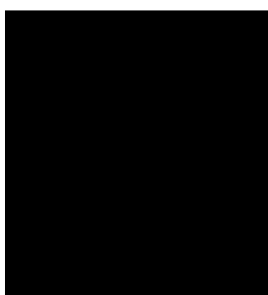


European natural gas demand is expected to rise in the next three decades. But, as *Anouk Honore* finds, the overall picture is not easy to predict, and depends on what happens in individual countries – particularly Italy and Spain

Uncertain future



★ So many things can change in twenty or thirty years. Statements about natural gas demand in Europe increasing by 1.5%–3% per annum up to 2030 may prove to be correct by the *end* of the period. But these predictions really tell us very little about the evolution of natural gas demand *during* the next 25 years, and whether there is a different story to tell about different countries/regions of Europe for different time frames.

It is common knowledge that natural gas demand in the non-power sectors will not increase dramatically. Modest growth around 0.8%–1% per annum is expected in most markets, including major ones such as the UK, Germany, France and the Netherlands. Indeed, in North-West Europe, these sectors have been developed since the early 1960s and are now reaching saturation point. A slightly different scenario is possible in some countries of southern Europe, where stronger growth in the non-power sector is expected – for instance in Spain, Portugal, Greece, and to a lesser extent, in Italy. However, this will have a relatively small impact on total European natural gas demand.

All natural gas consumption forecasts agree that demand growth will be driven by the power generation sector, which commonly represents two thirds to three quarters of the projected rise in consumption over the next two decades. The reasons for this are well known: the economics and efficiency of the new combined-cycle natural gas turbines

(CCGTs), the environmental qualities of natural gas, and the adaptability, flexibility and availability of natural gas in an liberalised and competitive power market. But does the general assumption that CCGTs will be the most economic choice for new power plants lead to an overestimation of natural gas demand?

The increase in natural gas prices makes it difficult to sustain a decision to invest in natural gas-fired generation in most countries in Europe. A cursory examination of the natural gas-fired plants projects shows that the scenario of high-natural gas demand from power plants by 2010 is not supported by the actual construction of these plants, except in two countries: Italy and Spain. It also illustrates that these two countries represent more than two thirds of all the projects at different stages of development in the 25 member states.

Why are natural gas-fired projects so numerous in these two countries? First, they have politics driving the use of natural gas for power generation. Second, building permits for coal-fired stations are almost impossible to get, which means that almost all the new projects are natural gas-fired. And thirdly, both of them have an obvious need for new generation capacity in the short term. From these observations, a question arises: are we expecting a “dash for gas”, with strong natural gas demand growth in these two markets?

“Natural gas for power generation will increase substantially in Europe, but probably not as much and not as fast as is generally believed”

Anouk Honore, Oxford Institute for Energy Studies

The Italian natural gas market

In 2004, Italy was the third-largest natural gas market in the EU, with a yearly demand of 80 billion cubic metres (bcm). The non-power sector still represents 66% of the demand, but the fastest growing area is the power sector, which consumed 26 bcm of natural gas in 2003 (up by 7.5% per year since 1990), mainly due to construction of CCGT generation in the last decade.

In 2003, 41% of Italy's electricity was generated from natural gas. This could be seen as a bit high in a country that imports a large share (84%) of its natural gas, but Italy has no other domestic fuels or nuclear power. Oil produced 27% of its electricity, coal 16% and hydro 12%. Renewables accounted for the remaining part.

There was 40GW of gas-fired power plant capacity in 2003, but this is increasing very rapidly. There are about 19GW of CCGTs recently operational or currently under construction, and roughly 20GW of additional planned projects.

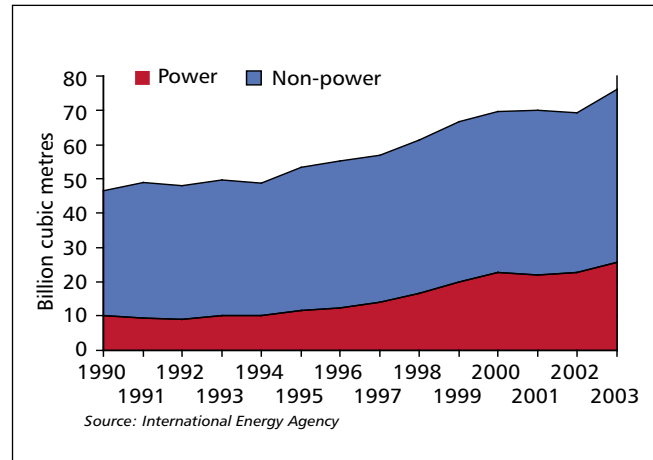
Three main factors explain the 40GW of natural gas-fired projects. First, over the past decade, Italy's installed electricity generation has not been able to keep up with demand, and the country still lacks adequate levels of domestic generation. Power consumption is rising across the industrial, commercial and residential sectors. Second, after the 2003 blackouts, security of electricity supply became a dominant concern in Italy, and the country is now looking at decreasing its electricity imports, which are considered less secure than domestic generation. Fast-track procedures have helped projects to gain administrative consent more easily for natural gas-fired plants, which explains the large number of already approved projects. And third, in response to the high cost of oil compared with other sources of thermal generation, power generators have begun to switch to alternative fuel sources, especially natural gas. As noted before, administrative approval for coal-fired projects are difficult to obtain for environmental reasons.

However, many of the natural gas-fired plants projects do not have a completion date, and it is unlikely that all these projects will be built and/or run at full capacity in the coming decade. For instance, roughly 5GW of natural gas-fired capacity with

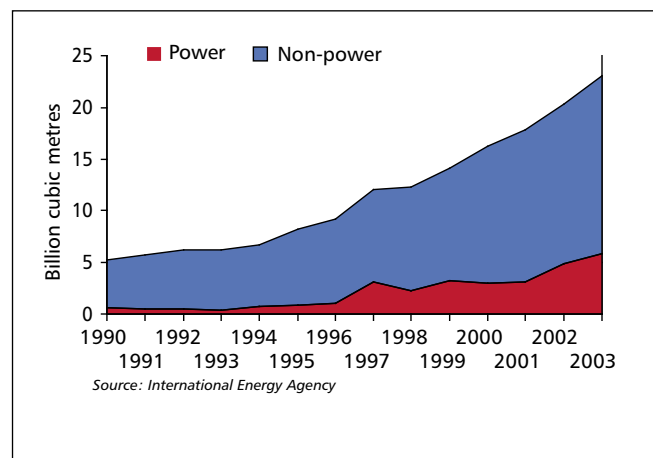
administrative consent have already been scrapped. However, if a large number of natural gas-fired plants are indeed built in Italy, these projects will not run at the 60% load-factor that was initially planned. And a lower annual load-factor has a huge impact on fuel inputs. Natural gas demand for the

“Increases in gas demand for the power generation sector in the EU are sensitive to the development of natural gas-fired generation in two countries: Italy and Spain”

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F1. Natural gas consumption by sector in Italy



F2. Natural gas consumption by sector in Spain

power generation sector in Italy will increase significantly, but probably not as much as generally believed.

The Spanish natural gas market

The Spanish market remains one of the most attractive natural gas markets in Western Europe due to its growing demand. Spain is indeed the fastest growing gas market, led by construction of new natural gas-fired power plants. In 2004, Spain consumed 27 bcm of natural gas, up from 5.4 bcm in 1990. Industry is by far the largest gas consumer, but natural gas for power demand has been increasing

“There is a very different story to tell in different regions of Europe regarding the future of natural gas in power generation”

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continuously over the past decade, and represented 25% of the demand in 2004.

Electricity generation from natural gas increased by 8% per year between 1974 and 1990, and by 28.7% per year between 1990 and 2003, denoting a huge acceleration in the past 15 years. In 2003, 15% of electricity was generated from natural gas, up from only 1% in 1990. Nuclear produced 24%, coal 29%, hydro 16%, oil 9% and renewables 7%.


In 2002, there was about 10GW of natural gas-fired power-plant capacity, but this number is increasing very rapidly. There are 13GW recently operational or currently under construction, more than 26GW are planned.

Some of these projects are clearly in competition – around Madrid for instance – and therefore not all of them will be constructed. Some of the projects will also be delayed due to fierce local opposition. However, 40GW of natural gas-fired projects is still an impressive number for the Spanish market.

This is a response to several factors. First, electricity demand is growing steadily in Spain. Electricity generation and consumption have grown at nearly twice the growth rate experienced in other countries of Western

Europe in recent years. For instance, from 1998 to 2002, electricity consumption in Spain increased annually on average 6%. Second, Spain needs to redress the past under-investment in electricity generation. And third, the limited connections with neighbouring country France prevent adequate electricity imports. Finally, dry weather conditions – and therefore a lack of available hydro-electric generation – have had catastrophic consequences on the electricity sector, as seen in March 2005 [Explain???]. All those factors make it necessary to add new capacities rapidly. Official projections show that natural gas and renewables will increase their share of electric generation considerably by 2011, while nuclear, coal and oil are expected to account for smaller percentages. Natural gas demand is expected to rise quickly in response to CCGT construction.

Another significant factor is the sharp projected increase in the non-power sectors as well. The government expects the residential and commercial sectors to increase by 88% by 2011 (up to 6.5 bcm). The industry sector is expected to grow by 50% by 2011 to 22.8 bcm. These figures will contribute to the increase in natural gas demand in Spain, and a dash for natural gas is probable in the next decade.

From a survey of natural gas-fired power-plant projects across European natural gas markets, our main conclusion¹ is that, yes, the use of natural gas for power generation will increase substantially in Europe, but probably not as much and not as fast as is generally believed. It mainly shows that there is a very different story to tell about different countries/regions of Europe regarding the future of natural gas in power, and that different time-frames provide different stories. Increases in natural gas demand for the power generation sector in the EU are highly sensitive to the development of natural gas-fired generation in two countries: Italy and Spain. Of course, the load-factor at which the plants will run will also have a major impact on natural gas demand. 

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¹ For further information on natural gas demand, see “Future gas demand in Europe: the importance of the power sector”. This working paper will be available on the Oxford Institute for Energy Studies website (www.oxfordenergy.org) in December 2005. Free to download.

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