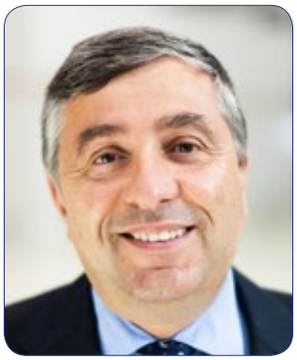

Marrying gas to renewables: Potential and problems

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Gas and renewables go very well together because they complement their strengths and they compensate for each other's weaknesses.

Let us consider the strengths and weaknesses of gas first: Gas is the lowest emitter of carbon dioxide (and other emissions) amongst the fossil fuels. Replacing coal-fired power stations with gas-fired power stations saves up to 50 per cent of emissions. Moreover, combined-cycle gas turbines are highly efficient. They reach fuel efficiencies of over 60 per cent, and combining them with the recovery of input fuel energy as usable heat (CHP) can lead to overall plant efficiency of around 90 per cent. Gas-fired power stations can be started up and ramped up and down rather quickly. Their construction phase is short, costs are low, and public acceptance issues are rare.

In principle, this description should make gas attractive, standing on its own. Let's look at the success story of the United States: More gas (as well as renewables and energy efficiency), less coal, lower energy costs and lower emissions. So what are the weaknesses of gas? Public opinion, particularly in the European Union, is very much in favour of renewables. The determining factors for the popularity of an energy source are no longer just security of supply, a competitive price and the most cost-efficient way of reducing carbon dioxide emissions. There is a strong desire for a high market share of renewable energy sources. Furthermore, in the longer term, the fact needs to be addressed that gas still emits carbon dioxide. This should be done by carbon capture and storage (CCS). If a truly positive framework is created for CCS, the weakness will turn into a strength, with gas continuing to form an alternative and increasing the diversity of low-carbon energy. Biogas is another avenue to address carbon dioxide emissions from gas. And finally, using excess electricity from renewable sources to produce hydrogen and synthetic methane (power-to-gas) is not just another option for gas but also a good example of the interface between gas and renewables.

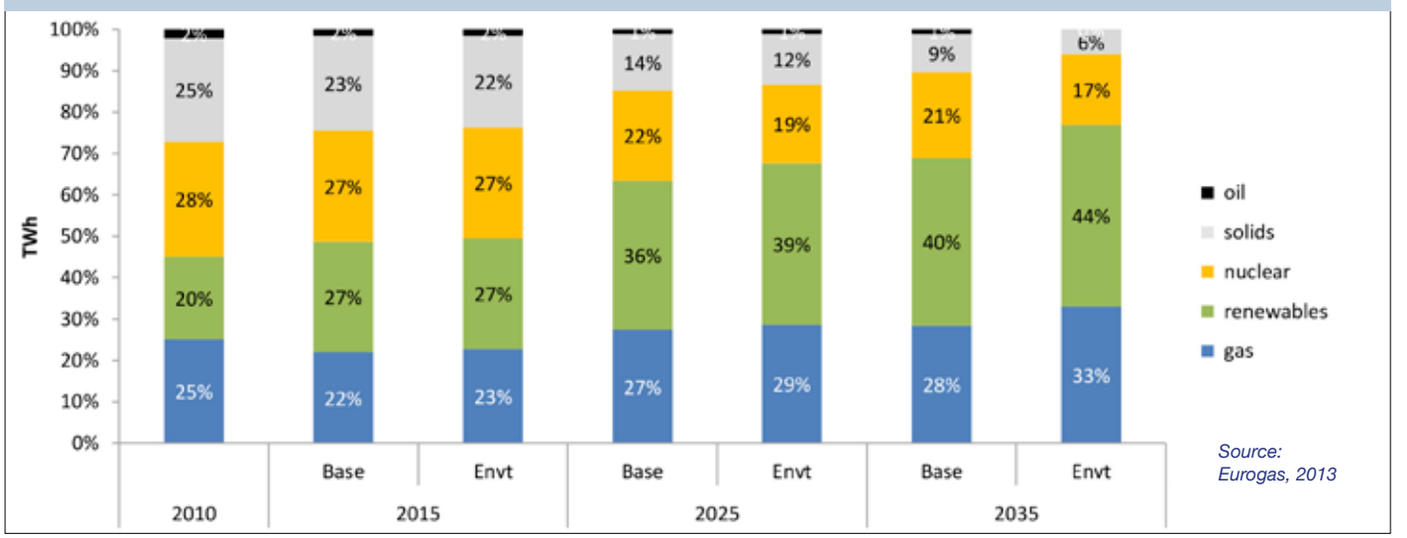
GDF Suez's onshore wind farm/gas-fired power plant at Combigolfe, near Marseilles

Photo: GDF Suez / Jamain Pierre

This leads us to the strengths and weaknesses of renewable energy sources. Leaving the discussion on biofuels to one side, their strengths are obvious: they do not produce carbon dioxide emissions, apart from those generated through the construction, transport and assembly of equipment. Renewable sources, such as wind and solar, suffer from the weakness of variable weather and hours of light and darkness. Large-scale energy storage is still an area for development, and there are limits to interconnection, including public opinion issues, and demand-side response because persuading consumers to adapt their energy consumption to availability rather than need or habit is difficult and still a long time coming. Moreover, despite the cost reductions that have already been achieved for some renewable technologies, globally they remain highly subsidised. Lack of a competitive environment for renewables has driven up the retail price of electricity in several EU Member States, much to the dissatisfaction of consumers.

Paradoxically, whilst the share of renewable energy sources has increased, so has the share of coal in some EU Member States, largely offsetting or even surpassing, in the case of Germany, the volume of carbon dioxide emissions saved by energy efficiency and renewables. The cheap coal not consumed in the US, thanks to domestic shale gas production, has been readily absorbed by the EU market where climate policy has not been able to prevent this from happening. At the same time, highly-efficient gas-fired power stations have become uneconomic, need to be mothballed or closed, and security of electricity supply is under threat due to the high share of electricity from variable renewable sources. Subsidisation of renewable energy sources and price regulation have contributed further to this situation. This is why some Member States are considering capacity remuneration mechanisms that reward the availability of

Power generation mix: Environmental case



power generation capacity rather than letting the energy-only market work via demand and supply.

Such developments can be avoided or be less pronounced if energy and climate policies are turned in such a way that competitiveness, security of supply and carbon dioxide reductions go hand in hand. Eurogas has recently calculated the outlook for power generation to 2035 in the EU based on the continuation of current policies favouring renewables in the energy mix (illustrated above).

The figure shows that gas and renewables will be able to grow together. The share of renewables will overtake the share of gas in 2015 and will rise steeply. Coal will be displaced throughout the whole period. In the more environmentally sensitive countries, these developments will be faster and stronger.

The current framework for energy and climate policies in the EU should therefore be adapted as soon as possible so as to provide a predictable environment encouraging cost-efficient low-carbon investment, including in gas solutions.

By the way, gas is not only an attractive fuel in power generation. It also performs well in heating and in transport. As a stand-alone fuel, gas is an ideal replacement for higher-carbon fuels. In transport, the gas can be delivered and stored as both CNG and LNG, the latter being ideal in shipping and trucks. But in heating and transport, too, gas can easily be combined with renewable energy sources in hybrid solutions.

A decarbonisation pathway should be technology-neutral to ensure that, whatever the need, the most cost-efficient solution wins and new technology replaces outdated technology. A meaningful economy-wide greenhouse gas reduction target is necessary, as well as a robust emissions trading system in which the price of carbon dioxide influences the choice of low-carbon energy over higher-carbon energy. Under such a system, the strengths of renewable energy sources will pay out without the need for subsidies. Conventional as well as unconventional gas resources, exploited at the highest safety and environmental standards, should not be left in the ground but made available to increase supply and diversity. Capacity remuneration mechanisms can be an effective means to address security of electricity supply where current market distortions cannot be removed quickly enough. Research, development and demonstration of low-carbon solutions should be strongly supported, again in a technology-neutral way.

There is no doubt that the potential for marrying gas to renewables is large and can be fully realised. Together they can provide a diverse and flexible energy mix for a competitive and secure low-carbon energy system. The energy industry is ready to do so, but needs to be reassured by a predictable policy framework that its investments will not be in vain. The sooner this is done, the sooner the tide can turn and extra costs can be avoided. ❑