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The prospects for COP 21 and the future role of natural gas

An Interview with David Robinson

With the Paris COP in sight, the Spanish Gas Association (Sedigas) interviewed me on my views about the objectives of the COP, what to expect from that meeting and what the remaining challenges were likely to be. They were especially interested in the role of natural gas in addressing the challenges of climate change, the prospects for natural gas in Europe and Spain, and the strategic challenges facing the natural gas industry in the region. The interview was recently published in the Sedigaz journal in *Gas Actual*¹. The following is a revised version in English.

GAS ACTUAL: By the time this interview is published, we will be on the threshold of the COP21. Many analysts consider it to be the most decisive climate change conference up to now. Do you share this opinion?

DR: I expect that there will be an agreement in Paris, but how decisive it will be remains to be seen². It has the potential to be the most decisive one since the establishment of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. Over 160 countries have already submitted their “Intended nationally determined contributions” (INDCs) with voluntary pledges to limit or cut their national annual emissions of greenhouse gases (GHGs) by 2025 or 2030. However, the announced INDC’s fall well short of the required ambition, which is to avoid a global temperature rise above 2°C this century compared to 1990 levels. The latest estimates are that, if all the INDC commitments were met, temperatures would have a 50% chance of being below (or above) 2.8°C this century. This is progress, but not good enough.

If this is the outcome, the Paris COP agreement on its own will not solve the climate change problem. No one following the negotiations closely expects the agreement to be successful in that sense. However, COP21 would mark a turning point if it established an agreed framework for addressing the challenges of climate change and provided a clear long-term direction for public policy and private investors around the world. Keys to that framework will be mechanisms for: tightening emission limits before 2020 and over the coming decades to stay well below the 2°C upper limit; providing finance for mitigation and especially adaptation in developing countries; and promoting innovation and investment in low-cost and low-carbon technologies.

1 <http://www.sedigas.es/gasactual/136/>

2 I have written a paper on the prospects for COP 21 in Paris. See David Robinson, “Paris 2015: Just a first step”, February 2015, <http://www.oxfordenergy.org/wpcms/wp-content/uploads/2015/02/Paris-2015-just-a-first-step.pdf>.



Why can't the COP agreement do more, for instance establish legally binding commitments to reduce GHGs sufficiently to avoid the most dangerous effects of climate change? This is basically because the agreement will not solve the familiar free-rider problem. This problem is common among public goods, like a clean environment. The potential for free riding exists when people are asked voluntarily to pay for a public good. That is precisely what is being proposed under the COP.

All countries would benefit from a global agreement that mitigated the risk of dangerous climate change, but few of the countries currently see their own benefits as being greater than its own costs, especially when the time horizon is short. This encourages weak commitments and countries renege when they have trouble meeting their commitments. To deal with this, I favour the idea of establishing "low-carbon clubs" comprising countries that are committed to ambitious reductions in greenhouse gases. There are different versions of this idea. I favour one where the wealthy members of the club provide financial and technical support to the poorest countries to encourage them to join the club and where all countries outside the club face penalties when exporting carbon intensive products to club members. This was the original idea behind the Montreal Protocol on Substances that Deplete the Ozone layer, which is considered one of the most successful international agreements ever signed and implemented. In short, the low-carbon club would punish (i.e. "club") outsiders who did not meet the club's standards and offer incentives for outsiders to join, especially the least developed countries.

Whatever the outcome of COP21 and of international agreements, we will also need additional policy measures at regional, national and subnational levels, such as putting a price on CO₂ emissions and providing other market-based and regulatory incentives to drive down the cost of decarbonisation. There will also need to be energy industry and regulatory reforms that are consistent with the decarbonisation. Civil society in its widest sense – including among other groups, citizens, the scientific community and business – will also play a critical role. For instance it is clear that there is a growing consensus among business leaders in support of the introduction of carbon prices.

GAS ACTUAL: As far as this meeting is concerned, what do you think should be the key objectives to which the international community should aspire?

DR: As mentioned earlier, the overall aim should be to establish an agreed framework for addressing the challenges of climate change that provides a clear long-term direction for public policy and private investors around the world.

More specifically, I agree with the basic objective of the UNFCCC: to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." The convention also states that: "such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner". The COP agreement must transmit the sense of urgency about acting both to mitigate greenhouse gas emissions and to adapt to the consequences of climate change.

There are a number of requirements for an ideal outcome in Paris; but as mentioned above, some of them will not be in the agreement.

- *Ambition and transition cycles.* The ideal agreement would include sufficiently ambitious CO₂ emission reduction commitments (INDC's) to give us a reasonable probability of avoiding a temperature rise of more than 2°C this century compared to pre-industrial levels. Current pledges fall well short of that, which means that greater efforts will be needed later. For that

reason, the agreement should be structured so that there will be a smooth transition to more stringent commitments over the coming decades. I anticipate that this will be in the agreement, ideally with a target of reaching carbon neutrality (no net emissions) in the second half of the century.

- *Finance for the least developed countries (LDC's), plus loss and damage provisions.* The agreement should include a predictable and adequate financial commitment to support efforts to mitigate and adapt to climate change in the poorest and most vulnerable countries. I think the agreement should also be able to respond to the impacts of climate change that cannot be prevented by mitigation or adaptation. This would require a provision for loss and damages. Currently, we are a long way from such a commitment – either for finance or loss and damages – and that this could be what leads to failure in Paris.
- *Legally binding commitments.* The ideal agreement should have a means of ensuring compliance with legally binding commitments. But this won't happen. As currently written, the only sanctions are to “name and shame” those countries that do not comply with their own INDCs; this approach has failed in the past and is simply not convincing. Hence, my support for the idea of establishing low-carbon clubs.

GAS ACTUAL: Should gas, as a more environmentally friendly traditional fuel, be one of the key fuels at the summit, bearing in mind that many reports foresee an increase in its share of the energy mix?

DR: Replacing coal with natural gas in the power generation sector should be regarded as 'low hanging fruit' as far as reducing CO₂ emissions is concerned in the short term. However, in most countries, this would require policy support since coal prices are lower than gas on a unit of generation basis; coal is still the world's main source of generation and coal based generation continues to rise. Falling world natural gas prices are unlikely to change this conclusion because coal prices are also falling in world markets.

A high price of CO₂ emissions (e.g. a carbon tax) would obviously discourage coal-based production and favour natural gas, and require polluters to pay for the “negative externalities” they cause to society. Although it is politically difficult to introduce a high enough price on CO₂ emissions for gas to displace coal today in the EU, the UK has shown that it is possible to establish a rising floor for that price in order to send a signal to investors to avoid high carbon technologies. Furthermore, while hydrocarbon prices are low, the impact of a carbon price is less noticeable, for instance on the price of gasoline. For that reason, it is particularly good time to be introducing a tax of this kind.

I also anticipate that investor concerns over stranded assets and the risk of more stringent emission controls (including emission performance standards related to a variety of pollutants) will encourage early closure of coal-based generation and discourage new investment in that technology, as is happening in the US. The latest OECD decision to limit export credits for most coal-based projects is another step in the right direction, as is the UK decision to close coal-based generation by 2025.

Most global energy forecasts include a very significant and continuing share for hydrocarbons. Although replacing coal is low hanging fruit as far as climate change is concerned, natural gas is also a source of CO₂ emissions. For significant and continuing long-term use of hydrocarbons to be compatible with the avoidance of dangerous interference with the climate requires the development of technologies which are economically viable at scale to absorb and utilise or store CO₂ emissions. I have in mind direct air capture, as well as carbon capture and sequestration or utilization (CCS/CCU). We are a long way from meeting the requirement for these to be economically viable at scale.

GAS ACTUAL: Natural gas plays an important role when it comes to fostering the development of renewable energies, acting as a guarantee against its intermittency. Will it remain so in the near future?

DR: As long as intermittency continues to be a concern, I anticipate that natural gas will play a role as backup supply. However, there are other sources of backup, including demand-response, interconnection and flexible generation from other sources (e.g.. hydro, other renewables, coal and even nuclear in some cases). Natural gas-fired plants will have to compete with these other sources of flexibility. The development of low-cost storage could reduce the value of conventional sources of flexibility, including natural gas. I anticipate that this will occur because greater penetration of intermittent renewables is testing the limits of conventional forms of flexibility, and is leading to significant R&D to develop new forms of storage.

Furthermore, the question is whether investors will be willing to finance new gas-fired plant when they are used mainly for backup and consequently have very low load factors. I would be cautious about that. My recent study of the European power sector leads me to expect a continuing problem of stranded gas-fired generation assets, in other words assets whose economic value has declined significantly due to lower utilisation and lower wholesale electricity prices.³

GAS ACTUAL: What do you think about the new role of natural gas in the future, for example, in new areas like land and maritime transportation?

DR: My Oxford colleagues in the Gas Programme advise me that onshore trucking is potentially an interesting market for natural gas, but progress to date has been slow; and that LNG as a marine bunker fuel shows more promise and could be an important market for natural gas in the 2020's.

GAS ACTUAL: The COP21 will put another key question on the table: the differentiation between industrialised and developing countries. The Green Climate Fund is already up and running but is this enough? How can we work with these countries without curbing their growth?

DR: Differentiated responsibility between industrialized and developing countries has been at the centre of all UNFCCC agreements, including in the areas of mitigation, adaptation and loss and damages. At its core, this is about finance. To reach a credible and sustainable global agreement requires a predictable and stable financial package for the least developed and most vulnerable countries.

The commitment made in Copenhagen by the developed countries was to provide \$100 billion per year (from public and private funds) by 2020. There is controversy over how to measure the available funding, but just about everyone would agree that it is insufficient.

Looking at the public sector contribution, The Green Climate Fund (about \$11 billion now committed) is a start, but has been very slow to actually fund projects. One of the keys to increasing the level and predictability of public sector contributions from the industrialized countries is to earmark funds that are not connected to annual government budgets. For instance, the EU is expected to earmark funds related to the European Union Financial Transaction Tax. Funds could also be raised as a percentage of revenues related to activities that generate CO₂, for instance on the value of air traffic,

³ David Robinson, "The Scissors Effect: how structural trends and government interventional are damaging major electricity companies and affecting consumers", OIES, August 2015. <http://www.oxfordenergy.org/wpcms/wp-content/uploads/2015/08/EL-14.pdf>

sea transport traffic, hydrocarbon exports, emission allowance auctions or carbon taxes.

Another proposal that I am leading with an Oxford colleague is to raise public sector funding from sub-national governments, like California in the US and Quebec, Ontario, Alberta and British Columbia in Canada⁴. In all of these cases, the idea should be to provide stable funding for mitigation and adaptation related to climate change in the least developed and most vulnerable countries.

The idea of sub-national climate finance is gaining traction and that at least one sub-national government will announce at the COP its commitment to provide climate change finance to the LDCs through a multilateral fund.

I favour the idea of public sector assistance to encourage the poorest countries to reduce their dependence on coal; these countries need low-cost and low-carbon energy in order to meet their development requirements. It is also time to consider mechanisms to encourage nations that depend heavily on hydrocarbons (as producers) to support the process of de-carbonization.

Of course, private sector funding is critical too. I like to think of the two sources of funding (public and private) as supporting one another. For instance, if the public sector financial contribution were to reduce slightly the cost of capital on long-lived renewable power assets, this would facilitate private sector funding of those investments. Likewise, when the World Bank, the OECD or national governments set emission standards for power stations that they will support, this influences private lenders to follow that lead, thereby encouraging investment in low or zero carbon generation and discouraging investments in coal-based generation (without CCS/CCU).

GAS ACTUAL. China is another key factor. Would you dare to predict its future performance?

DR: China is clearly a major contributor to global CO₂ emissions, especially due to its continued reliance on coal-based generation. However, China is making a major effort to reduce the growth of its greenhouse gas emissions and to bring forward the date when its CO₂ emissions will peak; the government commitment is that the peak will occur around 2030, but many experts expect the peak to be much sooner. In 2014 China appeared to have halted its growth in coal consumption and had already invested in significant wind, solar, hydro, natural gas and nuclear capacity. However, the speed with which it can replace coal is a moot point given the sheer scale of investment in plant and transmission infrastructure required, not to mention the importance of energy security and the political and social implications of closing mines and power stations. I certainly hope that recent press announcements about significant investment in new coal plants are exaggerated.

I think we should recognize that by driving down the costs of technologies that are critical for renewable energy generation (e.g. solar panels, wind turbines), China has helped to accelerate the penetration of renewable energy around the world. If they were able significantly to drive down the cost of electric or gas-fired vehicles, CCS/CCU, air capture and other low-carbon technologies, this would be a further important contribution to global de-carbonization. India has the potential to do something similar and should be encouraged to do so.

European Energy Policy

GAS ACTUAL: Moving on to regional policy: The EU has been a stronghold of mitigation policies for

⁴ See Benito Mueller, "Finance for the Paris Climate Compact: the role of ear-marked (sub-) national contributions", June 2015. http://www.oxfordclimatepolicy.org/publications/documents/CS-PB1-Finance_for_Paris_Climate_Compact.pdf

a long time. Are the 2030 objectives ambitious enough?
Will we see a European energy union? What role should natural gas play?

DR: The EU has been a global leader in setting targets to reduce CO₂ emissions, but what really matters is the reduction of emissions on a global scale. That requires innovation to drive down the cost of decarbonisation. Consequently, I don't think the specific targets for reduction of emissions in the EU are as important as the mechanisms and incentives to innovate and to develop the most efficient low carbon technologies, services and trading mechanisms that can be adopted and adapted around the world. It is good news that the EU has eliminated national renewable targets, which were an expensive and inefficient way of developing renewable power. However, there is still too much focus on government-driven investments in preferred technologies, largely financed through levies on final energy prices. I would much prefer the establishment of credible long-term incentives to invest and innovate, for instance a long-term rising CO₂ price/tax floor and/or a falling carbon emissions intensity target. In future, competitive markets should play a greater role, and governments a lesser one, in defining the mix of low carbon technologies.

I see some early steps in the direction of a European energy union. Politically that is apparent in giving a more powerful role to the European energy regulator (ACER), in the coupling of European electricity markets, and the promised investment in new interconnectors. Economically, it is increasingly evident in natural gas markets, especially with the growing role of trading hubs. However, there is a very long way to go. As long as individual member state governments determine the energy mix and consider energy security on a national basis, a European energy union will be a long way off.

EU policy makers have focused on renewable energy not only as part of the climate change mitigation strategy, but also as part of a regional security strategy to reduce dependence on imported fossil fuels and to develop new industries with world markets. This makes sense to me. A key question for the EU in a period of continuing tepid economic growth and generally high unemployment is whether the momentum of investment in renewables can be sustained, especially as the cumulative cost of support schemes is now very visible in consumer utility bills. To the extent that out-of-market payments are justified to meet EU-wide or national goals (such as decarbonisation), I favour a financing model that relies on budgetary support and taxation (e.g. revenue neutral carbon taxes) rather than increased final prices solely for electricity.

As for the role of natural gas in Europe, as I said earlier, replacing coal with natural gas is an obvious way to reduce CO₂ emissions in the EU. In the short to medium term, this is unlikely since coal prices are lower than gas prices on a unit of generation basis. On the other hand, it is likely to occur over the longer term as a result of different EU Directives (LCPD and the Industrial Emissions Directive). The expectation of a significant increase in the price of CO₂ emissions over the next few decades would accelerate closure of existing coal plants and discourage investment in new ones.

Finally, I would add a note of caution about the future demand for natural gas in Europe and the implications for investment and the recovery of fixed costs in gas infrastructure. If the EU is serious about its 80%+ emissions reduction by 2050, that means not just much less gas in power but probably also in heating; unless something remarkable happens in transport, there will be little room for reducing emissions elsewhere. If this were to happen, the gas market could be smaller than at present. Yet investment timescales in gas, especially gas infrastructure, are very long. In my view the gas industry needs to start developing a coherent long-term strategy – for instance looking for alternative uses of its pipeline, storage and LNG infrastructure. Some companies are already thinking about this, for example converting renewables to gas, which can then be transported and stored in existing infrastructure. If CCS becomes more significant, it may also be possible to use the gas

infrastructure to transport and store CO₂, although this will depend on location and geology. More generally, the gas industry should be thinking about the longer-term uses of its network in a low carbon world. As European gas production declines and if gas consumption also declines, infrastructure will be the industry's main asset.

GAS ACTUAL: LNG is one of the strengths of the Spanish gas sector. What role can Spain and LNG play in improving the continuity of European supply?

DR: Expanding the capacity of gas pipeline infrastructure between Spain and France may be a good start, provided the economics are attractive. Spain is something of a 'gas island' at present - to the detriment of its consumers. Spain's plentiful LNG import capacity could also help bolster supply to France and allow other pipeline supplies to be diverted further eastwards. However, for additional Spanish gas exports to reach central European markets would require additional infrastructure investment in France. It may be less expensive to transport LNG to northern Europe than to build new interconnectors and additional pipelines through France. The question is therefore whether these new infrastructure investments (interconnectors and national grids) are economically justified, and who would bear the costs if the assets lose value due to the lack of utilisation. This requires careful and independent study.

GAS ACTUAL: Talking about LNG, how do you think the export of LNG from the United States will affect the world market?

DR: My Oxford colleagues and I expect that US exports could be transformative, especially coming on the tail of some 80 bcm of new Australian LNG supply, which is already resulting in more LNG being diverted towards Europe. US LNG will compete with Russian pipeline gas (as well as gas and LNG from other sources, possibly including Egypt) for market share in Europe and could well result in lower prices in the 2018 to 2025 timeframe.

GAS ACTUAL: As for the price of gas, are we close to seeing a more uniform price, like that of oil, or will there still be differences between markets?

DR: Arbitrage will erode regional price differences for 'spot' traded gas, although given its significant transport costs there will always be a locational differential based on the differential transport cost of the marginal supplier.

Energy in Spain

GAS ACTUAL. How do you rate Spanish efforts in the fight against climate change? The Spanish gas system is preparing to move in a new direction in terms of infrastructure and supply. Can it take advantage of the gas opportunities as an ally towards decarbonisation?

DR: Spain's policy for addressing climate change has (like many other countries) relied too heavily on government decisions. Although there have been some positive results, for instance in terms of a growing share of renewable energy, the cost of different forms of intervention has been enormous. It is especially strange to see Spain promoting renewable energy at the same time as it supports the use of coal. Furthermore, the frequent changing of government policy and regulations in the energy sector has damaged Spain's reputation with investors.

I think it is time for a longer-term strategy review for the energy sector, reflecting the reality of decarbonisation and the growing ability of consumers to participate as generators of electricity and as

intelligent consumers. There is much more room for competition to help achieve policy objectives, including in deciding the mix of energies.

As for Spain's policy on natural gas, on the positive side, natural gas is very likely to continue to provide backup for intermittent renewable generation. It also has the potential to replace coal in generation and possibly oil products in transportation and heating, but as mentioned earlier this is unlikely with the current prices of natural gas, coal and CO2 emission allowances.

Furthermore, there is a problem of excess network/LNG infrastructure and CCGT plant within Spain and limited competition within Spain due to the poor interconnection capacity with France (although LNG is an increasingly important source of competition). For both reasons, expanding the gas interconnector capacity between France and Spain may make sense, as does the development of a trading hub. However, as mentioned above, the questions are whether this new infrastructure really does make economic sense, who will pay for the investments and who will bear the risks of stranded assets.