



Forward-looking perspective on oil and gas production in Europe

.....
Access to resources remains the major challenge for the oil and gas industry for the foreseeable future.
.....

In 2010 world energy demand was equivalent to about 260 million barrels of oil equivalent per day (boepd), and oil and gas represented 54% of this global demand.

According to the International Energy Agency (IEA), demand is expected to increase by about 35% by 2035, reaching about 350 million boepd. This increase will mostly be driven by the economic development of emerging countries and the increase in world population. While the share of oil and natural gas in the energy mix will remain stable at around 52%, the demand for gas is expected to increase relative to oil because gas resources are abundant and because gas combustion emits significantly less greenhouse gas (GHG) emissions than coal, in particular.

During the same time period, existing oil and gas fields will naturally see their production decline. The UK Continental Shelf is a good example: despite huge investments in the past decade to extend field life, production has continued to decline—from 4 million boepd at the end of the 1990s, to only about 1.5 boepd in 2012. In this context, industry must help the world find answers to its demand for energy.

First, the oil and gas industry, led by the efforts of key companies, has developed a global response strategy to minimise the risks it continuously faces when drilling exploration wells in new geological environments. The need for such a response strategy was re-emphasised in 2010 by the Macondo Well blowout disaster in the Gulf of Mexico.

A Well Engineering Committee (WEC), including top experts from many member companies, has been set up within the International Association of Oil and Gas Producers (IOGP). The WEC is an ideal forum for sharing expertise and analysing well incidents. On the operational side, the industry has developed and implemented several capping systems which can be used in water depths of up to 3,000 metres to cap wells that could be approaching an uncontrolled blowout. On the regulatory side, a new Offshore Safety Directive, adopted by the EU, is being implemented in the European countries.

Second, the industry must manage the need to continuously renew its access to new resources. Although the

shale gas revolution has dramatically changed the game in the USA, this revolution has not yet been exported outside of the USA. There are many reasons for this, including public acceptance of the technology required to extract oil or gas from shale deposits.

Access to resources remains the major challenge for the oil and gas industry for the foreseeable future. This is particularly true for Europe where more than 90% of oil demand will be imported from other parts of the world. The trend for gas is not very different; today, European domestic production meets 32% of EU gas demand (or 52% if Norwegian production is also included). By 2035, however, domestic production will be less than 20% and the remaining 80% of gas demand will need to be imported. Developing new ideas for Europe's existing production sites is therefore of major importance to limit this future dependence.

Maximising oil and gas recovery from existing and often mature fields is the first way to grow domestic production. This is an ongoing challenge, for all North Sea fields, for example. Recovery factors are currently about 30% and increasing them by only a few percent could allow the additional recovery of several billions of barrels. To achieve this recovery, today's most efficient technology is infill drilling with well trajectories optimised based on the latest generation of seismic data. Enhanced oil recovery (EOR), using water or gas injections, are also traditional means to increase oil recovery and are likely to be a real source of progress in the future. Maintaining adequate pressure in the reservoir in an 'optimised' way is key to successful EOR. This can be done by adding polymers to the injected water to adjust viscosity and optimise the pushing effect of the injected fluid, or by injecting surfactants to reduce residual oil in the reservoir pores. Another step change will be to increasingly use these technologies at early stages of field development, not just for already mature fields.

Exploration and discovery of new resources is the other route to increase domestic European production. Thousands of wells have already been drilled and most known sedimentary basins have already been explored, even if new discoveries of limited size are regularly made in the middle of existing fields. Here also, new seismic imaging of the subsurface has offered prospects which



were not visible only a few years ago. New areas of exploration are also offering opportunities for 'big cat' discoveries, for example, in the East Mediterranean, where several huge gas discoveries were recently made.

More generally, deep water drilling in the Mediterranean Sea remains a clear opportunity for Europe. Most of the technologies required for this type of development have already been implemented west of Africa. Floating production units of large size could play the role of central hubs surrounded by satellite field developments. When pressure boosting is required, technologies using processing facilities on the ocean floor could be considered consisting of two phase separator systems and subsea pumping of the liquid phase. Facilities of this sort have already been implemented on some ultra-deep water developments.

Having completely different environmental conditions and challenges, the great North provides another important opportunity for Europe. Production has already started west of the Shetland Islands and liquefied natural gas (LNG) is already being delivered from the Snøvit field in northern Norway.

In addition, new discoveries are regularly being made above the Arctic Circle. Is this just the beginning of exploration in the extreme Arctic? For some, the Arctic is going to offer an incredible opportunity for development; for others, it is an area which should be pro-

tected regardless its potential. In the next decade, upstream activities will probably be conducted in the ice free zones during the mildest months of the year, from April to October. Low temperatures, requiring winterisation of equipment, and darkness will be constraints that the industry should overcome easily. Ice coverage, logistics adapted to the remote conditions and a robust strategy to respond efficiently to incidents remain topics requiring considerable research and development before large-scale exploration of such frontier areas can be envisaged.

Even if energy demand were to remain stable in Europe through 2035, and even if legislation continues to push the development of renewable products, which has been the emphasis over the past few decades, it will be important not to forget oil and gas as key elements in Europe's energy future. These products are key to guaranteeing security of energy supply to European consumers. The overall potential in Europe is still considerable and, with the right policies in place, could be tapped to 2050 and beyond.

Oil and gas has brought us to where we are in European economic development. The industry can be proud of the access to energy that it has provided to consumers all year round. Cars are running, houses are heated, and gas-fired power plants are supplied and delivering electricity on demand. Not many other energy sources today can claim the same.

Author: Michael Engell-Jensen

Michael is Executive Director of the International Association of Oil & Gas Producers (OGP) based in London, United Kingdom. On behalf of the world's oil and gas exploration and production (E&P) companies, OGP works to promote safe, responsible and sustainable E&P operations. OGP represents the E&P industry in front of international and regional regulators.

Michael has more than 30 years of experience in the upstream oil and gas industry. Previous positions include Managing Director of Mærsk Oil in respectively the UK and Qatar, and corporate Senior Vice President Carbon and Climate for Mærsk Oil.

Michael's education includes a Ph.D. in applied nuclear physics from the Technical University of Denmark, executive management programmes at IMD, and the Business and the Environment Programme at Cambridge University.