



NATURAL GAS: THE DESTINATION FUEL FOR A SUSTAINABLE LOW-CARBON GLOBAL ECONOMY

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The International Gas Union (IGU) is representing the worldwide gas industry, gathering 83 countries, and covers 95 percent of the natural gas and LNG global activities, from the wellhead to the final consumers.

There is a large worldwide consensus, among international institutions (UNO and its agencies or the OECD), governments, opinion leaders, NGOs and public opinions that finding a path to a low-carbon and sustainable energy future is a major challenge of our time.

In fact, this goal is addressing three questions that should govern any sensible energy policy:

- Security of Supply: shall we have enough energy resources to cover the needs of people, the industry and transportation, in the future?
- Protection of the Environment: shall we succeed in producing and consuming this energy without creating irreversible damages to the environment?
- Affordability and Competitiveness: shall we make this energy available to all at affordable prices and on economically competitive terms?

IGU has come to the conclusion that, in spite of profound differences in the energy situation of each country, it is much easier to reach these targets simultaneously if they are addressed in a consistent manner at least at a regional level, or even better, at a global level. To allow an evolution of the energy mix that takes into account, and attempts to respond as best possible, to each of the three above-mentioned questions, will require an elaborate balancing act. Indeed we believe that the best response will come from aiming, at all times, for the greatest possible overlap between the demands of security of supply, protection of the environment and affordability, rather than from the assignment of rigid and independent targets to each.

The energy policy followed in the European Union since the beginning of this century is a good example of how stand-alone targets can fail to consistently address (i) climate and public health concerns; and (ii) industrial competitiveness and provides a clear illustration of the inadequacy of setting stand-alone targets that fail to deliver consistency between protection of the climate and of people's health on the one hand, competitiveness of the industry and affordability needs on the other.

The first Climate and Energy Package, adopted in late 2008, had set three European Union-wide 2020 targets, of (i) 20 percent greenhouse gas emission reduction, (ii) 20 percent share of energy from renewables and (iii) 20 percent decrease in primary energy use. In practice, the lack of prioritisation among these three targets had seriously detrimental effects on the competitiveness of the European energy system, particularly the electricity sector, as stressed in a January 2014 report from the French Commissariat Général à la Stratégie et à la Prospective. The fast track applied to the electricity sector in reaching the 20 percent renewables target has proven to be economically and environmentally questionable:

- The cost of decarbonisation of the electricity production with renewables is extremely high, resulting either in a considerable price

increase to the end customer or in a series of governmental subsidies, although insufficient to avoid the entry of a much larger share of people in the status of energy poverty;

- To mitigate the high cost of renewables, most countries, in particular Germany, Spain, the Netherlands and Italy have turned to cheaper imported coal as a source of electricity production, thus closing or mothballing some 50 GW of efficient and environmentally friendly gas fired power units (CCGT and cogeneration);
- The ETS (Emissions Trading system) proved inefficient in controlling the switch to coal, as most exporting industries could not afford high carbon prices on a worldwide competitive market.

All in all, it seems fair to say that the same level of greenhouse gas reduction could have been achieved with much better economic results, had the European Union opted for the "natural gas plus renewables" mix rather than resting on the "coal and renewables" one.

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The Second Energy Package issued by the European Union Commission on January 22, 2014, deals with the period 2020 to 2030 and opens new avenues for a more cost effective way to a low carbon economy:

- The CO₂ emission reduction is set as the main – even if not explicitly qualified as single – target: the ETS sector (11,000 fixed installations involved in power generation and manufacturing industries) would have to deliver a reduction of 43 percent in 2030 and the non-ETS of 30 percent both compared to 2005;
- The new target of 27 percent renewable energies in 2030 is set at the European Union level, each member state having the possibility to adjust its own evolution over the next 16 years.

This new European Union framework should give more flexibility to European Union member states in developing their own national energy policy. This may, in turn, permit a redefinition of the energy mix with a larger share for natural gas. The result, we believe, would be a more effective and competitive energy mix, that would take into account potential synergies between the electricity and gas grids, existing large gas storage capacities in Europe, and the natural complementarity between renewable sources (by nature intermittent) and decentralised natural gas power units.



On a worldwide basis, the 2013 International Energy Outlook to 2035 identifies a few key risks and opportunities for our industry:

- With world GDP rising by 3.6 percent per year, world energy use will grow by 56 percent between 2010 and 2040. Half of the increase is attributable to China and India. The engine of energy demand growth is clearly moving to South Asia;
- Coal grows faster than petroleum consumption until after 2030, mostly due to increases in China's consumption, and slow growth in oil demand in OECD member countries;
- Natural gas is the fastest growing fossil fuel, supported by new conventional reserves and increasing supplies of shale gas, particularly in the United States. However, coal still remains the dominant fossil fuel on the global scene. Natural gas is abundant and second to no other fossil fuel in terms of environmental qualities. Estimates point to more than 250 years of recoverable natural gas reserves at current consumption levels. New pipelines, new interconnections and expanding LNG infrastructures, along with a revolution in the exploitation of unconventional resources, have transformed supply realities.

At the global level, coal remains the largest source of power through 2035. Replacing old coal plants with new natural gas-fired plants could curb the GHG emissions by more than 60 percent per kilowatt hour generated. Even the most modern coal power plants emit twice as much GHG per kilowatt hour as natural gas combined-cycle units.

Global CO₂ emissions from energy use are expected to grow by 29 percent to 2035. Although emissions grow more slowly than energy consumption, as the energy mix gradually decarbonises, coal appears to be the main driver for the trends in CO₂ emissions in per capita terms, either in the right way, as we observe in the United States, with a switch from coal to gas for power generation, or negatively, as in China and India, still relying upon coal. If we follow the IEA's 2013 projections, it is difficult to see how the UN global climate mitigation targets could be reached by 2050. IGU suggests that a sensible target for our industry should be to curb by one-third the expected share of coal in electricity generation by 2040. This should result in an increase of the global natural gas demand by 25 percent, which implies an additional production of about 1,100 bcm in 2040, a realistic target given the estimated natural gas conventional and unconventional resources. Under this new scenario, the global gas demand for power generation would reach 3 tcm in 2035/2040, with the share of gas in power generation climbing from 24 percent to 36 percent.

The substitution of an additional 1,100 bcm of gas to coal for power generation would significantly reduce the growth of GHG emissions, making it possible to stabilise the emission level at a maximum of 40 billion tonnes from 2030 onwards. The necessary resources to achieve this target would mainly come from unconventional reserves such as shale gas and coal bed methane. In addition, our industry should not be shy in

addressing the health issues deriving from the massive use of coal. Studies lend evidence that the use of coal for power has very serious health consequences, the cost of which is estimated, in the European Union alone, at \$15 billion to \$42 billion per year and, while figures may be more difficult to estimate, the situation is more critical still in China and India. In large urban areas, like in Beijing or New Delhi, peaks of air pollution have become a major political issue and a real concern for people. Since the electricity sector represents 75 percent of the coal demand in the OECD countries and 60 percent in the rest of the world, it is possible to reduce massively the carbon emissions by regulating the use of coal in this sector, without affecting the competitiveness of the industry through heavy carbon taxes that would have detrimental effects on global trade.

Both the United States and United Kingdom have followed this route since 2013. President Obama's Climate Action Plan has set a limit of 500g of CO₂ emissions per kilowatt hour for new fossil fuel fired power plants, which means that no new coal-fired power plant can be built without a large portion of emissions being captured and sequestered. Compliance actions are required as soon as 2018, and the United States power industry has turned massively to using natural gas. This move is clearly also linked to the currently low price of gas in the United States. However, it is interesting to note that similar measures were introduced in the United Kingdom, where gas prices are on average almost three times higher than in the United States. The United Kingdom Emission Performance Standards (EPS) have set a limit of 450g of CO₂ emissions for new power plants until 2045.

Natural gas and renewables, which complement each other almost perfectly, both for electricity generation and storage, as well as for the injection of biogas in pipelines, should be the two main pillars of an environmentally friendly and sustainable long term global energy policy. Natural gas matches the challenges posed by renewables on many grounds, ensuring a suitable complementarity that offsets most of them, such as:

- Their variability and uncertainty: natural gas provides a back-up for the solar and wind resources that are by essence intermittent;
- Their location: natural gas CCGT can increase the electricity production capacity in remote locations, so as to mitigate the cost of extending the electricity grid, for instance when such extensions are needed by the installation of new offshore and onshore wind turbines. In the case of biogas, the natural gas transmission and distribution grids can accommodate and balance local productions facilities that would not be economic on a stand-alone basis;
- The uncertainty of electricity production forecasts from renewables: natural gas can be used to ensure the hourly balancing of the electricity grid, by a recourse to gas turbines. In IGU's view, natural gas should not be regarded as a transition fuel but actually as a destination fuel for ensuring a sustainable and climate friendly future at a global level. We can make this future happen... and it is anything but science fiction!■