



Joint IEA-IEF-OPEC Report

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

**Paris
30 October 2014**

Executive Summary

In response to a call from G20 Leaders and following the First Symposium on Gas and Coal Market Outlooks organised in 2012 by the International Energy Agency (IEA), the International Energy Forum (IEF) and the Organization of the Petroleum Exporting Countries (OPEC), the Second IEA-IEF-OPEC Symposium on Gas and Coal Market Outlooks was held on 30 October 2014, hosted by the IEA in Paris.

Held under the Chatham House Rule, the Symposium gathered more than 100 experts with a diverse range of backgrounds: the energy industry, business, government and academia. With the main focus on the interactions and new dynamics between gas and coal, the participants' different backgrounds and market perspectives contributed to the active discussions and exchange of views on the topics presented.

The first and second sessions of the Symposium focused on natural gas and coal short-, medium- and long-term outlooks. While the first session on natural gas centred on the demand, supply, transport and the LNG market, the second session gave extra attention to the emerging production, consumption and marketing patterns of coal. The final session provided the platform for the parties to assess the gas and coal competition in the power market from a long-term sustainability perspective, and market and policy issues that influence the growth of these fuels in the power generation sector.

Throughout the Symposium, there were common themes connecting both natural gas and coal, including the following:

- The key role of fossil fuels within the global energy mix;
- Price issues as an important factor influencing the development of both fuels;
- The significant impact of government policies in the area of economic growth, security of supply, or environmental concerns;
- Asia as the fast growth region of energy demand, where both fuels will compete for market share and policy changes are expected to have a major impact on global energy markets.

Participants in the Second Symposium revisited a number of points raised on natural gas that figured prominently in the discussions at the First Symposium. These included, amongst others:

- Together with coal and oil, natural gas has dominated global energy matrices and shown strong growth over the past 25 years in OECD economies;
- Favourable policy towards renewables in Europe is expected to constrain demand for natural gas, which is currently struggling to compete with low coal prices in the power generation sector;

- Strong natural gas demand increases in North America, driven by technology deployment and economics, may plateau when natural gas price signals sharpen;
- While demand for natural gas is dominated by the OECD countries, natural gas is expected to experience the fastest growth in the non-OECD countries;
- Whether gas demand growth will continue and deliver on expectations (also in non-OECD economies) will depend on many policy and market variables;
- Government policy favouring natural gas consumption in Asia, for instance to overcome air pollution issues, will stimulate demand.

Turning to the United States and the so-called 'shale gas revolution', economics have played a key role in North America. The shale gas in North America enabled a boom in its petrochemical and manufacturing industry and an increase in gas use in power generation supported by low price levels. Gas demand in these sectors and policy factors will concurrently determine the pace and magnitude of North American LNG exports. While North American LNG exports will contribute to the global LNG market, export volumes would represent a small fraction of the total gas consumption of the region.

Despite the fact that shale gas holds huge global potential, there are still uncertainties surrounding the shale gas development in other regions, such as Asia, Oceania and Latin-America, which can impact the global gas market outlook.

While the economic drivers of coal remain a major factor, future demand will be also influenced by policy, perhaps to a greater extent than for natural gas. Coal is expected to regain some market share in OECD countries, as projected growth in Japan, Korea and Turkey will offset the declining trend in other countries.

Asia also plays a key role in global coal consumption to keep-up with growing demand while pursuing policies to ensure a cleaner urban environment and more sustainable growth. In this respect, the "Coal-Power Conflict" or the lack of mining sector reform due to a divergence of interests between central and local governments occurring in non-OECD Asia and other coal regions, is of interest. Though the non-OECD region's share of coal imports is small as a percentage compared to production, it is large relative to the global trade, and hence any policy/issue in the region will affect the global coal market.

Ultimately, gas and coal industries thrive when governments reduce investment risk, and they struggle when confronted with unclear policy directions. Future climate and environmental policies already affect current investments due to the uncertainty they create at present.

With the exception of North America and its abundant shale gas, elsewhere coal is less

expensive than natural gas, which helps explain why it is expected to retain a prominent role in the world energy mix--though future levels of CO₂ pricing remain a variable to watch. The current situation in Europe puts the region in the limelight, as coal has been displacing natural gas in power generation as a consequence of the low CO₂ price on top of the already low coal price. Even in the North American power generation sector, natural gas will remain competitive only if the gas price is maintained at below USD 4/MBtu. Should gas move above that price range, it may well lose market share to coal.

With regard to transparency, the achievements of the Joint Organisations Data Initiative (JODI) were highlighted, including the public release of the JODI-Gas database in May of this year in Moscow. Sustained support of JODI and its guiding principles was recommended to further enhance the transparency, reliability, and completeness of data in both gas and coal markets.

The replacement of coal plants by combined cycle power plants (CCPP) would be an effective lever for the reduction of CO₂ emissions, since CCPPs emit 65% less CO₂ emissions than lignite steam power plants (SPP).

The projected increase in renewables in Europe may negatively affect natural gas demand in the medium-term, and not coal as was widely expected previously. Though coal and natural gas have a lower 'levelized cost of energy' (LCOE), they find themselves at the higher cost end of the merit order, behind subsidized renewables and nuclear that--contrary to fossil fuel markets--have much lower marginal production costs once they are built.

During the Symposium special attention was given to energy technology advancement, in particular Carbon Capture and Storage (CCS) capability. Though CCS is a crucial capability towards decarbonisation of energy markets, the fact that the decarbonisation cost with CCS would be much higher than through enhancing power plant performance makes it more likely that CCS may remain "orphaned" by future energy markets if major government support is not forthcoming.

1. Session One: Gas market developments in short-, medium- and long-term outlooks

Discussion during this session focused on the impact of emerging new supply from North America, competitiveness of gas *vis à vis* other energy sources, and the evolving role of LNG in global markets. The expected impact of unconventional gas production beyond North America (in Asia and other regions) was also mentioned.

There was a general view that while gas demand is expected to increase, especially in non-OECD Asia, new supplies from new regions such as North America and East Africa are expected to impact global market dynamics.

North America is expected to remain the largest gas consumer, in light of its increasing shale gas production and sustained downward price pressures, which have been stimulating demand. European gas demand growth projections look more uncertain. After recent gas demand declines, it remains unclear when demand will return to pre-crisis levels, though steady growth is projected over the medium- to long-term. While natural gas demand in power generation will remain the primary driver of natural gas consumption, there are expectations that demand for natural gas in the transportation sector could grow and may have implications for global gas demand if safety and infrastructure issues can be adequately addressed. The petrochemical sector was also seen as an important driver of future demand growth.

Views were exchanged about the major impact that the North American shale gas market is expected to have on the global gas market. North American LNG supply is expected to influence pricing in the traditional LNG market, given the use of Henry Hub indexation. Views were also expressed that North American LNG exports may be hindered by transportation costs or domestic opposition due to potential economic losses.

Comments were also made that unconventional development has been a major achievement in North America, but more time would be needed for it to develop in other regions. Questions remain regarding the future production of unconventional gas. Some experts highlighted that the possible growth of unconventional gas production in Asia will have an impact on global gas markets. Given the appetite for gas in Asia-Oceania, significant domestic production of unconventional gas would reduce the need for imported gas, impacting global markets. Small domestic production would increase demand for imports. In either scenario, Asia's gas demand and production potential are both variables that warrant close monitoring.

Views were shared that the role of LNG is becoming an increasingly important factor in global gas markets due to the rise in trade volumes and the expansion of inter-regional gas flows, even when these have stalled over the past years. Inter-regional gas flows

will establish further linkages among regional markets globally. Beyond contributing to decarbonisation, more diverse seaborne and land bound natural gas trade will also contribute to increase energy security, for example in a situation of a gas supply disruption. In this context, it was also mentioned that oil can easily and reliably act as an emergency supply source in the case of unforeseen events.

Finally, it was highlighted that the share of natural gas will continue to grow in total energy mix and certain market segments across regions, provided stakeholders in producing and consuming countries including governments, regulatory bodies and industries can align policies to provide the long-term stability and incentives that gas markets need to deliver on expectations.

2. Session Two: Coal market developments in short-, medium- and long-term outlooks

The discussion focused on the significant impact that policy and regulation have on coal demand and production. The session began with a presentation of the outlook for coal, which is expected to experience steady growth despite certain policies aimed at reducing emissions by lessening the use of coal.

Whilst the demand for coal is expected to be flat in the Atlantic, and even declining for some countries, a strong increase is expected in Asia. While the derivatives market is still dominated by the Atlantic, where the region has represented three quarters of total trade in 2014, it was noted that coal will remain part of energy matrices in OECD countries as constraint demand in North America and parts of OECD Europe is offset by increasing demand in other OECD regions.

In North America, the current low price of natural gas (below USD4/MBtu) makes it competitive to coal. The anticipated decline in coal fired power capacity as a result of government policy, as well as the increasing shares of renewables in power generation, further contributes towards a pessimistic outlook for coal in the region.

In contrast, despite unfavourable policies towards coal, it is still by far cheaper than natural gas in Asia. Casting economics aside, the fuel's long-term outlook still hinges on whether or not high CO₂ prices and government policies to enhance performance or phase out coal will be applied in practice. This could well curb coal demand.

Asia remains the centre of attention for discussions regarding both gas and coal market outlooks. Experts noted that the Asian region will determine coal market outlooks largely due to its market dominance. Asia's coal import is small as a percentage of its coal production, but large relative to the global trade. Hence, any small changes to its domestic production and consumption patterns will have a big influence on the global coal market.

In this regard, discussions during the Symposium focussed on the so-called “Coal-Power Conflict”. The key point behind this concept is that government policy on coal impacts electricity prices, notably in non-OECD Asia, given that the majority share of power generation in Asia remains coal fired. The way in which Asian governments accommodate conflicts with regional governments over power sector, mining and, in this case, other coal sector reforms will be crucial towards determining expected future levels of Asian coal imports, and thus the matter will be of great importance for international market developments.

In Europe, coal will remain the dominant fuel in power generation at least to 2020. Only few European countries will see a decrease in their coal fired power plant capacity by the end of the decade while other European countries are not expected to experience a decrease in capacity until 2020 or beyond. Along a similar vein the current low CO₂ price gives coal an edge over natural gas. The outlook for coal may be more favourable as the projected increase in renewables in Europe may reduce natural gas consumption over the medium term rather than coal consumption as had previously been widely expected.

While the current policy framework does not support new investment in coal-fired power generation, this does not mean investment in coal-fired power generation will not move forward. The combined effect of a potential increase in CO₂ prices and more stringent environmental policies may mean that coal's market share is likely to decrease over the long-term. For instance, coal-fired power generation capacity in European countries is forecast to decline over the long-term, reversing current trends.

3. Session Three: Gas and coal competition in the power market from a long term sustainability perspective

Following the discussions during Sessions 1 and 2, this final session focussed on the interrelation between gas and coal in the power market from a long-term sustainability perspective. The competition between gas and coal was presented and discussed in terms of economics and market regulation on decarbonisation among key regions such as North America, Europe and Asia Oceania.

Asia is seen as the main growing market for both the coal and gas industries. Policies related to pricing, environmental factors, security and diversity of supply issues tend to play a major role in determining the fuel mix in this region, where demographics and economic growth drive energy demand forward.

From the supply side, representatives of key gas producing countries noted that Asian energy demand growth and sustainability requirements made a strong case for investing in export capacity and diversify demand. The current outlook in European gas

markets, on the other hand, looked less promising due to conflicting price and policy signals.

Symposium participants appeared to converge on the view that, in principle, CCS is a key technology enabling the reduction of CO₂ emissions. However, current cost benefit analysis amongst available decarbonisation options shows that CCS remains too expensive and is likely to encounter opposition once deployment picks up momentum. Some Symposium participants argued to incentivise the construction of CCS capabilities by introducing financial support and reforming the EU Emissions Trading System. Agreeing on a CCS Roadmap and taking into account the development of low carbon technologies in national plans to reach the 2030 targets may well create longer-term incentives to implement the technology.

4. Conclusion

The Symposium focused on the interactions and new dynamics between gas and coal. The first two sessions covered the outlooks for the gas and coal markets, while the third session was dedicated to competition between these two fuels in power generation in key regions, which includes key variables such as government policies.

The importance of cooperation among all stakeholders, particularly given the uncertain and varied terms on which natural gas and coal compete in the power sector across regions, was stressed. These will greatly affect gas and coal market outlooks and a secure and sustainable functioning of energy markets in future.

Aligning producer and consumer country perspectives with shared long-term policy objectives remains crucial towards achieving a secure and sustainable functioning of gas and coal markets, whilst at the same time addressing producer and consumer country stakeholders' concerns. Towards that end, the IEA, IEF and OPEC look forward to continued engagement in and support of the global energy dialogue.