The Brazilian Oil and Gas Market Towards 2021

Brazilian Network Meeting in Cooperation with BNCC and NHO

Gulbrand Wangen, Regional Director for Brazil
Oslo 14 November
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We work with the energy industry

- Oil & gas upstream
- Wind energy
- Solar energy
- Oil & gas midstream
- Hydropower
- Energy system
Norwegian Energy Partners

Norwegian Energy Partners is an independent non-profit foundation established to strengthen the long-term basis for value creation and employment in the Norwegian energy industry through expanding the industry’s international business activities.

Norwegian Energy Partners has 250 independent, operating companies

<table>
<thead>
<tr>
<th>Founders:</th>
<th>Professional Organisations</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norwegian Government</td>
<td>Energy Norway</td>
<td>• Statoil</td>
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<tr>
<td>• Ministry of Petroleum and Energy</td>
<td>Federation of Norwegian Industries</td>
<td>• Statkraft Industries</td>
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<td>• Ministry of Trade and Industry</td>
<td>Norwegian Oil and Gas Association</td>
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<tr>
<td>• Ministry of Foreign Affairs</td>
<td>Norwegian Shipowners’ Association</td>
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<td></td>
<td>• The Norwegian Confederation of Trade Unions</td>
<td></td>
</tr>
</tbody>
</table>

www.norwep.com
Global Offshore E&P expenditure 2018-2021

Source: Rystad Energy 2017 Annual Offshore Oil & Gas Market Report for NORWEP
Offshore O&G expenditure 2018-21 per market

Source: Rystad Energy 2017 Annual Offshore Oil & Gas Market Report for NORWEP
Brazilian Market Assessment towards 2021

- The effect of the oil-price downturn is expected to decrease the market in 2017/18 with a turn around from 2019 with Petrobras investments and main focus on its deep water projects
- Despite several projects having been delayed, the fields are considered highly profitable and expected to go ahead

Source: Rystad Energy 2017 Annual Offshore Oil & Gas Market Report for NORWEP
The Top Five Operators in Offshore Oil & Gas Brazil

- Petrobras was by law the sole operator and mandatory stakeholder in all pre-salt oil fields sold under the Production Sharing Agreement. Changed in 2017, but Petrobras remains as the dominant player.

- Statoil, Shell, Total and Chevron are currently the only international companies with large Brazilian operations.

- Statoil is estimated to be the second largest operator due to its development of the second phase of the Peregrino field in addition to the new development of the Carcará field also expanded after the Licensing Round in 2017.

- Shell is expected to further invest in its existing fields in addition to exploration in the company’s blocks in the Barreirinhas basin and in new fields after the Licensing Round.

- Total will spend most money on its Lapa field.

- Queiroz Galvão Exploração e Produção (QGEP) will focus on its upcoming Atlanta discovery in the Santos Basin.

Source: Rystad Energy 2017 Annual Offshore Oil & Gas Market Report for NORWEP
Offshore Wells, by Wellhead Type in Brazil

- Most development wells have wet wellheads as they are typically used in conjunction with FPSOs.

- Still, some dry wellheads have been installed, for example at the Papa Terra field.

- Moving forward, the growth in the number of wells drilled will mainly be driven by increased exploration activity in the pre-salt Santos and Campos basins resulting from licensing rounds in 2017/2018.

- Statoil was awarded operatorship on Carcará North West in the licensing round in October 2017. Seadrill awarded contract by Statoil for 2 rigs.

Source: Rystad Energy 2017 Annual Offshore Oil & Gas Market Report for NORWEP
Upcoming projects – FPSO market

- After more than 2 years in the tendering phase Sepia FPSO was awarded to MODEC with procurement managed from Singapore and hull conversion in China – Cosco Shipyard

- New competitive situation for the FPSO segment in Brazil blending local content with project execution abroad. BW Offshore, SBM, Modec, Teekay Offshore, Bumi Armada and local companies in the race

- The development of Libra, Atapu and Buzios, in addition to Statoil’s Carcará, is estimated to drive most of the growth towards 2021

Source: Rystad Energy 2017 Annual Offshore Oil & Gas Market Report for NORWEP
Upcoming projects – Subsea Market

- The decline in 2016 is largely due to the estimated spending profile for the Lula field.

- Going forward, the market is forecast to increase. The growth is contingent on sanctioning of new projects, most important being further development of Marlim (Revitalization), Libra and Buzios V.

- Petrobras has a fleet of PLSVs on long term charter, enabling the company to perform installations work itself.

- Subsea production systems (SPS) will likely be call-offs on existing frame agreements with the large local SPS producers.

- Aker Solution is expected to win the contract for 12 specialized Horizontal Trees on Libra in very tough competition.

Source: Rystad Energy 2017 Annual Offshore Oil & Gas Market Report for NORWEP
Upcoming projects – Decom. and Late Life Production Market

- About 20 platforms are no longer producing and another 30 are reaching the end of their commercial lifetime
- Ongoing tender by Petrobras for maintenance of 25 shallow water fields in the Campos Basin
- MMO contract negotiations ongoing with 3 Brazilian companies for 13 production platforms in the Campos Basin including CSE Mecanica & Instrumentacao (Aker Solutions)
- Decommissioning expenditure is still forecast to be limited towards 2021
- NORWEP hosted a workshop in Rio on decommissioning and Late Life maintenance in November 2017 with 11 partners, IBP and stakeholders
- New regulation for decom. due in 2018

Source: Rystad Energy 2017 Annual Offshore Oil & Gas Market Report for NORWEP
## Progress Assessment of Brazilian Priority Projects 2018-2021

<table>
<thead>
<tr>
<th>Project</th>
<th>Operator</th>
<th>Main development concept</th>
<th>Estimated sanctioning year</th>
<th>Rystad Energy start-up</th>
<th>Reserves mmboe</th>
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<tbody>
<tr>
<td>Atlanta full field development</td>
<td>QGEP</td>
<td>Floater</td>
<td>2014</td>
<td>2018</td>
<td>0-250</td>
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<tr>
<td>Sepia</td>
<td>Petrobras</td>
<td>Floater</td>
<td>2015</td>
<td>2020</td>
<td>250-499</td>
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<tr>
<td>Libra</td>
<td>Petrobras</td>
<td>Floater</td>
<td>2017</td>
<td>2020</td>
<td>1000+</td>
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<tr>
<td>Marlim 1 &amp; 2 field revitalization</td>
<td>Petrobras</td>
<td>Floater</td>
<td>2017</td>
<td>2020</td>
<td>0-250</td>
</tr>
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<tbody>
<tr>
<td>Buzios V</td>
<td>Petrobras</td>
<td>Floater</td>
<td>2019</td>
<td>2023</td>
<td>500-999</td>
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<tr>
<td>Pao de Acucar</td>
<td>Statoil</td>
<td>Floater</td>
<td>2020</td>
<td>2024</td>
<td>500-999</td>
</tr>
<tr>
<td>Carcará</td>
<td>Statoil</td>
<td>Floater</td>
<td>2020</td>
<td>2024</td>
<td>500-999</td>
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<tr>
<td>Oliva</td>
<td>QGEP</td>
<td>Subsea tie back</td>
<td>2021</td>
<td>2024</td>
<td>0-250</td>
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<tr>
<td>Seat</td>
<td>Statoil</td>
<td>Subsea tie back</td>
<td>2021</td>
<td>2025</td>
<td>0-250</td>
</tr>
</tbody>
</table>

Source: Rystad Energy 2017 Annual Offshore Oil & Gas Market Report for NORWEP
Bidding rounds already scheduled

<table>
<thead>
<tr>
<th>Year</th>
<th>Concession Bidding Rounds</th>
<th>Production Sharing Bidding Rounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>14th: 27 September</td>
<td>2nd and 3rd: 27 October</td>
</tr>
<tr>
<td></td>
<td>15th: May</td>
<td>4th: May</td>
</tr>
<tr>
<td>2018</td>
<td>16th: Q3</td>
<td>5th: Q3</td>
</tr>
<tr>
<td>2019</td>
<td></td>
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</table>

Source: ANP/NORWEP
## The 2nd and 3rd Production Sharing Bidding Round - The Winners

<table>
<thead>
<tr>
<th>Bacia</th>
<th>Rodada</th>
<th>Blocos</th>
<th>Consórcio Vencedor</th>
<th>Operador</th>
<th>Excedente de Óleo a União</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santos</td>
<td>RPP2</td>
<td>Entorno de Sapinhoá</td>
<td>Petrobras (45%); Shell (30%); Repsol Sinopec (25%)</td>
<td>Petrobras</td>
<td>80,00%</td>
</tr>
<tr>
<td>Santos</td>
<td>RPP2</td>
<td>Norte de Carcará</td>
<td>Statoil (40%); ExxonMobil (40%); Petrogal (20%)</td>
<td>Statoil</td>
<td>67,12%</td>
</tr>
<tr>
<td>Santos</td>
<td>RPP2</td>
<td>Sul de Gato do Mato</td>
<td>Shell (80%); Total (20%)</td>
<td>Shell</td>
<td>11,53%</td>
</tr>
<tr>
<td>Campos</td>
<td>RPP2</td>
<td>Sudoeste de Tartaruga Verde</td>
<td>Sem Oferta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campos</td>
<td>RPP3</td>
<td>Alto de Cabo Frio Central</td>
<td>Petrobras (50%); BP (50%)</td>
<td>Petrobras</td>
<td>75,86%</td>
</tr>
<tr>
<td>Santos</td>
<td>RPP3</td>
<td>Alto de Cabo Frio Oeste</td>
<td>Shell (55%); QPI (25%); CNOOC (20%)</td>
<td>Shell</td>
<td>22,87%</td>
</tr>
<tr>
<td>Santos</td>
<td>RPP3</td>
<td>Peroba</td>
<td>Petrobras (40%); BP (40%); CNODC (20%)</td>
<td>Petrobras</td>
<td>76,96%</td>
</tr>
<tr>
<td>Santos</td>
<td>RPP3</td>
<td>Pau Brasil</td>
<td>Sem Oferta</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: NORWEP/ANP
The 2nd Pre-Salt Licensing Round - Statoil is shaping the future

- Carará North added to the portfolio with operatorship
- Partnership with Exxon and Petrogal

Source: Statoil, 27 October 2017
The 2nd and 3rd Pre-Salt Licensing Round- Time for Collaboration

- Statoil and Exxon together in Carcará (right)
- Aker Solutions and Subsea 7 together with ANP in the BCW (left)

Source: NORWEP
Framework improvements with impact on business

Regulatory framework improvements to reactivate the E&P sector


Short term regulatory measures to unlock investments:
- Local content waiver regulation
- Contracts extension
- Incentives for incremental production in mature fields (royalties reduction)
- Transfer of rights negotiation
- Repetro renewal
- Environmental licensing improvement

Bidding rounds calendar
- Open acreage offer
- Reduced entry costs
- Simpler contracts
- Incentives for investments funds to participate as non operating partners
- Royalties adjustment in mature and frontier basins

- projects waiting for FID:
  - R$ 240 bi investments
  - 20 FPSO's
  - 900 wells

- US$ 80 bi investments
- 17 FPSO's
- 300 wells

Source: ANP/NORWEP
Local Content review

Policy for new bidding rounds and possible waiver on ongoing projects

- Offshore:
  - 25% Production Unit
  - 25% Well Construction
  - 40% Collection and Disposal System
  - 18% Exploration

- Onshore:
  - 50% Exploration
  - 50% Production

Source: ANP/NORWEP
Norwegian Investments in Brazil 2014 -2016

Investments
• 2015-2016: 4.6 billion USD
• Increase (2014-2016): 27.6 %

Jobs created in total
• Direct Jobs 26,000
• Indirect jobs 520,000
• Represent 0.6 % of employed workforce in Brazil

Norwegian Investments in Brazil 2014-2016 by sector

**Oil & Gas**
- Acquirement by Statoil of Licence BM-S-8

**Renewable**
- Bioenergy, wind and hydro power
- Scatec Solar with project sanctioning in 2016
- Increased from 6 to 13%

**Other**
- Agriculture business, chemicals, finance, IT, media, mining
- Decreased from 38 to 34%

Energy Matrix: Wind & Solar in the lead as renewable growth

- GDP Per capita in 2016: USD 9508 (Norway USD 70812)
- Population in 2016: 207.8 Million (Norway 5.2 Million)
- Electricity generation capacity in 2017: 154 MW (Norway 33 MW)
- Consumption 2017: 539 TWh (Norway 144 TWh)
- Regulated market: 75 %
- Free market: 25 %

Source: Vincy Partners
Luis Inácio Lula da Silva – Labor Party - PT

• Was the 39th President of Brazil. He was the president of Brazil from January 1, 2003 to December 31, 2010

• He succeeded Fernando Henrique Cardoso, and was succeeded by Dilma Rousseff.

• On July 12, 2017, the former president Lula was convicted at first instance of and money laundering and sentenced to nine years and six months in prison.

Source: NORWEP
Jair Bolsonaro – Social Christian Party (PSC)

- Politician and former military officer. Elected into the Chamber of Deputies by the Progressive Party (PP), and was the congressman who gained the most votes in the general elections of the state of Rio de Janeiro in 2014

- Controversial figure in Brazil, known for advocating in favor of far-right and populist political views. Strong in social media

- Perceived as a nationalist with conservative, anti-left, anti-communist political views

- Candidate for the 2018 presidential election.

Source: NORWEP
Luciano Huck – no party defined

- Brazilian television host, media personality and entrepreneur. Hosted *Caldeirão do Huck* the last 16 years every Saturday on Rede Globo, with an audience of about 18 million people

- Founded Joá Investments, a fund focused on technology and lifestyle start-up companies

- Founder and chairman of Instituto Criar for TV, Movie and New Medias, a non-profit that promotes youth professional, social and personal development by filmmaking

- First Brazilian with one million followers on Twitter in 2009. Nowadays, 12.3 million people follow his tweets, around 16.7 million people have liked his Facebook page and 9.7 million follow him on Instagram
Marina Silva – Rede Sustentabilidade Party

• Member of the Worker's Party (PT) until 2009 and served as a senator before becoming environmental minister in 2003.

• In 2010 running in the Brazilian presidential elections for the Green Party (PV), she earned 19.33% of the popular votes.

• In 2014 when Eduardo Campos announced his candidacy for the presidential election Marina Silva was proposed as vice presidential candidate. After Campos's death in a plane crash on 13 August, she was selected to run for the Socialist Party.

• In 2007, The United Nations Environment Program named one of the Champions of the Earth and in 2009 she got the Sophie Prize.

• In 2012 she was one of the eight people chosen to carry the flag in the opening ceremony of the London Olympic Games.

• In 2014, she was nominated by the Financial Times as one of the Women of the Year.
Geraldo Alckmin – Brazilian Social Democratic Party - PSDB

• In 2014 reelected as the governor of São Paulo, for the fourth (not consecutive) time

• In 2006 run as candidate for presidency

• Degree from Universidade de Taubaté's medical school, specializing in Anesthesiology, before start working in the São Paulo Public Service Hospital.

Source: NORWEP
15 of the top twenty companies are present in Brazil

- FarstadSolstad merged in 2017 – Only 14 vessels in operations in Brazil
- DOF maintain strong position with most vessels on Brazilian flags
- FMCTechnip merged in 2017 with gradually less links to Norway
- Aker Solutions has a strong foothold with major investments made
- BW Offshore maintain position with plans for expansions
- National Oilwell Varco dramatically reduces becoming more US controlled except for APL loading solutions
- Kongsberg and Rolls-Royce suffer from the downturn in Offshore Supply

Source: Rystad Energy/MPE/NORWEP
Conclusion-The way forward for Norwegian Companies

- **Topside and process** equipment will grow, but more challenging with many FPSO lease contractors
- **Subsea** will grow, but is a very competitive local market with 4-5 dominating players
- **Operational services** is a stable market, growth depending on Norwegian companies winning contracts in FPSO, MMO, Shuttles
- **Transport & Logistics** have 200 vessels mainly on Brazilian flag. Though competition.
- **Drilling and Services** will grow, but dependent on Norwegian companies winning contracts
- **Seismic and G&G** will grow, tough completion among Norwegian companies
- **Procurement, Construction and Installation** will grow if Vard is winning contracts
- **SME’s** big potential for innovative and cost effective solutions

Source: Rystad Energy/MPE/NORWEP
PROMOTING NORWEGIAN ENERGY CAPABILITIES IN INTERNATIONAL MARKETS

Gulbrand Wangen, Regional Director Africa, Brazil, India and Midstream

Source: NORWEP/ANP

Oslo | 25 October 2017

norwep.com