Natural Gas: Vector of Growth and Sustainability

Salvador Gabarró

Energy demand is growing significantly in the world today, linked primarily to economic growth that can be explained in two ways. Firstly, the greater energy needs derived from demographic growth and industrial and technological development. Secondly, as a result of the greater level of energy consumption that goes hand in hand with social well-being and advanced societies.

Currently, rising oil prices are triggering a context of expensive fossil fuels, which has clear consequences on different energy markets. From the gas perspective, one of the most relevant is the change in the liquefied natural gas (LNG) market. Advances in this technology have allowed the exploitation of resources that were not economically affordable in the past, thus contributing to a growing globalisation of this sector.

This has led to new energy scenarios, which also, as one might expect, generate new performance dynamics. A quantification of the increase of energy demand according to the International Energy Agency predicts an average year-on-year increase bordering on 2 per cent over the next 25 years, encouraged by the economic growth of developing countries. According to all estimates, by the 2030 time horizon global energy demand will be 50 per cent higher than the demand recorded in 2005.

Thus, we stand before a future scenario of expected strong and steady growth, in which natural gas will be the energy with the greatest demand increase, reaching 22 per cent of the world's total primary energy consumption. It will continue to hold third place as the most consumed energy in the world in 2030, 9 points below oil, which will still be the leading source of energy. It is important to note that electricity generation will absorb around 60 per cent of the increase of global demand for natural gas, thus making it the main source of electricity production in the world.

Another important point to acknowledge is that the global energy sector as a whole is experiencing major increases in the cost of equipment and

Salvador Gabarró, President, Gas Natural SDG.

materials, given factors like the intensification of the demand, especially in Asia, the scarce supply of certain components and of qualified labour, and the reduction of competition in the supplier market due to mergers. This cost inflation is particularly relevant in sectors like gas liquefaction plants or the exploration and production of hydrocarbons. As a result, a high energy price scenario is expected to continue, driven by the increase in demand and the high cost that accessing new supply sources involves.

Although there are sufficient proven and commercially exploitable natural gas reserves to cover future demand for the next 65 years, it is important to consider that access to these reserves will become ever more complex. This will be due to several factors, the most prominent being that production will be concentrated in a smaller number of countries with greater levels of risk; that producer companies are gradually increasing their sovereignty over their energy resources to the detriment of companies in third countries; and that over recent years there has been a significant toughening of the tax schemes applied by producer countries.

Developing countries (including China and India) are competing very aggressively to access resources through their own state companies. While these countries turn to state policies to access hydrocarbons, European companies are limited by their demanding financial markets. Nevertheless, natural gas imports by the European Union will increase in the years to come, given rising demand and the decline in local production (in the United Kingdom, Italy and Norway). Therefore, LNG will consolidate its position as a key element in the diversification of supply.

Spain: the deregulation of the energy sector

As regards Spain, no European country, except for the United Kingdom, has deregulated the gas sector as much and as fast. In recent years, very significant structural changes have been undertaken to encourage the real and effective deregulation that has been carried out, requiring important sacrifices by the Gas Natural Group, such as the sale of Enagás, the loss of interest in regasification plant equity, and the auction of gas from the Maghreb.

Since the initiation of the deregulation process, gas sales in Spain have gone from 13.1 bcm in 1998 to 35.1 bcm in 2007. In other words, gas volume is 2.7 times greater than the gas sold in 1998. All market segments have grown considerably since then, but in the electricity market, which hardly used gas in 1998, combined cycle plants appear to be the engines driving demand for natural gas in Spain, and in 2007 they already represented almost 35 per cent of all sales. Consequently, at the end of 2007, sales in the Spanish deregulated market represented almost 90 per cent of the total, a proportion that already amounts to 100 per cent in the industrial market.

Although big steps have been taken towards the deregulation of the gas sector in Spain, the last stages of this process need to be designed carefully so as to ensure it is sustainable over the years. In this respect, Last Resort Rates for gas, and tolls and levies applicable to the system, should include all service costs and be calculated following the principles of better regulation established by the EU. Furthermore, given the extreme dependence on foreign providers in the Spanish gas sector, it is essential to take into account the considerations and requirements needed to guarantee the gas supply when defining the rules that will govern the sector.

Environmental and energy efficiency's challenges

In 1998, Spain endorsed the Kyoto Protocol, with the commitment that in 2012 Spanish CO_2 emissions will only be 15 per cent greater than the 1990 figures. The current situation is far from ideal, since at present Spanish emissions are around 50 per cent above those registered in 1990.

Therefore, it is important to note how natural gas contributes to sustainable development and mitigates the effects of climate change, since its combustion releases fewer greenhouse effect gases than other fossil fuels. In this sense, natural gas combined cycle plants, the use of high-efficiency advanced technologies, emission trading, and the introduction of Mechanisms for Joint Implementation and Clean Development, are the main elements that will pave the way for us to fulfill our European commitment to the Kyoto Protocol. The technology used in combined cycles powered with natural gas has established gas as the fossil fuel that provides the highest generation performance. A quantification of the total savings shows a drop of about 35 per cent in the consumption of fossil energy required to generate electricity compared to conventional processes. Furthermore, the reduced emission level enables its location near large cities, thus involving less loss of energy and lower transport costs. These emissions, which are lower than those of other technologies used to generate electricity using fossil energies, entail reductions of 60 per cent in terms of CO_2, and over 80 per cent in nitrogen oxides. Emissions of sulphur dioxide and of particles are practically nonexistent. Thus, given that the generation of electricity represents around 30 per cent of CO_2 emissions in Spain, supporting the production of electricity using natural gas combined cycles is a key element in advancing towards the goal of reducing emissions as envisaged in the Kyoto Protocol. Therefore, it is essential to promote innovative and more efficient energy solutions. In this sense, in both the residential and the commercial markets, the natural gas + solar energy duo has a performance rate that exceeds the alternative of solar energy + electricity by 29 per cent, emitting 59 percent less CO_2 and costing the user 20 per cent less. Another important priority in the battle against the effects of climate change is promotion of the use of

fuels in vehicles that are more efficient and, most importantly, better for the environment. This should be a priority, not only given CO_2 emission problems, but because almost 90 per cent of Spanish cities with over 100,000 inhabitants have serious pollution problems. In the transport sector, the use of natural gas as a fuel has major environmental and financial advantages compared with petrol and diesel fuel, and has no collateral effects on the prices of other goods such as agricultural products, for instance. The Gas Natural Group encourages the use of natural gas vehicles (NGV) as the best way to encourage the reduction of emissions in urban areas, since that is where natural gas plays a key role. According to information from the European Natural Gas Vehicle Association (Engva), the use of natural gas in vehicles reduces over 95 per cent of particle emissions and almost 85 per cent of nitrogen oxide emissions, as well as reducing CO_2 emissions by 20 per cent. Challenges for the Spanish gas sector Spain's energy sectors are currently undergoing periods of change and transformation. As regards the natural gas sector, we can extrapolate some of the issues that affect Europe as a whole, specifically the absolute dependence on imports. This is particularly notable in the case of LNG in Spain, which in 2007 amounted to 70 per cent of the total. The definite disappearance of the current regulated rate system in 2008 stands as an important challenge for all operators in the Spanish gas sector, especially for distributors, who will see their business model modified since they will no longer supply by rate. In contrast, the completion of the deregulation process will strengthen and ensure the right of all customers to choose their gas purveyor. Thus, we are immersed in a process that requires both the adaptation and modification of operational rules and systems, but which also offers customers guarantees. The increase of network and of underground storage areas will play a key role in favouring competition between operators, maximising the guaranteed supply and increasing efficiency.

Growth and sustainability World energy experts predict that the second half of this century will be ruled by gas fuels, that is, until hydrogen-based energy and renewable energy sources lay the groundwork needed to achieve a cleaner environment with less carbon content. Consequently, natural gas is the most rapidly-growing fossil energy source in terms of demand. This growth is due to the advantages of high efficiency technologies, to the actual qualities of natural gas in terms of the reduction of greenhouse emissions, and to the fact that it is the most economical resource for hydrogen production. All these factors contribute to mitigating the effects of climate change and to abiding by the Kyoto Protocol. The adverse impact that generally results from the consumption and production of energy can be tempered by reducing the energy intensity of consumption, or by replacing current energy resources with other options that enable us to achieve the goal of sustainable development. One of the most affordable ways to reduce energy demand is boosting

process efficiency by introducing technological improvements, increasing the proportion of renewable energy sources, and developing new technologies and applications for the use of clean fuel, like natural gas. In all, natural gas will play an important role in the international energy panorama, both in terms of the improvement of efficiency in combustion processes, and through the introduction of new energy vectors and the transition to lower carbon content fuel. The Gas Natural Group bases its performance on growth, innovation and efficiency so as to make determined progress along the path towards sustainable development, which should be one of the main goals envisaged by all companies at this moment in time.