



THE GERMAN E&P INDUSTRY: WORLD-WIDE ACTIVITIES

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of the domestic demand for gas but only 3% of the requirement for oil.

The importance of the international activities of the German E&P companies becomes obvious when considering the impact of the hydrocarbon production from overseas, especially in relation to oil production. Including international production the ability to meet domestic demand rises to 19% for oil and to 27% for gas.

**For German
E&P companies the
importance of
overseas oil and gas
production is growing.**

World-Wide Activities

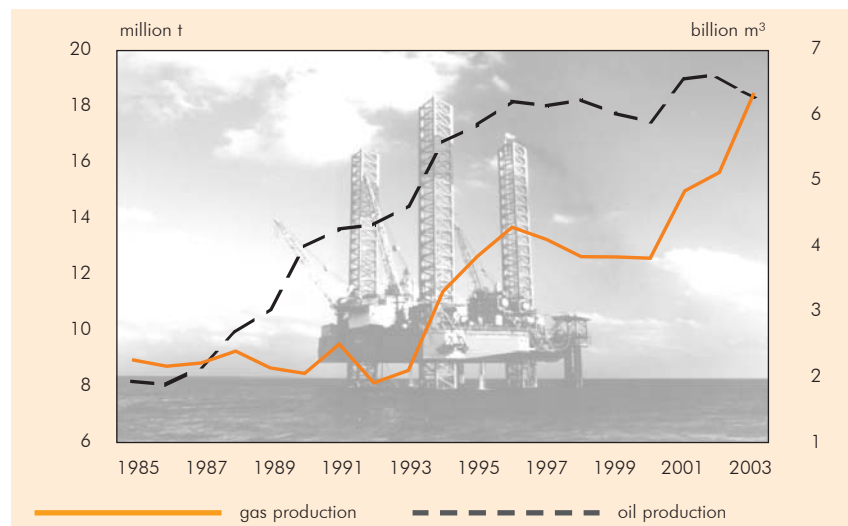
The companies of the German oil and gas industry can look back on a long history of domestic exploration and production and a continuous growth in activities in the international arena. Today, the German Exploration and Production (E&P) Industry, as well as the entire Service Industry supporting this sector, are operating world-wide.

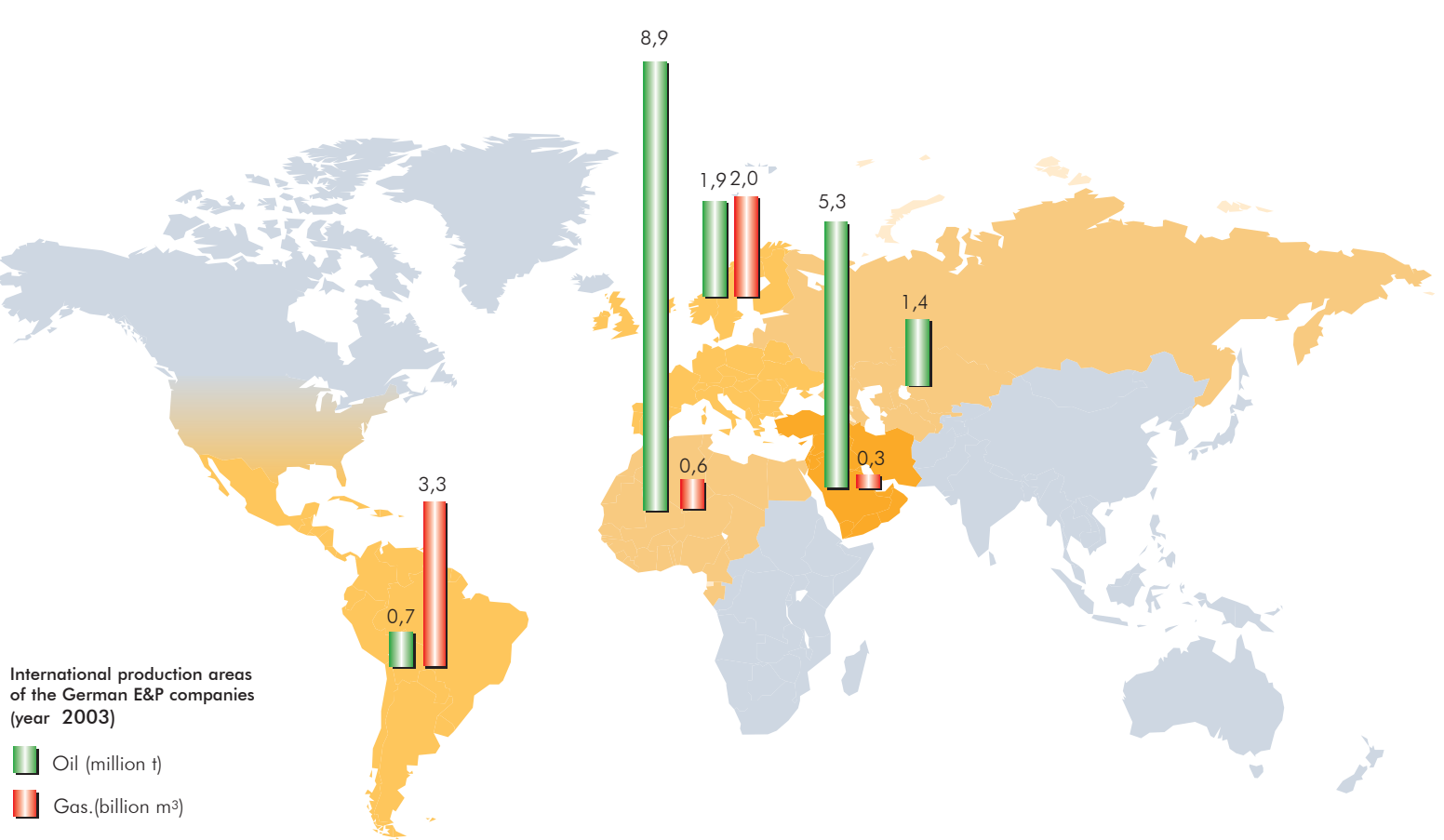
Apart from the more traditional foreign production areas in Africa and the Middle East, the German E&P Industry has expanded into other regions of the world.

Oil And Gas Production

Today national hydrocarbon production of the German E&P companies is able to meet more than 20%

Development of international oil and gas production by German E&P companies





Overseas oil and gas production will continue to be of increasing importance for German E&P companies.

Investment

In recent years two third of the German E&P Industry's investment was made outside of Germany with a clear tendency for further growth in the future. Member companies of the WEG are investing overseas in the expansion of existing activities as well as in new projects in established hydrocarbon provinces.

The overseas investment of German E&P companies is steadily increasing.

Employment

The companies of the German E&P Industry are employing highly qualified people in almost 140 different job disciplines.

Most of the German E&P companies' international subsidiaries are

structured as joint-ventures, where the personnel ratio between domestic employees and seconded German expatriates can be as high as 125 to 1.

The creation of additional jobs abroad has also positive effects on the employment in Germany.



Comprehensive know-how in drilling and production technology is the basis of the German E&P Industry's international activities.

Technology Thrusts

The various and complex geological characteristics of the German oil and gas fields (with depths up to 5,000 m) have always required the development and application of high-end technology equipment and services. As part of their world-wide activities, the companies of the German E&P Industry make use of their comprehensive know-how in drilling and production technology.

In "Frac Technology" (hydraulic stimulation) the know-how has been steadily expanded. A frac treatment creates artificial fractures in a low permeability reservoir by means of the application of high fracture fluid pressure which subsequently leads to a higher flow of oil or gas and thereby higher hydrocarbon production.

The combination of horizontal drilling and so-called "Multiple Fracs" – several fracs placed in the horizontal section of a well – has already been successfully performed in wells in Germany at depths of 5,000 m.

"Extended Reach Drilling Technology" enables the drilling of wells with horizontal displacements greater than vertical depths. By applying this technology, the E&P Industry has successfully overcome problems in accessing oil and gas reservoirs

resulting from geological, surface or environmental constraints.

"Enhanced Oil Recovery Technology (EOR)" is the means to increase the ultimate recovery of an oil reservoir by using thermal or other physical measures (e. g. steam flooding, polymer flooding or gas injection). In particular steam flooding has been successfully performed in German production operations.

of the deepest vertical research wells of the world, with a total depth of 9,101 m, was drilled in Germany in the 1990's to investigate the earth's crust. The technology developed during this research project has been particularly significant in the development of the automation of the drilling process, having had a fundamental impact on the design of the new generation drilling rigs now operating ecologically and economically onshore.



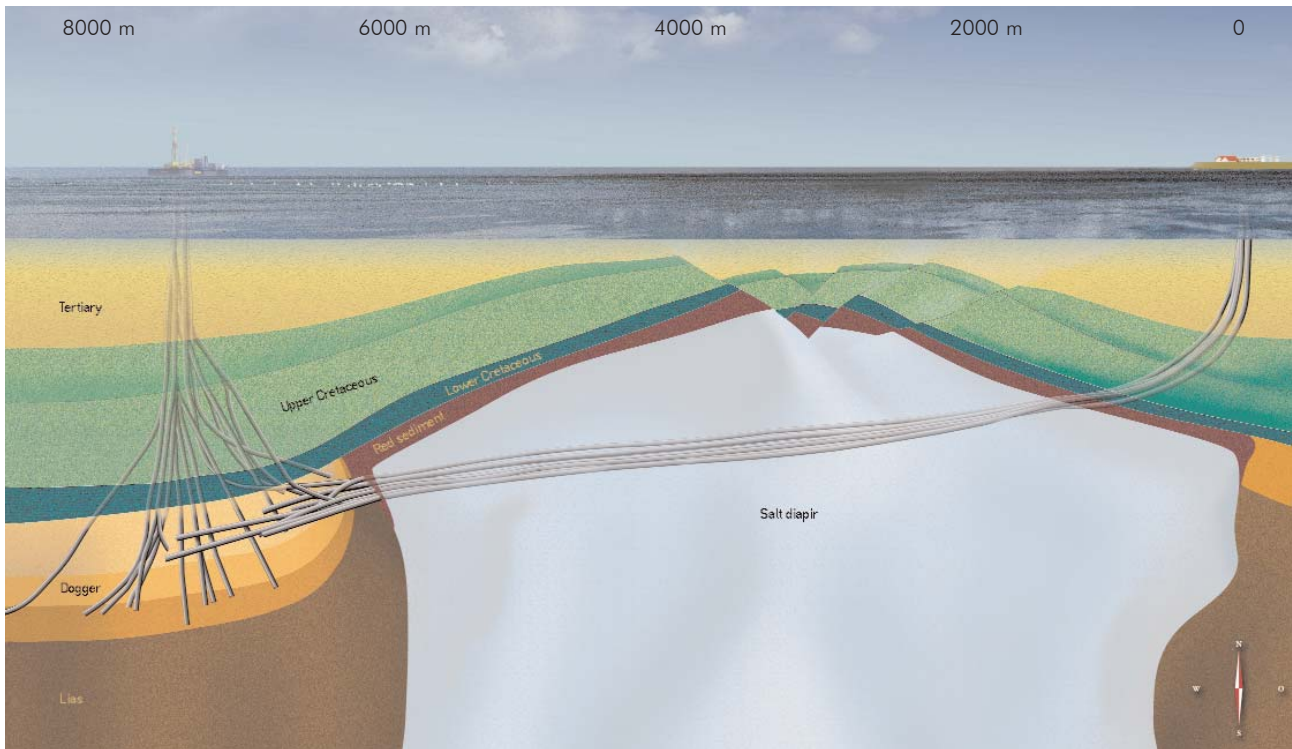
As part of the *Continental Deep Drilling Program (KTB)* of the Federal Republic of Germany, one

These examples of the development and successful application of innovative technologies enable the German E&P Industry to position itself successfully in foreign countries in the future.

Wells with horizontal displacement of up to 10 km successfully drilled and completed.

Health, Safety & Environment (HSE)

The German E&P Industry has a proven record of ecologically prudent exploitation of hydrocarbon



Extended Reach Wells Dieksand – Geological Section and Well Path

reservoirs. For decades German E&P companies have safely produced oil and gas in environmentally sensitive areas in Germany under the most stringent public regulations. In the southern part of the "Nationalpark Schleswig-Holsteinisches Wattenmeer" (natural reserve mud flats of Schleswig-Holstein) oil is produced with specially developed and tested high-end technology. Several "Extended Reach Wells" have been successfully drilled from onshore locations and production from the reservoir has been increased without impacting on the ecologically sensitive areas of the mud flats. In parallel a comparable project with German participation has been realized in southern Argentina.

In order to minimize environmental impact German standards require the utilization of associated gas, which is produced together with the oil, in an ecologically safe manner such that emissions from flaring have been considerably reduced.

German E&P companies also apply this principle of atmospheric protection in their international operations. For example, a German E&P company made the construction of a new gas plant an integral part of its field development plan of an oil project in North Africa. The processed associated gas is utilized for both power generation and pressure maintenance in the oil reservoirs.

The German E&P Industry has many years of experience with sour gas (sulphurous gas). The operational safety of sour gas desulphurisation plants is of the highest technical standard due to the use of sour gas resistant materials and reliable monitoring and remote control systems.

The "Super-Claus-Technology" developed in Germany reduces the sulphur content of sour gas, thus helps to minimize sulphurous emissions. Today this technology is used all over the world.

This know-how enables German E&P companies to develop technically and operationally challenging reservoirs abroad in an economical and environmentally prudent way. At the same time, German companies are dedicated to applying their strict HSE standards world-wide.

The German E&P Industry provides the highest standards in technology in the exploration and production of hydrocarbons, world class leadership in HSE knowledge and procedures and proven international experience in the oil and gas sector. German E&P companies are well positioned to extend their current international activities and to initiate new projects in new areas in all parts of the world.

MEMBER COMPANIES

of WEG – the association of German E&P companies



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