

Wintershall in Latin America

- **Annual production in Argentina at approx. 26 million barrels of oil equivalent**
- **Participating in 15 fields in Argentina's Tierra del Fuego, Neuquén and Mendoza provinces**
- **New growth opportunities in Latin America with Brazil**

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Wintershall has been successfully involved in **Latin America** for decades and celebrated its 40th anniversary in Argentina in 2018. Here the company produces hydrocarbons, especially natural gas, and is now the country's fourth-largest gas producer. The company is active in the central Argentinean provinces of **Neuquén** and **Mendoza**, as well as in the south off the coast of **Tierra del Fuego**.

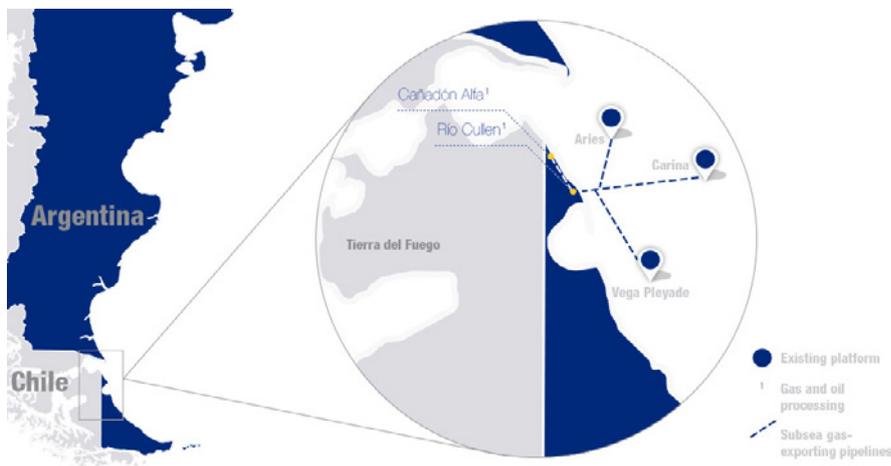
Wintershall is now expanding its **Latin America core region** and will also be involved in **Brazil** in the future. The country's Atlantic coast is considered one of the most promising oil regions in the world. There Wintershall was awarded seven production licenses in April 2018 and is the operator for four of these licenses. The licenses are located off the north- and south-east coasts of Brazil.

Argentina

Wintershall has been producing natural gas in Argentina for four decades, and is the country's fourth-largest gas producer. Wintershall began its involvement here when it acquired its first concessions in Tierra del Fuego. The wholly owned subsidiary Wintershall Energía S.A meanwhile holds working interests in 15 oil and gas fields in Argentina, and produces about 26 million barrels of oil equivalent (boe) annually.

Tierra del Fuego: Increase in production

Wintershall has been active in Tierra del Fuego in the south of Argentina since 1979. In 1989, the company began to produce oil from the Hydra field, situated in the Austral Basin in the province of **Tierra del Fuego**. Wintershall has continuously made efforts to increase the natural gas production from the offshore fields ever since. These improvements have been made possible by applying cutting edge technology combined with high investments. In 2018, about 20 million cubic meters of natural gas per day were produced from the CMA-1 area, including the Carina, Aries and Vega-Pléyade fields where Wintershall holds a 37.5 percent participation interest. Other partners are Total as operator and Pan American Sur. Around 20 percent of the gas produced in Argentina today comes from the CAM-1 area.



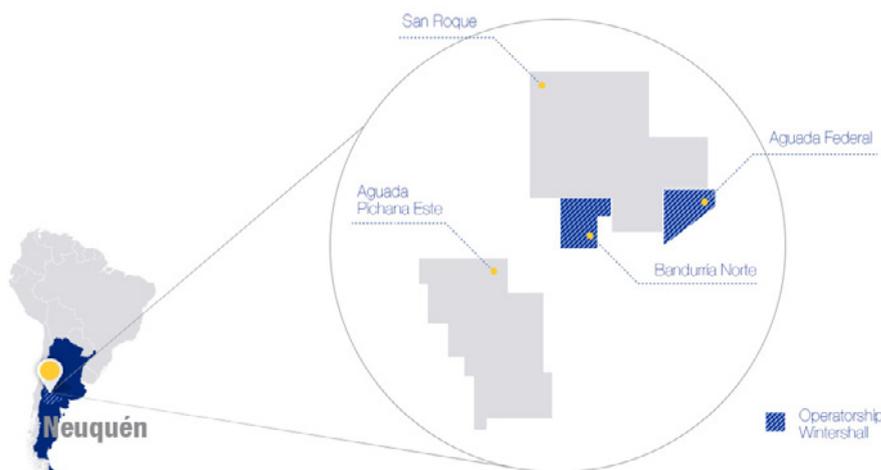
Together with Total and Pan American Sur, Wintershall put the new **Vega Pléyade** gas field, located in the Argentinean Sea off the coast of Tierra del Fuego, into production in February 2016. The world's southernmost gas development project makes a significant contribution to Argentina's gas supply and has a daily production volume of up to 6.7 million cubic meters. The offshore Vega Pléyade field is a key project for Wintershall in Argentina with 2P reserves

amounting to around 19 billion cubic meters of natural gas. The platform is connected to the onshore processing installations at Río Cullen on the Tierra del Fuego coast by a 77-kilometer subsea gas-exporting pipeline.

In April 2017, the CMA-1 partners approved the Cañadon Alfa plant expansion project, whose main objective is to increase production and develop additional reserves from the offshore gas fields. This is being achieved by installing two new low-pressure compressors and a third pipeline connecting the Río Cullen and Cañadon Alfa plants. The new plant is scheduled to be finished in April 2019.

Operator in the Vaca Muerta formation

Wintershall has been active in the production of conventional natural gas and oil in the Neuquén province for more than 20 years and knows the geological conditions there. Wintershall has shares in the Aguada Federal, Bandurria Norte, Aguada Pichana Este and San Roque blocks. Wintershall is utilizing this knowledge in developing the blocks in the attractive Vaca Muerta formation. Shale gas or shale oil projects are currently being conducted in all blocks.



Wintershall holds a 90 percent share in the **Aguada Federal** block in Neuquén province and is the operator here (Gas y Petróleo del Neuquén S.A. (GyP) holds 10 percent). The companies are jointly developing the block. Within the block, promising shale can be found in the Vaca Muerta formation at a depth between 2,700 and 3,000 meters below ground. Following the completion of two vertical exploration wells, four horizontal wells were drilled in 2015, which each run horizontally for about 1,000 meters. These were tested in



The first well in the Aguada Federal block in Neuquén province was drilled in 2015.

2018. The information obtained from the drilling led to the decision in late 2018 to drill two more horizontal wells. The wells will run 2,500 meters horizontally and be completed in early 2019.

In July 2015, Wintershall took over the operatorship of a second license in the Neuquén province: **Bandurria Norte** (100 percent), where the company is conducting another shale oil project. In 2017 three horizontal wells were drilled in the 107 square kilometer block, which are also directed at the Vaca-Muerta formation. The results are currently being assessed.

The exploration and production of unconventional energy resources poses major technological challenges. Wintershall is nevertheless in an excellent position to master these challenges thanks to its many decades of experience in environmentally responsible and efficient production from complex reservoirs, and its specialist technological expertise in the production of tight gas in Germany.

20 years of experience in Neuquén province

Wintershall has a 27.3 percent participating interest in the Aguada Pichana East block (operator Total 27.3 percent, YPF 27.3 percent, PAE 18.1 percent). In addition, the company has a 22.5 percent interest in the new Vaca Muerta shale gas developments in the same block (operator Total 41.0 percent, YPF 22.5 percent, PAE 14.0 percent).

So far, about 348 wells have been drilled in the Aguada Pichana East block, which stretches over 761 square kilometers. Natural gas is currently being produced from about 300 of these wells. In 2018, the block has produced 7.4 million standard cubic meters of gas each day. In 2017, a shale gas development with 20 wells was launched following the promising results produced by 10 wells in the shale pilot project. The first of these wells started production in December 2017.

The **San Roque block** (Wintershall 24.7 percent, operator Total 24.7 percent, YPF 34.1 percent, PAE 16.5 percent), which stretches over 1,040 square kilometer, is situated north-east of Aguada Pichana. In 2017, a daily average of 3.9 million cubic meters of gas were produced from about 50 wells.

Wintershall was granted permission in October 2018 to export up to 750,000 cubic meters of gas each day from the San Roque and Aguada Pichana Este blocks to Chile. The permit is valid until May 2019.

Utilizing the huge potential offered by unconventional resources

Argentina has the second-largest shale gas resources in the world. According to data from the US Energy Information Administration (EIA), the country has 23 trillion cubic meters of shale gas – which is equivalent to 11 percent of the global shale gas resources. In terms of shale oil resources, Argentina ranks fourth worldwide, with 27 billion barrels of oil equivalent (boe). Hence, Argentina is one of the most important growth regions for unconventional resources alongside the USA.

The **Vaca Muerta** geological formation, situated in the Argentinean province of Neuquén, is particularly important. It is one of the largest shale gas and shale oil formations worldwide: the EIA estimates that the formation has recoverable resources amounting to 16.2 billion barrels of oil and 8.7 trillion cubic meters of gas. The formation covers an area of 30,000 square kilometers at a depth of about 3,000 meters, has an average thickness between 150 and 600 meters, and a high total organic carbon (TOC) content. All the technical features of the Vaca Muerta shale compare well with the already proven shale in the USA.



Thumper truck for conducting seismic surveys in Mendoza

Mendoza province: Oil discovery in Block CN-V

In the south of the Mendoza province, Wintershall Energía holds the exploration license for the **CN-V** block (Wintershall 50 percent, Geopark 50 percent) and is the operator. In spring 2013, Wintershall conducted exploration activities in Block CN-V with a 3D seismic survey covering 180 square kilometers. In 2017, oil was already discovered with the first exploration well. The well is being tested to assess the further potential of this discovery. A second exploration well was drilled in 2018 and is currently being tested.

Responsible partner with local ties

Wintershall has been working in Argentina for four decades and has established a strong bond with the country. For Wintershall, close ties and good cooperation between industry, policymakers and the public are important for recovering the available energy resources in a sustainable manner.

Wintershall is also committed to social and cultural projects in the Argentine regions where it works, and supports numerous local pro-

jects in health, education and culture there. Wintershall therefore takes responsibility in very concrete ways as a reliable partner.

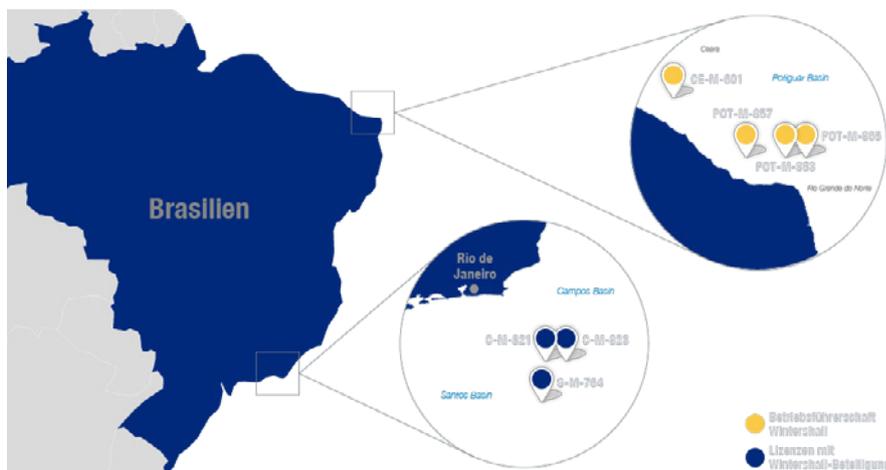
Brazil

Wintershall is further expanding its portfolio in the core region of South America and, in addition to Argentina, is also present in Brazil. In a state bidding round in the spring of 2018, Wintershall secured seven exploration licenses in one of the most attractive growth regions for the oil and gas industry – including four as the operator. Initial exploration drilling in the allocated blocks is scheduled for 2019.

Further growth opportunities in Latin America

The Brazilian market offers enormous growth potential for Wintershall: the amount of proven reserves in the oil fields of the largest South American country has increased significantly in recent years. Five of the ten largest offshore reservoirs in the world are situated off the coast of Brazil – according to the Brazilian National Oil, Gas and Biofuels Agency (Agência Nacional do Petróleo, Gás Natural e Bio-combustíveis, ANP), around 30 billion boe are located here.

ANP estimates that about 12.5 billion boe are located off the north coast of Brazil in the Ceará and Potiguar deep-sea basins. Here Wintershall is the operator for four licenses. The Kassel-based company is collaborating with Chevron (USA) and Repsol (Spain) with three further licenses. The three blocks are located in the Campos and Santos basins off the southeast coast of Brazil. The ANP estimates that the reserves there amount to around 18.3 billion boe.



Wintershall will be investing in Brazil over the next few years with new ideas and wants to establish itself there as a strong and reliable op-

erator and partner. The company will progress the complex exploration in the allocated blocks and compete for additional licenses.

It is planned to establish an operating company (OPCO) in Rio de Janeiro in the medium term, and more employees will be recruited. The portfolio is to be broadened and diversified. These measures are part of Wintershall's global growth strategy: by 2022, a total of 3.5 billion euros will be invested worldwide in expanding the production.

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