



Joint IEA-IEF-OPEC Report

**on the First Symposium on Gas and Coal Market
Outlooks**

**Paris
4 October 2012**

Executive Summary

In response to calls from G20 Leaders, the International Energy Agency (IEA), the International Energy Forum (IEF) and the Organization of the Petroleum Exporting Countries (OPEC) jointly hosted the First Symposium on Gas and Coal Market Outlooks at IEA Headquarters in Paris, France, on 4 October 2012.

Held under the Chatham House Rule, the Symposium gathered together more than 90 experts with a diverse range of backgrounds: the energy industry (both consumers and producers), business, government and academia. The Symposium offered a platform for sharing insights and exchanging views about current outlooks for gas and coal markets and for examining related regulations.

The first session of the Symposium covered recent developments in gas markets, including the impact of increased production of non-conventional gas, the evolving role of liquefied natural gas (LNG) in world markets, and improvements in access to market data - including the extension of the Joint Organisations Data Initiative (JODI) to cover gas.

The second session focused on current and future drivers of coal demand, the impact on coal of government policies related to energy and the environment, and the effects of competition in power generation on coal demand. The session also addressed the sources and quality of coal market data and ways in which they might be improved.

The final session looked at on-going efforts to enhance transparency and regulation in the financial markets for gas and coal at both national and international levels, and what impact this might have on energy markets going forward.

There was consensus that the natural gas market faces many uncertainties, which include the following: the impact of economic growth on gas demand, the outlook for nuclear power post-Fukushima (and related impacts on gas demand), challenges inherent in the development of so-called mega-projects, questions around subsidies for renewables, price formation, future environmental and CO₂ scenarios, and what the future holds for unconventional gas.

Recent developments in unconventional gas are likely to transform gas markets and may well impact the global energy landscape. Participants noted that shale gas has been at the center of an energy revolution in the US, with dramatic effects on gas prices, energy security and job creation. On the other hand, they recognized that this has not been the case elsewhere in the world. There is still a lot of uncertainty regarding the quantity of gas in place. Some participants noted that shale gas may be viewed as a double-edged sword: while it makes more gas available to consumers, a supply glut may lower gas prices – thereby negatively impacting producers. . In addition, prolonged low gas prices may negatively impact consumers in the long run, as we have seen with past boom-bust cycles. Low prices reduce producers' incentives to invest in expanding capacity, which

tends to cause supply shortages - sending gas prices higher.

Participants discussed the importance of coal and gas in the global energy mix, as both fuels represent almost half of total primary energy consumption in the world. In the past decade coal and gas supplied 60% of the world economy's growth in energy demand. There was a consensus that the world's gas and coal resources are sufficient to meet future demand under any currently-envisioned scenario.

The participants also noted the following key points:

- Coal and natural gas markets have experienced rapid structural change in recent years, with shifting regional demand patterns and greater international trade among the main driving forces.
- The US shale gas revolution has led to a crowding-out of thermal coal in the US power sector, sending this excess coal into the international thermal coal market and subsequently leading to oversupply in the Atlantic Basin.
- Technological advancements over the last twenty to thirty years have led to improvement in efficiency and flexibility of natural gas and hard coal fired power plants.
- The Symposium noted the progress made with JODI-Gas in increasing natural gas data transparency, thanks to the cooperation of the seven JODI Partners. However, there are still some issues need to be tackled to improve JODI gas reliability and completeness, such as confidentiality, training of statisticians and data harmonization. Participants noted that Second Gas Data Transparency Conference in Doha (May, 2012) identified a number of possible means to address these challenges, such as transforming the JODI-Gas exercise into a permanent initiative, organizing regional training sessions, launching a beta version of the JODI-Gas database and developing a JODI-Gas Training Manual.

Participants noted the ongoing regulatory reforms in the financial and derivatives markets and acknowledged that these reforms may benefit markets by improving transparency. At the same time, the Symposium recognized the need to preserve the ability of physical traders to use these markets to facilitate trade and hedge underlying price risk, and highlighted the need to ensure that reform efforts do not negatively impact market liquidity.

There were diverse views shared about the gas pricing mechanism (oil-linked contracts versus spot hub price indexation). Some participants argued that the European long term contracts should move away from oil-linked prices to market prices. Other participants insisted that long-term contracts remain necessary for the smooth functioning of the natural gas chain, including investments, and noted that there is currently nothing to replace the old system of long term contracts, as the gas hubs in Europe currently lack sufficient participants and liquidity.

The IEA-IEF-OPEC Symposium on Gas and Coal Market Outlooks offered an opportunity to discuss the outlooks and uncertainties for the respective markets, both from

a producer and a consumer perspective. Recognizing that gas and coal markets have become more complex, participants stressed that sharing diverse views, insights and analyses among organizations and experts helps deepen and enrich the global energy dialogue. Future events covering the Gas and Coal Markets, as well as market regulations and transparency, would be beneficial to promote a deeper understanding of these important issues.

1. Introduction

As gas and coal are forecasted to continue to meet an important share of global energy demand, the need to improve our collective understanding of these markets is evident. The G-20 Cannes Summit Leaders' Declaration in November 2011 requested "further work on gas and coal market transparency and asked the IEA, IEF and OPEC to provide recommendations in this field." In addition, the declaration called for "annual symposiums and communiqués on short-, medium- and long-term outlooks and forecasts for gas and coal".

Following that call, the three international organisations held their first Symposium on Gas and Coal Market Outlooks in Paris in October 2012. To facilitate discussions during the Symposium, presentations by experts with diverse experience in the energy world set the scene and stimulated debate on the outlooks for gas and coal markets and related financial regulations.

2. Session One: Recent natural gas market developments and outlook

Discussion in this session focused on the global impacts of increased production of non-conventional gas, the evolving role of LNG in world markets, and improvements in market data availability- including the extension of the Joint Organisations Data Initiative to gas. Experts in this session also shared insights about regional gas prices, as well as opportunities and challenges related to non-conventional gas. Participants exchanged views on the assumptions implicit in regularly-published gas outlooks, and the session concluded with comments on the uncertainties affecting the gas outlook.

Participants in this session noted that concerns about economic weakness have impacted the way in which policymakers shape energy policy. Those same concerns have reduced support for interventionist policies favorable to the environment and renewables, and have impacted the development of new mega-projects. Speakers in this session noted that investment in new capacity has helped the market to be well supplied in the medium-term; however, gas markets may experience some tightness by the end of the decade, should demand suddenly increase.

The panel experts noted that the global natural gas demand growth forecast under the IEA's Golden Age of Gas scenario equals the combined expected increase from coal, nuclear and oil, which would represent gas overtaking coal as the world's second most important fuel. There was consensus that world gas resources, both conventional and non-conventional, are sufficient to meet future demand under any scenario.

Participants were reminded that the realization of the IEA's scenario is not at all a certainty. There are a number of questions regarding this scenario, notably with regard to its timeframe, whether or not it will mean lower prices, an increase in gas's share in the global energy mix, and whether or not it will play out in countries that do not have large supplies of unconventional gas.

Another topic covered was that major gas exporting countries like Russia may face some

difficulties from recent developments in the gas market, notably the drop in the European gas demand (a result of the European economic crisis and the increased reliance on coal for power generation, especially in light of the fact that Emission Trading Scheme (ETS) carbon prices are very low), growing momentum toward hub-based pricing, and the potential of large LNG exports from the US. However, this is counterbalanced by a healthy demand growth in Asia, and elsewhere, especially in the aftermath of the Fukushima nuclear accident. In addition, discussants noted that gas production is expected to increase in many regions, but new projects will be more expensive and will thus require higher prices to support the necessary investment.

Participants noted that recent developments in unconventional gas may significantly transform gas markets. Shale gas has been at the center of an energy revolution in the US, with dramatic effects on domestic gas prices and job creation. This has not been the case in Europe, as uncertainty about the amount of unconventional (shale) gas present is still high. Furthermore, European nations continue to take different positions on shale gas – ranging from Poland’s enthusiasm for shale gas to France’s reluctance to allow exploration. Some other participants considered shale gas to be a double-edged sword: while it makes more gas available to consumers, a possible supply glut may weaken the prices of natural gas and reduce incentives for producers to invest. Low gas prices may also have an adverse effect on the growth of renewables.

Views were shared about gas outlooks and pricing mechanisms (oil-linked contracts versus hub-based prices). Some participants recognized the need for long-term contracts and that hub-determined spot prices currently suffer from a lack of liquidity and excessive volatility, while others mentioned that spot pricing will only continue to rise in terms of total contract share.

There was agreement that more and better natural gas data would benefit market actors, in part because limited natural gas data transparency encourages speculation rather than investment decisions based on fundamental analysis. Participants noted the progress made in extending JODI to cover gas, thanks to the cooperation of the JODI Partner organisations. However, the session noted that making JODI-Gas a reality is not without challenges, such as concerns about confidentiality, harmonizing data, and the need to train statisticians. . The experts noted that the Second Gas Data Transparency Conference in Doha (May, 2012) identified a number of related countermeasures to address these challenges: transforming the JODI-Gas exercise into a permanent initiative, organising regional training sessions for statisticians, launching a beta version of the JODI-Gas database and developing a JODI-Gas Training Manual.

Some participants see natural gas as a transition fuel while others see it as the energy of the future. In this case, there is a need to solve the challenges related to carbon capture and storage (CCS) deployment for gas-fired power plants.

Experts noted that the gas industry could be doing a better job of spreading the word about the benefits of gas, and likewise recognized a need for on-going platforms designed to incorporate various views in addressing the challenges of unconventional gas development.

3. Session Two: Recent coal market developments and outlook

In this session, experts from a diverse range of energy backgrounds set the scene and stimulated debate on the current and future drivers of coal demand, including competition in power generation (gas vs. coal) and how it is affected by government economic, energy and environmental policies. Comments in this session also addressed the sources and quality of coal market data, recent technological developments and regional price differentials. Participants also discussed assumptions applied to a range of regularly published outlooks on the global coal market, as well as the degree to which uncertainties influence these projections.

Session participants discussed the importance of coal in today's world. They noted that it is currently the second primary energy source used in the world (representing around 28% of primary energy) and some expect it will overtake oil as the most important fuel source by 2030. Around 75% of global demand for thermal coal is driven by power generation, and more than 40% of the global power generation is fueled by coal. In addition, nearly 85 % of coal is consumed in the same country where it is produced.

There was a consensus that coal resources are abundant and available across the globe, as identified coal reserves are sufficient to meet current production for more than 100 years.

The participants noted that prices for coal show better integration than regional gas prices. This is partly because shipping gas as LNG is roughly four times more expensive than shipping coal, due to high costs involved in the liquefaction of natural gas.

The participants highlighted that the center of power in the global thermal coal trade has firmly shifted from the Atlantic to the Pacific, increasing the importance of non-OECD countries for the global coal market (driven to a large extent by China's recent surge in imports). China and India in particular have little alternative but to expand coal use in the power sector, at least in the near- to medium-term. Therefore, coal is expected to continue to be the dominant fuel in China's energy mix – despite policy efforts directed at diversifying the mix. China is currently a price setter for coal, though if India becomes the largest coal importer, price formation may change.

The experts in this session noted that the US shale gas revolution has led to a crowding-out of thermal coal in the US power sector, which forced these idled coal supplies into the international thermal coal market -- subsequently leading to additional supply and low prices in the Atlantic Basin. On this point, it was noted that at current prices for coal, gas and CO₂, coal has a significant cost advantage over natural gas in the North-Western European electricity sectors. As a result, the European coal demand in 2011 increased by a historic 7% (benefiting from cheap US imports), while gas demand declined. Some posited that it would take a CO₂-price in excess of 60 EUR/t CO₂ to give natural gas in Europe a cost advantage similar to the one in the United States. The environmental benefits of using gas are immense when compared to coal, but low ETS carbon prices prevent taking advantage of such gas environmental credentials.

4. Session Three: Financial regulation in gas and coal markets

Discussions in this session focused on on-going efforts to enhance transparency and regulation in the financial market for gas and coal at both national and international levels and what impact these efforts might have going forward.

To facilitate the discussions in this session, a number of experts presented their views on the topic, which stimulated an interesting debate about market transparency in gas and coal and proposed financial regulations in energy derivative markets.

The session participants noted that in the interest of improving regulatory oversight and managing risk in energy derivatives markets, greater transparency is being called for by energy and financial authorities alike. In this respect, participants noted that transparency differs across regions and commodities (gas versus coal). Transparency of prices for coal should be improved; some experts cited examples of price quotes differing by as much as 20%.

Participants acknowledged that regulations have important effects on market functioning and on participants' behavior, and emphasized the need for appropriate regulation and oversight in the financial energy markets - including the release of more frequent and granular market data. The session also acknowledged that regulatory reform is essential to ensure future soundness of the system, to improve transparency, to safeguard efficient price discovery and to reassure the public that prices are set in an open, competitive market.

Experts in this session noted the ongoing regulatory reform efforts in the financial and derivative markets. They recognized that the ongoing changes in financial markets regulation will likely have a significant impact on commodities markets. It was also noted that the financial and commodities regulators do not know enough about each other's areas. Therefore, there is a risk that energy commodities markets will become overregulated as a result of the tighter financial markets regulation. In this respect, there is a need to strike the right balance between transparency and liquidity of the market.

The session participants also acknowledged that increased trading activities and physical transactions are needed for more effective price discovery and price transparency. They noted that greater inter-regional gas transport has increased spot LNG trading. Moreover, the jump in Asian demand - particularly Japanese power demand post-Fukushima -- boosted spot trading activities.

Experts in this session noted that at the beginning of the last decade, many gas producers were expecting the US gas market to become a large LNG important market, which would drive energy prices in the US and in the international market as well. However, US shale gas production has completely changed the landscape and has contributed to the emergence of more fragmented markets than previously expected, partly caused by the lack of gas export capacity in the US.

Discussions also focused around price formation in Europe. Participants noted that trading at Europe's natural gas hubs increased over the past decade. However, there are still many concerns about hubs' market depth and liquidity in order for them to function as acceptable price discovery and reference points. Some participants argued that the European long-term contracts should move away from oil-indexed prices to market prices in order to reflect changes in supply and demand conditions; and that hub prices provide the only viable reflection of those conditions. They noted that the liberalisation of the gas market in the UK and Northwest Europe partially delinked gas prices from oil linkages. However, other participants argued that at present there is not a viable alternative to replace long term contracts, and that gas hubs in Europe are not liquid enough and there are not enough participants. Two of the major arguments against moving to hub-based pricing involve the possibility of manipulation either by sellers or buyers of gas, and the likelihood that these prices will be more volatile than those based on oil-indexed contracts. Another argument is that, in such a capital-intensive and long payback period industry, long-term contracts ensure the right balance of risks and rewards between the buyer and the seller, which is a sine qua non condition to ensure that the huge investments are made in a timely manner -- for the benefit of the producers and consumers alike.

Finally, some participants expressed the view that any alternative gas pricing mechanism should not be subject to manipulation, should provide fair price levels for both consumers and producers, and should facilitate investment in new projects.

5. Summary of the discussions

The First IEA-IEF-OPEC Symposium on Gas and Coal Market Outlooks offered an opportunity to discuss the outlook for the respective markets, both from a producer and a consumer perspective, and to address the associated uncertainties and challenges. Recognizing that gas and coal markets have become increasingly complex, discussions at the Symposium underscored the fact that sharing insights and analyses among the organizations and with other experts is mutually beneficial, helps reflect the diversity of views on gas and coal markets, and could contribute to a better mutual understanding.

Key outcomes of the Symposium are summarized below:

- There was a consensus that the natural gas market faces many uncertainties, including how economic growth will impact expected gas demand, the outlook for nuclear power post-Fukushima (and related impacts on gas demand), challenges inherent in the development of many mega-projects, questions around subsidies for renewables, price formation, future environmental and CO₂ scenarios, and what the future holds for unconventional gas.
- Coal and gas combined account for almost half of the total primary energy consumption in the world, supplying 60% of the growing energy needs of the world economy. In this respect, there was a consensus that world gas and coal resources are sufficient to meet future demand under any scenario.

- The recent developments in unconventional gas may transform the gas markets. Symposium participants noted that shale gas has been at the center of an energy revolution in the US, and has had a dramatic effect on gas prices and job creation. This has not, however, been the case in elsewhere in the world. They also noted the challenges, specifically environmental, that are associated with shale gas activities.
- Coal and natural gas markets have experienced rapid structural change in recent years, with shifting regional demand pattern and greater international trade among the main driving forces.
- The US shale gas revolution has led to a crowding-out of thermal coal in the US power sector, which has forced these idled coals into the international thermal coal market - subsequently leading to additional supply finding its way into the Atlantic Basin and increased coal use in the European power generation sector.
- Technological advancements over the last twenty to thirty years have yielded improvements in efficiency and flexibility in natural gas and hard coal-fired power plants.
- There are many challenges for increasing data transparency of the gas market, which include data availability and harmonization, as well as timely submission of data.
- Symposium participants noted the ongoing regulatory reform efforts in the financial and derivatives markets, and acknowledged that these reforms may benefit markets by improving transparency. At the same time, the Symposium recognized the need to preserve the ability of physical traders to use these markets to facilitate trade and manage underlying price risk and highlighted the need to ensure that reform efforts do not negatively impact market liquidity.
- Diverse views were shared about gas volumes and pricing mechanisms (oil-linked contracts versus hub-indexed prices). Some participants argued that the European long term contracts should move away from oil-linked prices toward spot prices. Other participants argued that at present there is no viable alternative to replace long term contracts, and that gas hubs in Europe are not liquid enough and do not currently have enough participants to function as hubs. Concerns were raised about the possibility of manipulation either by sellers or buyers of gas, and the likelihood that hub-based prices might be more volatile than those set by the traditional oil-linked contracts. Moreover, in such a capital-intensive and long payback-period industry, long-term contracts can help to balance risks and rewards between the buyer and the seller.

- The discussants noted the progress made on JODI-Gas with the cooperation of several international organizations. In this respect, the Symposium commended the international efforts to increase market data transparency, such as the JODI process, and stressed the need to make further significant progress in this area.
- Finally the Symposium agreed to continue the efforts to improve the producer consumer dialogue in an effort to boost energy security for all.

6. Conclusion

At the end of the event, participants noted the successful outcome of the Symposium, as well as the positive and constructive nature of the dialogue among energy stakeholders. They recommended holding future events to continue enhancing the producer-consumer dialogue around key issues related to energy.