



Decades of tradition: Crude oil and natural gas from Germany

- **Contribution to supply security despite declining production**
- **Barnstorf becomes central technology and training location**
- **Mittelplate is the flagship of domestic production**

Traditional production

Wintershall, a 100 percent subsidiary of the BASF chemical company, has been producing crude oil and natural gas in Germany for eight decades. The company is currently producing from 15 oil fields and 35 gas fields. In total, around 800,000 tons of crude oil and around 435 million cubic meters of natural gas were produced in Germany in 2018 (own and externally operated production).

Fit for the future

However, the production of crude oil and natural gas in Germany has been declining for years. This is due to the natural depletion of the reservoirs and is a geological reality. At the same time, the price of oil is fluctuating. The merger of Wintershall and DEA offers both longstanding companies the opportunity to respond to these changes and thus extend the economic life of the domestic production. "We must forge new paths in order to be fit for the future. This includes concentrating on the most

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important production sites in Germany and adapting our costs to the declining production," says Mario Dreier, Acting Director of Wintershall Deutschland.

In addition, the domestic production also continues to offer a competitive advantage: relative to locations abroad, the production in Germany is more demanding and often only possible with considerable additional effort. Faced with this challenge, the production in Germany with its maximum safety and environmental standards has increased the company's technological expertise. The research also ensures competitive advantages. For example, one particularly important research field is concerned with increasing the oil recovery rate from reservoirs. "The knowledge that we gain from the exploration and production in Germany enables us to successfully position ourselves in the world's production regions," explains Mario Dreier. "Given that the times with so-called 'easy oil' are also increasingly over internationally, we can impress worldwide at the major gas and oil sources with the expertise we have garnered in domestic production."

Contribution to supply security

Supply security begins on our own doorstep. In total, around 2.1 million tons of crude oil are produced annually in Germany. Although this covers just under three percent of the German oil demand, the domestic crude oil production still matches the amount that Germany imports from Saudi Arabia each year. This once again shows that every liter produced domestically contributes to the security of supply.

Importance of oil and gas in everyday life

Germany needs raw materials – today and in the future. There would be no medicines, no wind turbines and no iPads without oil. In addition, natural gas as a climate-friendly energy source is the ideal partner for renewable energies. Crude oil and natural gas from Germany also provide a home advantage for the domestic energy supply. This makes it all the more important that Germany utilizes the resources at its disposal in the best possible way – cleverly and responsibly.

Wintershall's German sites

Last year, Wintershall expanded its technology center in Barnstorf in Lower Saxony and equipped it with state-of-the-art digital technologies. Around 2,000 rock samples, consisting of drill cores from production regions worldwide, are analyzed here every year. At the heart of the new laboratory is a micro-computed tomography (microCT) scanner, which supports the 20-member team in their analyses. With the new high-tech

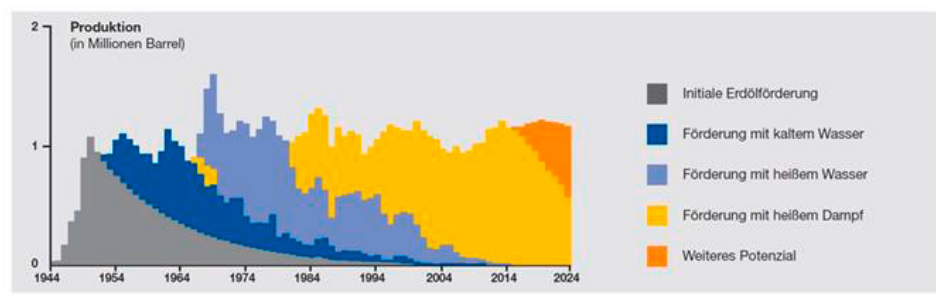


Wintershall's new technology center in Barnstorf, Lower Saxony.

equipment, Wintershall experts are creating high-precision 3D images of drill cores from natural gas and crude oil reservoirs in the so-called Digital Rocks process. "We can now analyze the potential of oil and gas fields even faster, more precisely and more efficiently," says Mario Dreier. The technical equipment for the new technology center is unique in the German-speaking world. Wintershall has invested around six million euros in the new facility with a floor area of 2,700 square meters.

Following the merger of Wintershall and DEA, Barnstorf will be the central technology and training location with its worldwide core drill storage facility. Barnstorf is also a production site.

One of the oldest oil fields in Germany is situated in **Emlichheim** on the German-Dutch border. Here, Wintershall has been recovering oil at a consistently high level for more than 70 years – that is worldwide unique. The BASF subsidiary has been using the technically demanding steam flooding process here since 1981.



The steam flooding facility in Emlichheim produces hot steam that makes the crude oil easier to extract from the reservoir.

"We believe that this site will continue to supply Germany with oil for the next 25 years," says Horst Prei, Operations Manager in Emlichheim. Here twelve new wells, which went into production in 2017, are intended to help. They are connected to the well-known Bentheim Sandstone oil reservoir, which lies at a depth of 700 to 900 meters.

In March 2018, Wintershall completed a modern, 3D seismic survey in Emlichheim. The investigation, which provides a high-resolution three-dimensional picture of the Emlichheim oil field, forms the basis for the further development of oil production at this site.

In this regard, Wintershall is planning further drilling at the site over the next few years as part of development phase III, with the first five wells scheduled to start in September 2019. In addition, work will begin in the second half of the year on the construction of an approximately 14-kilometer-long crude oil pipeline between Emlichheim and Osterwald in order to transport the extracted oil in a safe and environmentally friendly manner to the refinery in Lingen.

Emlichheim will be one of Wintershall DEA's future core activities in Germany alongside Völkersen (currently DEA) and Mittelplate (where Wintershall already has a 50 percent stake).

The **Mittelplate** offshore oil field, where Wintershall and DEA Deutsche Erdoel AG (operator) both have a 50 percent shareholding, is one of the main cornerstones of Germany's oil production. Over 35 million tons of oil have already been extracted from the reservoir. To ensure Mittelplate will continue making an important contribution to domestic production in the future, Wintershall and DEA have already initiated another drilling campaign in 2017, which will go on until 2022.

30 years of trouble-free production in the Wadden Sea illustrate how crude oil production and environmental protection can function hand in hand. "Mittelplate is a good example of the environmental standards self-imposed by German E&P companies," emphasizes Mario Dreier. "For 30 years this has ensured the safe and environmentally friendly extraction of natural resources, even in the sensitive Wadden Sea production area."

Since production began in 1987, a total of 28 wells have linked the oil field to the Mittelplate artificial drilling and production platform, which is constructed seven kilometers off Friedrichskoog in the Wadden Sea. The drilling platform stands like a compact, liquid-tight steel and concrete basin on the tidal flats. It is completely protected by sheet pile walls against all the external forces of nature. A comprehensive disposal system ensures that the North Sea and Wadden Sea are not polluted by drilling and production operations. In addition to the successful offshore operation, DEA and Wintershall are also recovering oil from the eastern parts of the reservoir from onshore using extended reach production wells. One of these is more than nine kilometers in length.

One of the largest oil fields in the Upper Rhine Rift Valley is situated in **Landau** in the Southern Palatinate. The BASF subsidiary has been recovering oil for more than 60 years around the Landau vineyards – roughly 4.5 million tons in total. In February 2017, seismic measurements were successfully completed, aimed at further developing and consolidating production at the site. The high-resolution 3D seismic survey provides an accurate, three-dimensional image of the geological strata in the Landau oil field. This enables experts to estimate the still existing oil reserves and locate wells in a precise manner. The seismic evaluation has now been completed. Geologists and reservoir engineers are currently determining whether there is potential for possible new wells.



The Mittelplate oil field is located on the southern edge of the Wadden Sea national park in Schleswig-Holstein, Germany.

Since 1979, Wintershall has produced about 35,000 tons of oil each year south of Augsburg in the **Großaitingen** region. Wintershall's Bavarian site is thus by far the largest oil production operation in the Alpine foothills – here the oil reservoirs line up like pearls on a necklace. At the end of 2016, Wintershall successfully drilled a new oil well and brought it into production in 2017. Further wells are planned.



Wintershall has invested in recent years in the modernization of plant facilities.

Domestic natural gas

Lower Saxony forms the center of Germany's natural gas production. More than 95 percent of the natural gas produced in Germany comes from this federal state. But the production is declining! Domestic gas production currently only covers around seven percent of the German demand – just a few years ago it was 20 percent.

A large gas reservoir is possibly situated in the Düste Karbon gas field in **Barnstorf**. This is where Wintershall has been pursuing its Düste Z10 conventional tight-gas project. The project has remained on hold since 2012, however, as a result of the debate about the use of fracking. Wintershall is currently investigating whether the Düsten Z10 project could be implemented economically or if it is even feasible. Further information is required here, which is why a short-term pressure test approved by the LBEG was carried out in January 2019. Wintershall will provide timely, comprehensive and transparent information on all further steps.

Since 1965, Wintershall has been recovering **sour gas** in the Lower Saxony municipality of **Staffhorst** near Nienburg, making it one of the worldwide pioneers in the production of this type of natural gas. Around 100 million cubic meters of natural gas were extracted from eight wells in 2018. Wintershall has completed the Päpsen Z2 exploration well and the production is highly successful with 9,500 cubic meters per hour. But it doesn't stop there: "We're examining further development potential," says Mario Dreier. For example, a new well is planned in 2019. "Because Staffhorst shows that expertise garnered by Wintershall here in Germany opens the doors to energy partnerships worldwide, for example in Abu Dhabi," emphasizes Dreier.

Further information is also available on our Internet portal at www.wintershall.de, where we will continually report on the latest state of planning.

These and other images are available for downloading at www.wintershall.com in the press section.