", Natural Gas Europe, April 2015, <http://www.naturalgaseurope.com/turkey-iran-natural-gas-23086>

<sup>24</sup> Simone Tagliapietra & Georg Zachmann, "Iran: a new natural gas supplier for Europe?", Bruegel, October 2015, [http://bruegel.org/2015/10/iran-a-new-natural-gas-supplier-for-europe/?utm\\_content=bufferfa97e&utm\\_medium=social&utm\\_source=facebook.com&utm\\_campaign=buffer](http://bruegel.org/2015/10/iran-a-new-natural-gas-supplier-for-europe/?utm_content=bufferfa97e&utm_medium=social&utm_source=facebook.com&utm_campaign=buffer)

<sup>25</sup> Simone Tagliapietra & Georg Zachmann, *op.cit.*

<sup>26</sup> In November 2008, Turkey and Iran had signed an agreement according to which Turkish TPAO should develop the 5000 km. Iran-Turkey-Europe Gas Pipeline Project (ITE) with 35 bcm/a capacity to ship Iranian gas to Europe through Turkey. Turkey's part of ITE pipeline would start from Turkey-Iran border and lead to the Greece-Turkey border, then through Greece and Italy and then divided into two branches: the north, leading to Germany, Austria and Switzerland and the southern, leading to France and Spain.

<sup>27</sup> Iran uses only 70-75% capacity of Tabriz-Ankara pipeline (with 10 bcm/a), though actual capacity of pipeline is 14 bcm/a. Whereas, Iran could just expand the volume of Tabriz-Ankara pipeline up to total capacity.

<sup>19</sup> "EU Energy Geopolitics: The Potential Role of Iran and the Turkish Route", Natural Gas Europe, December 2014, <http://www.naturalgaseurope.com/eu-energy-geopolitics-iran-russia-turkey>

<sup>20</sup> Ilgar Gurbanov, "Repercussions of Turkish Stream for the Southern Gas Corridor: Russia's New Gas Strategy", Natural Gas Europe, April 2015, <http://www.naturalgaseurope.com/analysis-turkish-stream-southern-gas-corridor-russia-gas-strategy-23199>

<sup>21</sup> "SOCAR talks selling of stake in TANAP project", Trend.az, September 2015, <http://en.trend.az/azerbaijan/business/2433046.html>

<sup>22</sup> "Turkey eyes Statoil's TAP share", The Oil & Gas Year, August 2015, <http://www.theoilandgasyear.com/news/turkey-eyes-statoils-tap-share/>

option of gas export more favourable for Iran. Because, instability renders energy flow through pipelines risky in terms of energy disruptions<sup>28</sup>. Iran's geographical position, the long coastlines in the Persian Gulf along with huge offshore gas fields enable the country to enter into the lucrative LNG markets of Asia.

### Opportunities for Azerbaijan

On the other hand, as a landlocked Caspian state who is seeking to diversify its energy routes, Azerbaijan will have transit opportunities for its oil/gas export via Iran, in addition to routes via Georgia (to Supsa port), Turkey (to Europe) and Russia (Novorossiysk port) to the world market. Since Soviet times, as of the 1970s, there is an existing Gazimohammed-Astara-Abadan gas pipeline with 9.6 bcm/a capacity, to deliver Iranian gas to Azerbaijan from the Khuzestan province of Iran. Starting from 2006, this pipeline is used to swap natural gas delivery from Azerbaijan to Iran, in return for the provision with Iranian gas of Nakhchivan, which does not have direct territorial and infrastructure contact with Azerbaijan because of conflict with Armenia. In 2009, Azerbaijan and Iran have signed a new agreement for purchase of Azeri gas by Iran<sup>29</sup>. For that reason, Azerbaijan had constructed a compressor station in the Astara region of Azerbaijan, at the border with Iran, to boost the gas supply to Nakhchivan and the export to Iran. However, the project has been frozen because of sanctions. It will be reconsidered again, said the Head of SOCAR, Rovnag Abdullayev<sup>30</sup>.

Through this formula Azerbaijan can merely boost its gas supply to Iran's northern regions for their domestic consumption, and in return, Iran can export its own gas, as Azerbaijani-exported gas via the Persian Gulf to the world markets in form of LNG<sup>31</sup>. Both sides can benefit

of this formula. Iran would not need to construct cross-country pipelines from energy-rich south to less-supplied and infrastructure-ill northern regions, while it will be able to meet domestic demand of these regions by virtue of Azerbaijani gas export. Meanwhile, Azerbaijani gas will be able to access new gas markets in Asia through shorter routes, because, and Ambassador Mohsun Pakayin had also mentioned that, "Azerbaijan can also invest in Iran's oil and gas fields in the Persian Gulf and we can enlarge the transportation potential of Azeri gas through swapping and cooperate on export of our oil and gas resources to third countries". He also noted that, "officially Tehran is ready for joint development of the oil and gas fields in the Caspian Sea."<sup>32</sup> There are huge gas reserves in the Iranian sector of the Caspian Sea. However, these reserves are located in the deepest point of the Caspian and Iran does not have the advanced technology needed for extraction<sup>33</sup>. However, Azerbaijan has the necessary technologies and experience, and Iran may benefit from it. Azerbaijan can deliver Iran's Caspian gas through its territories in reverse flow from south to north and inject it into the South Caucasus Pipeline (then onwards) – technically it is possible.

Furthermore, amidst the withdrawal of sanctions from Iran's energy sector, Georgia also sees the opportunity of Iranian gas for Georgia (and beyond) to diversify its gas supply, which is mainly provided by Azerbaijan's SOCAR.<sup>34</sup> However, since Georgia does not share common borders with Iran, former will need to use the territories of either Armenia or Azerbaijan for the transit of gas. There are existing pipelines from Iran to Armenia and from Russia to Armenia. If Iran pushes the full capacity of the Iran-Armenia pipeline, its gas might be transported through Armenia to Georgia. However, there is not a necessary interconnector with relevant capacity to supply Iranian gas to the Russia-Armenia pipeline. Even if the Russian-Armenia pipeline has a reverse flow capability, it is questionable how Russia will deliver its gas

<sup>28</sup> Simone Tagliapietra & Georg Zachmann, *op.cit.*

<sup>29</sup> "Влияние снятия международных санкций с Ирана на Азербайджан", Caspian Bridge, July 2015, <http://www.caspiana.org/2015/07/22/vliyanie-snyatiya-mezhdunarodnyx-sankcij-s-irana-na-azerbajdzhan/>

<sup>30</sup> "Ровнаг Абдуллаев: «Азербайджан пересмотрит проект по транспортировке газа в Иран»", Haqqin.az, July 2015, <http://haqqin.az/news/49369>

<sup>31</sup> "Влияние снятия международных санкций с Ирана", *op.cit.*

<sup>32</sup> "Iran Şahdəniz-də payını artırmaq niyyətini açıqladı", *op.cit.*

<sup>33</sup> "Iran and Russia have conflicting Interests in Export of Gas to Europe", Caspian Barrel, March 2015, <http://caspianbarrel.org/?p=27987>

<sup>34</sup> "Georgia wants more Russian gas to diversify supplies", AA Energy News Terminal, October 2015, <http://aaenergyterminal.com/newsMain.php?newsid=6477631>

to Armenia. Moreover, Gazprom-Armenia (a subsidiary of Gazprom), the owner of Russia-Armenia pipeline, might not welcome Iranian gas into this pipeline. Consequently, delivery of Iranian gas through Armenia to Georgia requires overcoming the financial burden and technical barriers, while Azerbaijan has the necessary infrastructure to serve as a transit country for Iranian gas. Thus, Azerbaijan-Iran gas pipeline, with reverse flow technical capability, would make transit of Iranian gas through Azerbaijan to Georgia much easier.

## Conclusion

The lifting of Iranian oil and gas sanctions coincides with the deterioration of West-Russia relations, the suspension of South Stream and the launching of Turkish Stream. This grants a historical opportunity to the world's second largest natural gas owner Iran to enter European gas markets. In the light of the EU's huge gas dependence on Russia and the Kremlin's endeavours to build a Turkish Stream pipeline, access of Iranian gas to Europe comes timely. Given the vagueness of the building of the Trans-Caspian Pipeline and insufficient amount of Azeri gas for the EU's long-term energy consumption, Iran's presence in the SGC project would mean a greater impact for the project.

However, it is not a short-term process. As analysed above, after complete removal of sanctions, Iran would still need some 5-6 years to prepare its energy sector in order to transport gas to Europe. And the sanctions will not be removed immediately, it might take few years upon Iran's compilation with its JCPOA commitments. However, being a second supplier does not mitigate Iran's problems concerning its gas export, as the country will face the competition from other natural gas suppliers (Russia); the lack of necessary energy infrastructures; need for foreign investment to revive its energy sector and need to build new pipelines; a growing domestic-gas-demand etc.

Furthermore, Iran's gas export to Southeast Europe via Turkey can hit Russia's Turkish Stream and its potential markets. In terms of volume and market diversification, Iran and Russia will be serious competitors in Europe once sanctions are removed. Participation of Iran in the

SGC means the weakening the Russia's domination in Southeast Europe. Iranian gas might be a game changer for Europe's gas supply on one hand, but it will be a game-spoiler for Russia's gas monopoly in Central and Eastern Europe on the other hand. Whereas, given the economic and geopolitical reasons, Iran might prioritize LNG export to Asian countries (given the high LNG prices) rather than pipeline export of gas to Europe. Therefore, the pipeline export will likely target mostly neighbourhood countries.

## DISCLAIMER

*The views expressed in this Newsletter are strictly those of the authors and do not necessarily reflect those of the European Centre for Energy and Resource Security (EUCERS), its affiliates or King's College London.*

## ACTIVITIES

The European Centre for Energy and Resource Security (EUCERS) at King's College London jointly organized a three-day workshop on the topic of 'Changing Global Gas Markets' with, the Konrad Adenauer Stiftung's regional project on energy security and Climate change in the Asia-Pacific region, the Energy Studies institute (ESI) of the National University of Singapore (NUS), and the Atlantic Council of the U.S. from 28<sup>th</sup> of October to 30<sup>th</sup> of October 2015. The workshop was organized to discuss geopolitical and geo-economic impacts on the Asia-Pacific region as well as Europe and its contribution to sustainable energy systems. It was held in William Ballroom of hotel Parkroyal on Pickering, Singapore.

Recently, the Asia-Pacific region has surpassed Europe to become the world's largest gas importing region. As the fastest-growing natural gas market worldwide, the Asian gas market, with 790 billion cubic meters of natural gas demand<sup>35</sup>, is estimated to become the world's second-

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<sup>35</sup> Data Source: IEA (International Energy Agency), Developing a Natural Gas Trading Hub in Asia,

largest natural gas market by 2015. The demand is expected to surge ahead in the coming years, primarily driven by traditional importers in the region like China, India, Japan and South Korea. The center of gravity of the global natural gas market is shifting eastwards, in line with economic growth and increasing energy demand. As a result, energy geopolitics and energy security issues in the Asia-Pacific region is of greater concern.

#### DAY I: Wednesday, 28<sup>th</sup> October, 2015

In the afternoon of 28<sup>th</sup> of October 2015, the first welcome address was made by Dr Peter Hefele, Director of the regional project on energy security and climate change at Konrad Adenauer Stiftung (Hong Kong).



Dr Hefele (left) and Professor Paik (right)

Then Professor Siaw Kiang Chou, Executive Director of the Energy Studies Institute (ESI) at National University of Singapore made his welcome address to all the participants. After the introduction, the meeting was chaired by Professor Dr Friedbert Pflüger, Director of EUCERS at King's College London, together with Ms Annie Medaglia, Deputy Director of Global Energy Center at Atlantic Council of the U.S. The first keynote speech was given by Mr Michael Feist, CEO of Stadtwerke Hannover (municipal utility company in Hanover, Germany) and Executive Vice-President of the German Association of Energy and Water

[https://www.iea.org/media/freepublications/AsianGasHub\\_WEB.pdf](https://www.iea.org/media/freepublications/AsianGasHub_WEB.pdf)

**Industries.** Mr Feist reviewed the carbon emission reduction targets in European region and revealed the huge potential of carbon emissions reduction by substituting coal with gas. Other renewables such as wind energy or solar energy can also contribute to the carbon emission reduction. However, they all have their own issues. For example, in some locations from January to March, the insufficient sunlight and wind would probably make renewables difficult to meet the energy needs. As a result, it is important to ensure gas supply. When addressing gas supply security, Mr Feist also introduced the political impact, gas pricing mechanism, and rising LNG imports in EU. Mr Jean Abiteboul, Senior Vice President of Cheniere Marketing Ltd., U.S. presented after Mr Feist's keynote speech. He gave an overview on global gas markets, as well as corresponding forecasts on gas markets in different regions in 2020 and 2025. Mr Abiteboul anticipated that the United States is likely to become one of the lowest cost LNG providers in the future, with a projected LNG capacity of 94 mtpa in 2025 (Australia: 81 mtpa, Qatar: 68 mtpa). In the meantime, Asia will become the main market for LNG growth, with an estimated LNG demand of 314 mtpa in 2025 (in comparison Europe: 89 mtpa, Americas: 19 mtpa). Finally, Mr Abiteboul summarized the benefits of importing LNG from the U.S. to Asia as diversifying the latter's sources of supply and its gas price mechanisms, getting access to cheap and abundant sources of energy and mitigating the uncertainty on demand and lack of storage. After the presentations, many questions were raised. Professor Dr Friedbert Pflüger put forward the thought that whether we have been just too optimistic about the gas market in Asia. Since the Asian economy is slowing down, gas prices in Asia are much higher than in Europe; and also nuclear power is back on the energy development plans for many countries in Asia. After intense discussion Ms Medaglia made closing remarks and the seminar was followed by a dinner with participants.

#### DAY II: Thursday, 29<sup>th</sup> of October, 2015

**Part I Geopolitical and Geo-Economic Impacts on the Asia-Pacific Region and Europe and its Contribution to Sustainable Energy Systems**

At the beginning of this part, Professor Dr Friedbert Pflüger first made an introductory statement on how to

secure our energy supply. Key pillars that can contribute to energy security were identified: supply diversification; energy independence; energy interdependence; and free market competition.

### Session 1: Natural Gas - The Bigger Geopolitical Picture

Professor Pflüger chaired the session and the first presentation was made by Professor Jonathan Stern, Chairman of the Natural Gas Research Programme at Oxford Institute for Energy Studies.



Professor Pflüger (left) and Professor Stern (right)

Professor Stern analysed the emerging gas superpowers and global power shifts. Based on introduction of current gas superpowers of Russia and Qatar, as well as emerging gas superpowers of Australia and the U.S., Professor Stern concluded that the gas world is moving away from pipeline gas to LNG. And for these gas superpowers, the export volumes do not make themselves 'winners' if their projects are not profitable. In terms of geographical reach and profitability of existing projects, Russia and Qatar are clear winners; while in terms of new projects, only Qatar is a clear winner due to the low costs of existing projects and careful approach in expanding its scale of export. Then Mr Sanjay Jobanputra, Vice President and head of Business Development Asia, Statoil gave the second presentation. He talked about commercial thinking and geopolitical risk in the global gas industry. Mr Jobanputra first pointed out that long-term forecasts are uncertain.

Though some known uncertainties can be handled by constructing scenarios, there are still a large number of other known unknowns such as consumer behavior, climate change impact that cannot be measured accurately, not to mention those unknown unknowns. Still, Asian markets were predicted to drive global LNG demand growth in the future. Pacific Basin LNG demand was expected to rise from 200 mtpa in 2015 to 300 mtpa by 2025, while South East Asian LNG demand was estimated to increase from 10 mtpa in 2015 to more than 45 mtpa by 2025. Demand would be driven by traditional buyers such as China, Japan and India, as well as emerging buyers in South East Asia. The third speech was made by Dr Tatiana Mitrova, Head of the Oil and Gas Department at the Energy Research Institute of the Russian Academy of Sciences (ERI-RAS). Dr Mitrova laid emphasis on the changing global energy flows and the corresponding geopolitical implications for the Asia-Pacific region and Europe. Based on the presentations valuable comments were made by Professor Keun Wook Paik, Senior Fellow at the Oxford Institute for Energy Studies, and Mr Sergey Tulinov, economic affairs officer of United Nations Economics and Social Commission for Asia and the Pacific (UNESCAP).

### Session 2: Looking into the Geo-Economics of Gas

This section was chaired by Ms Annie Medaglia. The first presentation was made by Mr Laszlo Varro, Head of Gas, Coal, and Electricity Markets Group at the International Energy Agency (IEA). Mr Varro discussed the role of gas in a carbon constrained energy system. He stated that cheap coal exported by the US is now replacing gas in Europe. Even Germany is building new coal plants to replace its nuclear power. Based on the current situation, Mr Varro led us to a discussion whether we actually need gas as a bridge fuel, or if solar energy and batteries make gas capacity redundant. The next presentation was by Dr Chunping Xie, KAS fellow at the European Centre for Energy & Resource Security, King's College London. Dr Xie first gave an overview of current gas markets in East Asia, followed by a brief introduction on current pricing mechanisms in different gas markets. Further estimations were made on gas consumption based on a heterogeneous panel co-integration model. Estimations were also made on gas

production based on a logistic curve model. In addition, according to the construction of gas pipeline, as well as the long-term contracts at present and in the future, natural gas imports were also estimated. **The final presentation in the session was given by Dr Xunpeng Shi, Senior Fellow at ESI at the National University of Singapore**, who mainly discussed gas hub initiatives in East Asia. An overview on East Asia's gas market was given, suggesting that Japan, South Korea and China together took up 61% of the world's total LNG imports in 2013, and this number is estimated to be 43% by 2035. However, the proportion of total LNG imports in the Asia-Pacific region will still remain as high as 70% in 2035. Comparisons were made on the world's gas pricing mechanism and emphasis laid on the current situation of Asia premium. Based on the above-mentioned points, Dr Shi concluded the possibilities and benefits of developing gas hubs in East Asia.

### Session 3: Climate Change and the Future Role of Natural Gas

This session was chaired by Professor Hongyuan Yu, Director for Public Policy at the Shanghai Institute of International Study. The first presentation was made by Dr Frank Umbach, Research Director at EUCERS, King's College London.



Dr Umbach (left) and Mr Lambine (right)

Dr Umbach talked about the role of natural gas in the future energy mix of Europe and the Asia-Pacific region. He analysed drivers and determining factors for global,

European and Asian gas demand by 2040. Forecasts on global gas demand and gas production were also introduced, as well as the projected gas import dependency and LNG import. Conclusions were drawn that the world's gas demand increases are dependent on Asia's demand; however, Asia's gas demand growth might be revised downwards due to the slowdown of economic growth etc. In addition, the switch from coal to gas will take place in the U.S. and in Europe, but not in Asia. Instead, coal will be the fastest growing energy resource in Asia, and may become the most important one around 2030 or 2040. If coal will be replaced by gas in Asia in the future is still of great uncertainty; and at the moment not really realistic based on the current situation. **The next presentation was given by Professor Quentin Grafton from the Australian National University and former Executive Director of the Australian Bureau of Energy Economics.** Professor Grafton presented an analysis of risks, returns and regulation of unconventional gas. Risks included hydraulic fracturing, methane emissions, other risks of seismic events, gas blow-outs, air pollution and non-water well pad issues were also emphasized. When talking about returns, following aspects of annual value-added GDP, employment, annual incremental government revenues in the U.S. unconventional oil & gas industry were taken into account. Regulations in the unconventional gas industry were also discussed.

DAY III: Friday, 30<sup>th</sup> of October, 2015

### Part II Gas/LNG trading hubs and hub pricing in East Asia

After introductory statements by Professor Siaw Kiang Chou, Dr Yongping Zhai, Technical Advisor of the Energy Sector Group at Asian Development Bank (ADB), made a keynote speech on 'Natural gas in Asia's energy mix: a development financier's perspective'. General information about ADB was firstly introduced. Numbers suggested that ADB's clean energy investments are growing rapidly in recent years, most of which are spent on renewable energy projects (59%). ADB's energy policy objectives suggest that natural gas is an important part of the energy mix to improve energy security and to reduce emissions of greenhouse gases etc. A comprehensive ADB study on developing a competitive LNG market in Asia was also introduced, which was

mainly about assessing the requirements of fostering a competitive LNG market and examining how an Asian gas trade hub can be created to benefit Asia as a whole.

### **Session 1: Introduction to Gas Hubs and Hub Pricing in East Asia**

This section was chaired by Professor Keun Wook Paik, Senior Fellow at Oxford Institute for Energy Studies. The first presentation was made by Ms Yuanyuan Chen, economist at Shanghai Petroleum and Gas Exchange. With a topic of 'China's initiatives in building gas hubs', Ms Chen first introduced the construction of gas pipelines and LNG terminals, and also its market reform in progress, including market liberalization on E&P of shale gas, gas import, interprovincial town gas companies, and price deregulation from governmental guidance to market-based mechanism. In addition, a particular introduction was made to Shanghai Petroleum and Gas Exchange (SHPGX), covering its shareholder structure, value chain and its efforts on the Chinese gas price index. With pipeline natural gas, liquefied natural gas and LNG receiving capacities as its three products, the SHPGX started its trial operation from July 2015. Professor Tetsuo Morikawa, Senior Researcher at the Institute of Energy Economics (IEEJ) in Japan gave the second presentation. Professor Morikawa first described the concept of a LNG hub, which is to form an international LNG price instead of domestic wholesale pipeline gas prices (in comparison to the case of the U.S. or European hub like Henry Hub or NBP). A domestic approach to develop Asian benchmark price was described in detail, including gas market liberalization, domestic wholesale price (hub) development, divergence of wholesale and import prices, and also de-oil-indexation of import prices. An international approach was also introduced, covering relaxation of destination clause, spot market development, divergence of oil-indexation and spot prices as well as spot price development. In addition, electricity and gas market liberalization in Japan as well as LNG trading hub initiatives in Japan were also presented. The third presentation was made by Mr Dave Carlson, Senior Business Development Director of the Singapore Exchange (SGX). In his speech, Mr Dave Carlson focused on Singapore's initiatives in building a gas-trading

hub. Due to the lack of indigenous gas (compared to the Middle East or North America) and the non-liberalized gas market (compared to Europe or North America), wholesale gas prices in Asia are high compared to the rest of the World. And Singaporean gas prices are amongst the highest in the world, only below those countries who fully reliant on LNG. In addition, the LNG market is becoming shorter termed and the spot market share is growing. As a result, the market needs a trusted spot benchmark. Physical LNG participants, together with EMC/SGX of Singapore, are trying to create such a benchmark for Asia. In addition, the Singaporean LNG Index Group of SLInG was also introduced, which is a spot index based on a weekly industry poll for major traders' assessment of a fair mid-price for a Singaporean FOB LNG cargo. Based on their presentations, comments were made by Mr Paramate Hoisungwan, Senior Analyst and Upstream & Gas Team Leader of ASEAN Council on Petroleum (ASCOPE) and Mr Michael T. Jones, Senior Analyst of Northeast Asia Gas & Power, Wood Mackenzie.

### **Session 2: Moderated Discussion**

This session was a roundtable discussion, chaired by Dr Xunpeng Shi. Leading panelists discussed stakeholders' views on the East Asian gas hub initiatives.

### **Session 3: Lessons learned from European experience**

Dr Frank Umbach chaired the session and the first presentation was made by Mr Henning Gloystein, Energy Editor Asia at Thomson Reuters. Mr Gloystein discussed the successes and failures of European energy market liberalization. He pointed out that the UK natural gas market (NBP), Dutch natural gas market (TTF), German and Nordic power markets (e.g. EEX and NordPool) have worked well in European energy markets; while French power & gas markets (and southern European markets), German natgas markets, and Carbon markets have not done so well. At last, learning points for Asian natgas and LNG were concluded as: 1) excess supplies need to become liquid; 2) non state-controlled buyers of several sizes are required; 3) should benefit from a large customer base and diverse suppliers; 4) regulator should be trusted and neutral. The second presentation was made by Mr. Andre Lambine, Senior

**Advisor of Gas at Platts, on ‘critical success factors of European gas hubs’.** Key success factors were concluded as: 1) Transparency. Hub price quotations and indices have been publicly available since the hubs commenced trading; 2) Deregulation. There must be demand to trade; 3) Interconnectivity. Trading between geographical areas must be facilitated; 4) Standardization. Makes it possible to compare prices; 5) Balancing of the Market/Clearing House. That can reduce counterparty risk; 6) Financial trading which will boost liquidity. **The third presentation was made by Dr Xunpeng Shi on ‘Europe’s transition from oil indexation to hub pricing: An Asian perspective’.** Dr Shi argued that, oil indexation is no longer justifiable due to many reasons such as oil not being an alternative to gas (coal emerges as an alternative now) and also the low correlation with the U.S. market. Transition from oil-indexed to gas-on-gas (GoG) competitive pricing is underway in Europe as its gas hub development is a dynamic process, which is still in progress. In East Asia, some countries would like to see gas hub trading take off in the near future, too. Lessons from the European experience are valuable for reflecting on successes and failures of gas hub emergence and an East Asian perspective can be derived from European experience and adjusted to a new context. Based on their discussions, comments were made by Juan Roberto Lozano Maya, Researcher at Asia Pacific Energy Research Centre (APEREC).

#### **Session 4: Lessons learned from other commodity markets**

This section was chaired by Professor Quentin Grafton. The first presentation was made by Mr Hari Malamakkavu Padinjare Var, Research Associate at ESI, National University of Singapore. His speech was mainly about transition to market based price in crude oil markets and lessons learned for hub pricing in natural gas markets. Both evolution of crude oil pricing and traded natural gas pricing were introduced. Key factors in development of oil benchmark pricing were analysed and hub market development framework was built for natural gas. **The second presentation was made by Ms Jacqueline TAO, Analyst, ESI, National University of Singapore.** Detailed introduction was given to the coal pricing mechanisms. Lessons for market based pricing of

natural gas markets were concluded as: 1) Large volumes of trade, though critical, does not guarantee the evolution of a geographical trading hub; 2) Relevance and reliability must be present, in addition to price discovery; 3) Governance plays an important role. **The third presentation was made by Dr Xunpeng Shi, who focused on Dojima rice exchange.** An overview was given on the Dojima rice exchange, as well as its history and challenges. Implications were summed up for gas market development on following aspects: spot market, futures market, government and policy development. Based on their presentations, comments were made by Dr Yanfei Li, energy economist at Economic Research Institute for ASEAN and East Asia (ERIA).

During the workshops some main conclusions were drawn, including – but not limited to – the following points: 1) Natural gas plays a significant role in carbon emission reduction and should therefore be regarded as a bridge fuel; 2) World’s gas demand increase, especially LNG demand increase are to a large extent dependent on Asia’s growing demand, notwithstanding the slowdown of Asian economy at present; 3) Gas supply security is a major issue and efforts should be made on following aspects: supply diversification; energy independence; energy interdependence; and free market competition; 4) Natural gas pricing mechanism are vital for gas market development. The European experience in gas pricing mechanism are valuable for the transition in Asia; 5) During the transition of gas pricing mechanism, the initiatives in building gas hubs in Asia are of much concern, and some Asian countries such as China and Japan are trying hard to realize plans. Though in the end the workshop did not reach an agreement on whether we should develop a natural gas trading hub in Asia or not, we had intense discussions throughout the three days and important thoughts and insightful comments were made.

We would like to thank our partners for their support making this workshop and the very interesting and insightful discussions possible and are looking forward to future cooperation with the Konrad Adenauer Stiftung, ESI at the National University Singapore and the Atlantic Council of the U.S.

## ANNOUNCEMENT

We are delighted to announce our fourth and final EUCERS/ISD/KAS Energy Talk on Iraq as re-emerging energy superpower. The workshop will be hosted in cooperation with the EU-Iraq Energy Centre at the Maughan Library's Weston Room on 30<sup>th</sup> of November 2015 from 17.00 (with a reception from 19.00).

Draft Programme:

### *17.00 Welcome Address and Introduction*

**Professor Dr Friedbert Pflüger**, Director, EUCERS, King's College London

**Hans-Hartwig Blomeier**, Director London Office, Konrad-Adenauer-Foundation (KAS)

### *Introductory Statements include:*

**N.N. Representative of Government of Iraq**

**Leonidas Kioussis**, International Relations Officer, DG Energy, European Commission (tbc)

**Dr Christos Mylonas**, Iraq ER and GR Manager, Shell Iraq Petroleum Development BV

**Stefan Haid**, Principal, Civil Economics, Energy and Infrastructure, Roland Berger GmbH and EU-Iraq Energy Centre project responsible

**Mehmet Sepil**, Longtime entrepreneur founded Genel Energy in 2001 to extract oil in Iraqi Kurdistan.

**Christophe Michels**, Chief Operating Officer, Iraq Britain Business Council (IBCC)

**Dr Frank Umbach**, Research Director, EUCERS, King's College London

*Followed by a discussion with participants (ca. from 18.00)*

*19.00 Reception*

## 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 Vantanser.

22.10.2015 Brussels, Germany	Frank gave a PPT-Presentation on "Risks to Maritime Energy Infrastructure: Cyber Threats and Information Operations" at the Scenario-Based Workshop on „The Protection of Energy Infrastructure in the Maritime Domain“, a NATO-Azerbaijan Expert Workshop of the Industrial Resources and Communications Services Group (IRCSG) in EAPC Format at the NATO-Headquarter
21.10.2015 Helsinki, Finland	Frank gave a PPT-Presentation on "Global Energy Security – Mega-Trends and Challenges" at the Strategic Foresight Analysis – Interim Update Workshop – II of the NATO-Supreme Allied Commander Atlantic (ACT)
16.10.2015 Tehran, Iran	The Munich Security Conference held a Core Group Meeting in Iran where Friedbert moderated the session on „Economic and Energy Perspectives“.
16.- 17.10.2015 Cadenabbia, Italy	The Konrad Adenauer Stiftung organised a conference on "Energy Security and Geostrategic Challenges - Resource Policies in Times of the Energiewende. Cooperation between Germany, EU and Kazakhstan" and Frank presented on "Strategic Challenges of Energy Security in Europe and Eurasia" and „Russian Energy Foreign Policies and Pipeline Diplomacy between EU, Caspian Region and China“.
15.10.2015 Cambridge, UK	Dr Slawomir Raszewski spoke on Energy Geopolitics in the Black Sea region at Magdalene College, Cambridge.
12.10.2015 Berlin, Germany	Frank presented on „Energy Foreign Policies: Global Changes of the Energy Markets and the Geopolitical Implications“ at a meeting of the Christian Democratic Union of Germany
01.10.2015 Berlin, Germany	Friedbert chaired a panel on "Global Energy Markets in an Age of Climate Change and Price Volatility" at the ZEIT conference "Natural Gas and Climate Change – Road to Paris".
30.09.2015	Friedbert presented with Frank the new EUCERS Study on "The Future of

Coal” at the Future Energy Forum.

30.09.2015 Berlin, Germany	Frank presented at the Future Energy Forum on „Coal-Based Electricity Production versus Climate Protection – Does It Fit Together”
29.09.2015 Oberammergau, Germany	Frank presented on “Global Energy Developments” and “Regional Energy Security Developments in the Middle East, Eastern Europe and Asia” at the first Energy Security Strategic Awareness Course, NATO-School

## PUBLICATIONS

Professor Dr Friedbert Pflüger wrote an article for “Europe’s World” on “Energy superpower Iran will be a global game changer in in the Autumn 2015 edition. <http://europesworld.org/2015/11/03/energy-superpower-iran-will-global-game-changer/#.VkID-KQkKBu>

Dr Umbach published two articles with the Geopolitical Information Service (GIS – [www.geopolitical-info.com](http://www.geopolitical-info.com)). On 22.10.2015 “Southern Gas Corridor Project Holds Promise for EU Energy Security” and on 18.9.2015 “Turkish Stream – Reality or Pipe Dream?”.

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If you have found our Newsletter interesting, wish to hear more about our activities, or, indeed, contribute with ideas or essays, please contact Carola Gegenbauer, Operations Coordinator EUCERS on [carola.gegenbauer@kcl.ac.uk](mailto:carola.gegenbauer@kcl.ac.uk) or call 020 7848 1912.

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