Innovating the Oil & Gas Industry, Volume IIII

UNCOVER GLOBAL INSIGHTS

"Having a better understanding of the timing of potential new reserves additions is key to understanding how new reserves additions may match up—or not—with new global demand for oil and gas."

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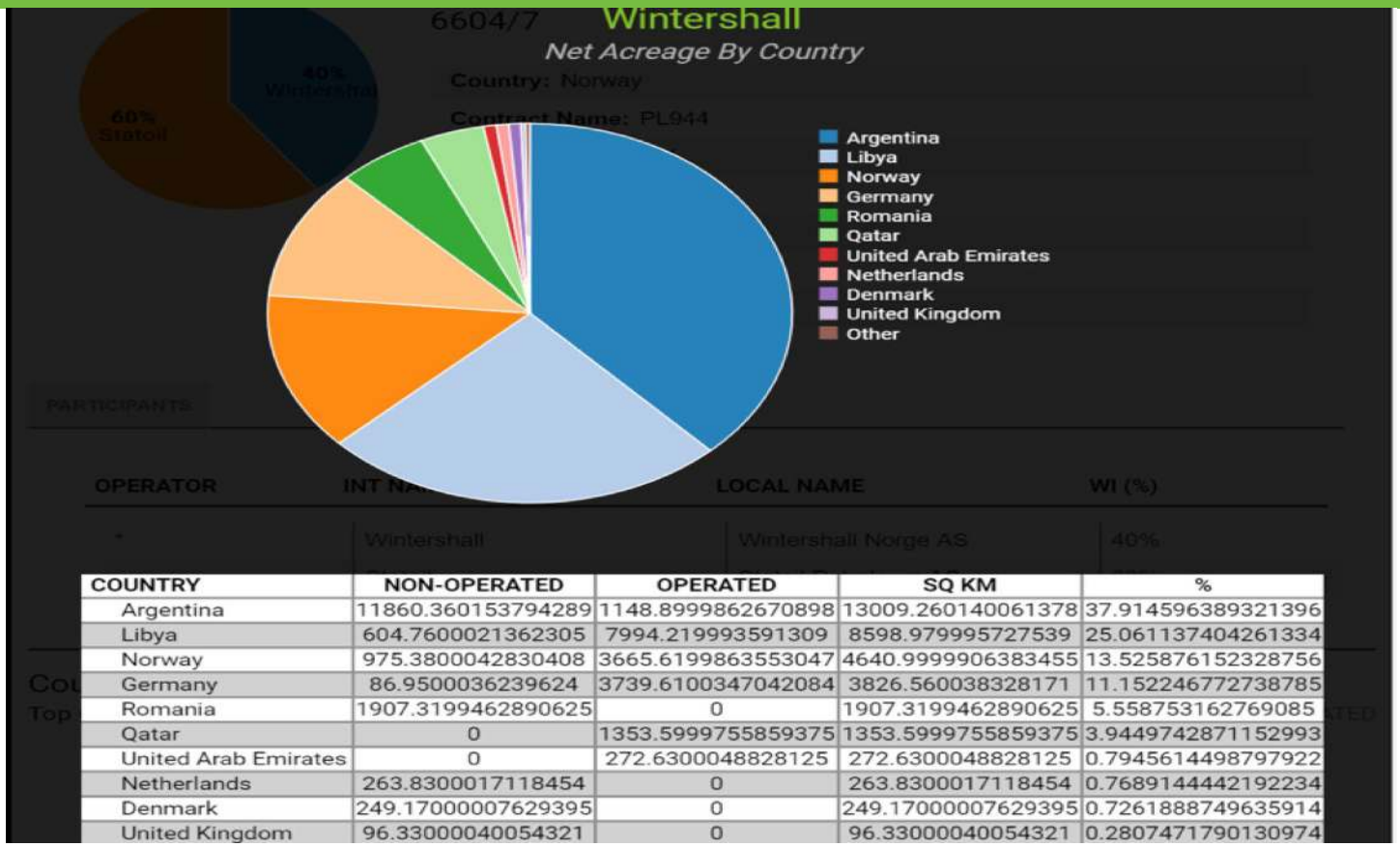
1

Norwegian APA 2017 Bid Round—
An Indicator The Offshore Market is Opening Up?



COUNTRY	NON-OPERATED	OPERATED	SQ KM	%
Argentina	11860.360153794289	1148.8999862670898	13009.260140061378	37.914596389321396
Libya	604.7600021362305	7994.219993591309	8598.979995727539	25.061137404261334
Norway	975.3800042830408	3665.6199863553047	4640.9999906383455	13.525876152328756
Germany	86.9500036239624	3739.6100347042084	3826.560038328171	11.152246772738785
Romania	1907.3199462890625	0	1907.3199462890625	5.558753162769085
Qatar	0	1353.5999755859375	1353.5999755859375	3.9449742871152993
United Arab Emirates	0	272.6300048828125	272.6300048828125	0.7945614498797922
Netherlands	263.8300017118454	0	263.8300017118454	0.7689144442192234
Denmark	249.17000007629395	0	249.17000007629395	0.7261888749635914
United Kingdom	96.33000040054321	0	96.33000040054321	0.2807471790130974

Recently, the results of the Norwegian APA 2017 Bid Round were released. Out of the 39 companies who put in bids, 75 production licenses were awarded to 34 companies. The 75 production licenses, totaling 22,246 km2, are located offshore Norway in three areas: the North Sea (45 licenses, totaling 964 km2), Norwegian Sea (22 licenses, totaling 9,114 km2), and Barents Sea (8 licenses, totaling 4,167 km2) (Figure 1).

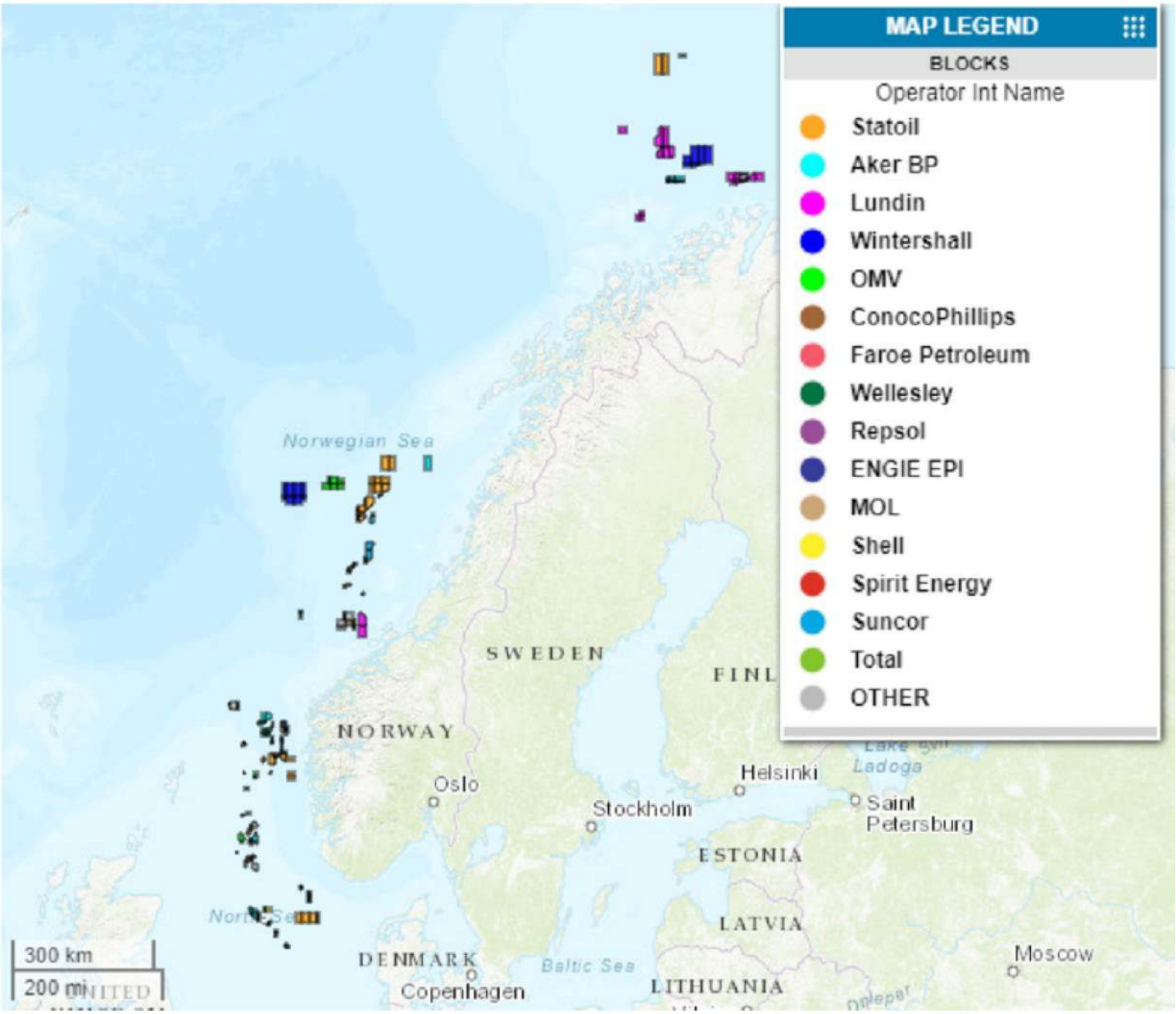


Figure 1: Map showing the 75 production licenses awarded in the Norwegian APA 2017 Bid Round (closed on January 16, 2018); the blocks are colored by operator.

Twenty-two of the production licenses are additional acreage for existing production licenses. Statoil leads the pack with operating interest awarded in 31 licenses over 43 blocks covering just over 7,100 km2, followed by Wintershall with three licenses over 17 blocks totaling just over 3,000 km2 (Figure 2).

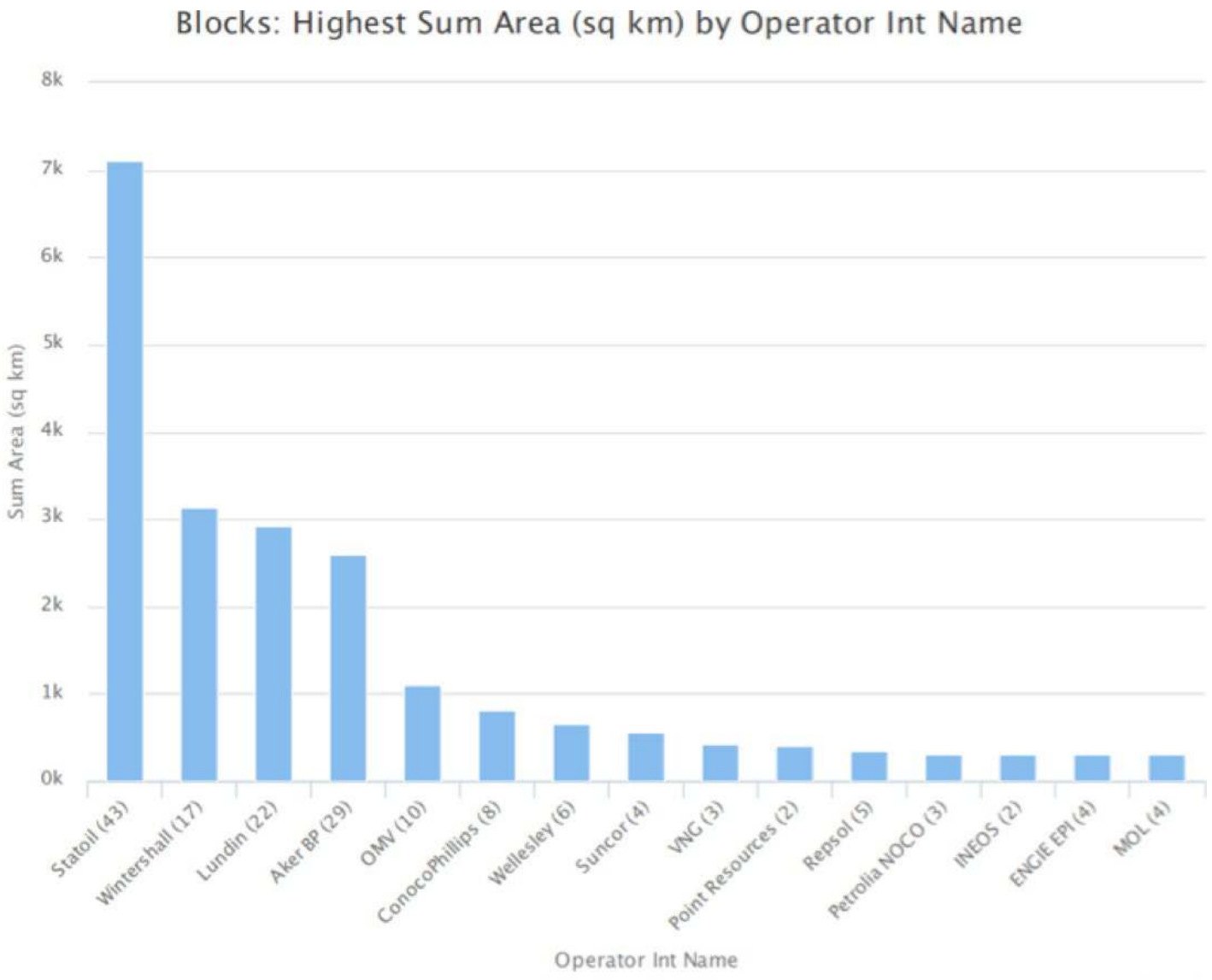


Figure 2: Group comparative chart showing the number of blocks with interest awarded and acreage totals by operator of each block in the APA 2017 Bid Round.

Figure 3 shows the overall landscape of Norway including the results of the APA 2017 Bid Round. Figure 4 gets into more detail about Wintershall in the company trend data, showing what their interests are worldwide. In comparison to the 2016 APA Bid Round where 33 companies applied for acreage out of 139,942 km2 offered, with 56 licenses awarded to 29 companies; is this an indication that the offshore market is opening up?

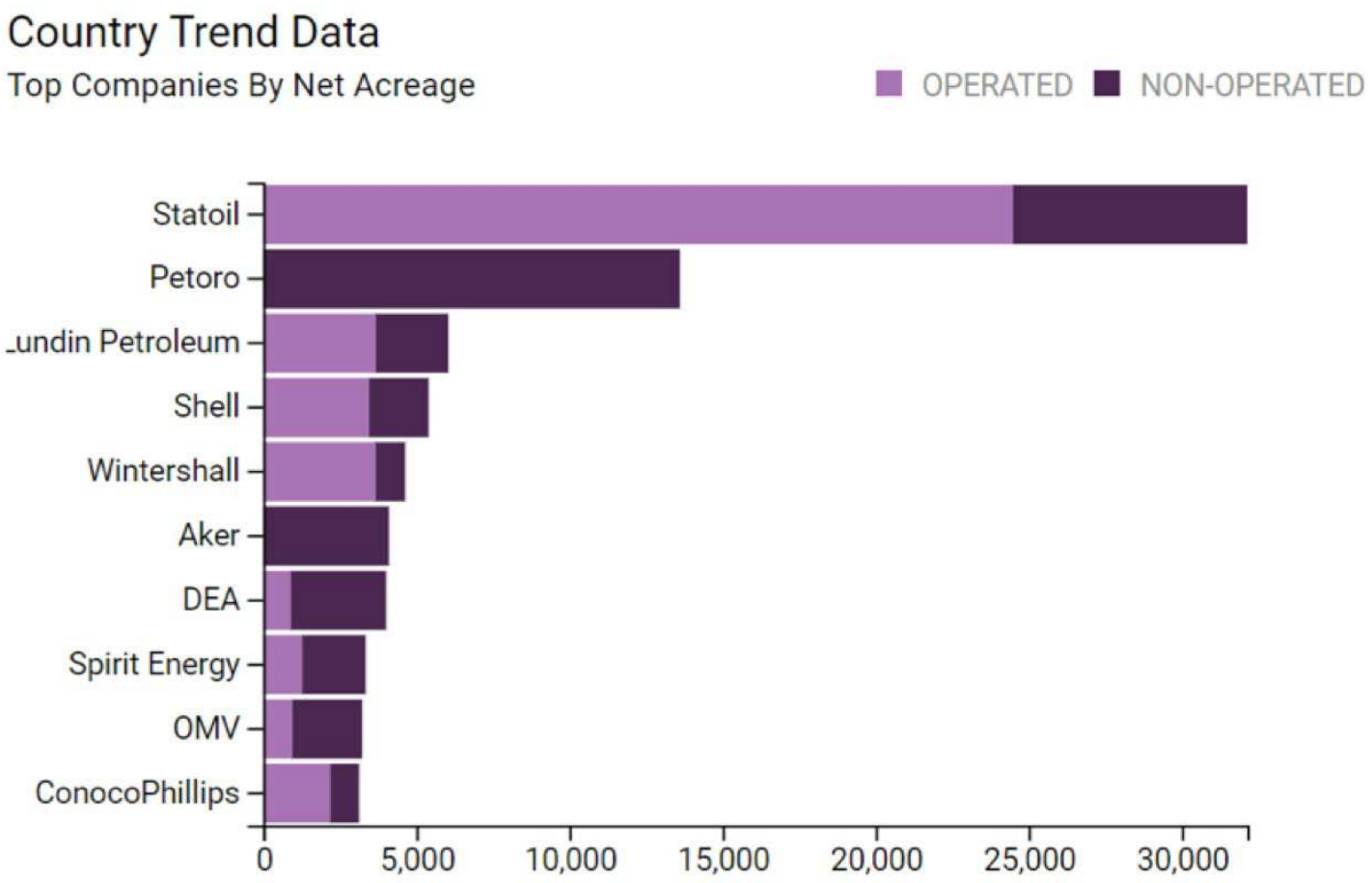
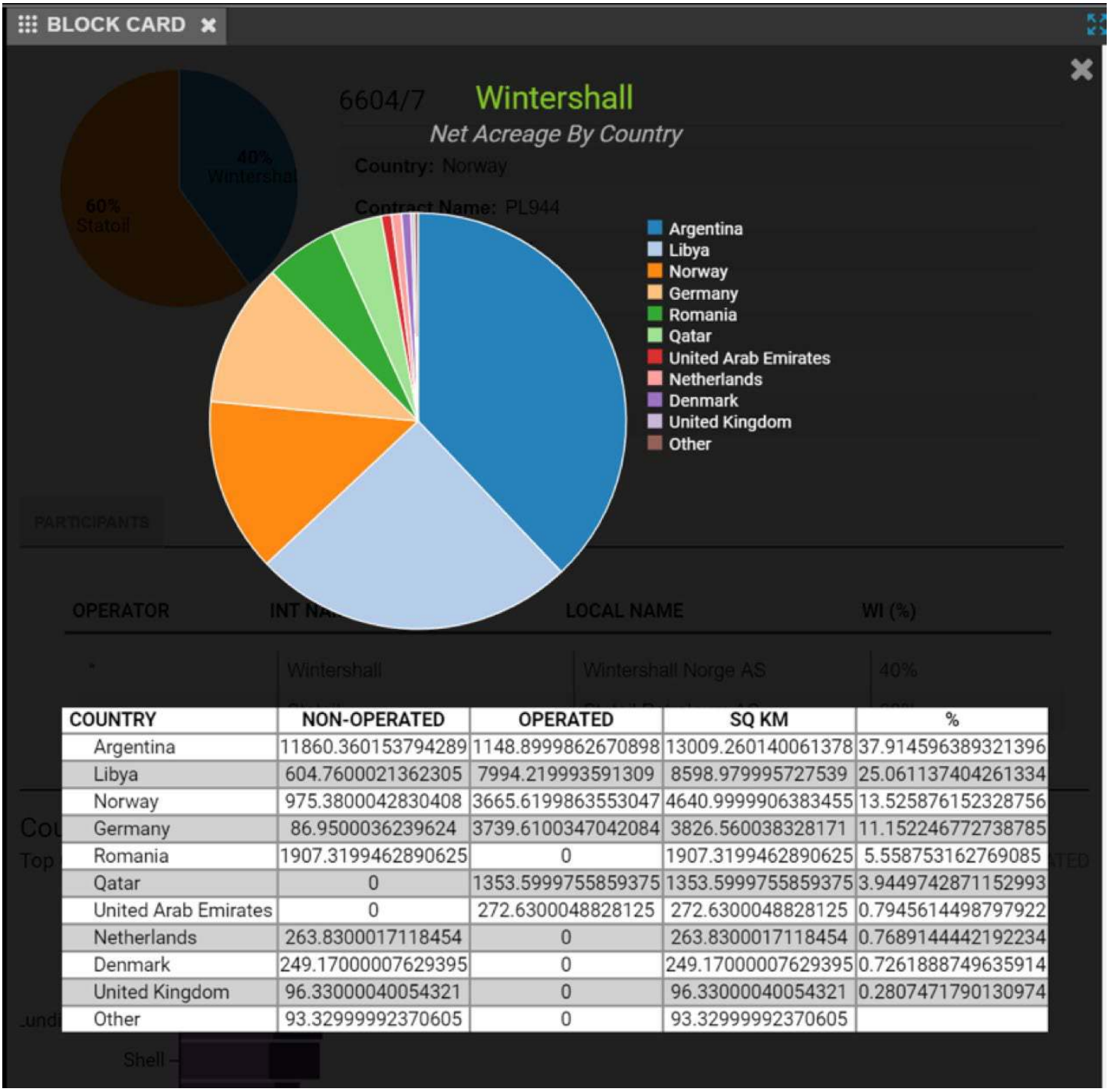


Figure 3: A country look at Norway after the bid round. Statoil has the highest amount of acreage and is a top operator in the area. Country trend data is available in 170 countries globally.



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United Kingdom	96.33000040054321	0	96.33000040054321	0.2807471790130974
Other	93.32999992370605	0	93.32999992370605	

Figure 4: Company trend data for Wintershall, a German oil and natural gas company that is a subsidiary of BASF; interesting to watch as they are currently going through a merger with DEA. While heavily active in the North Sea and Europe, they also have assets in North Africa and the Middle East. This company trend data allows one to learn about the company's global portfolio and operator positions and is available through the block card information.

A look at the planned future bid rounds (Figure 5) within DI International includes the United States GOM Lease Sale 250 to be held in March 2018.

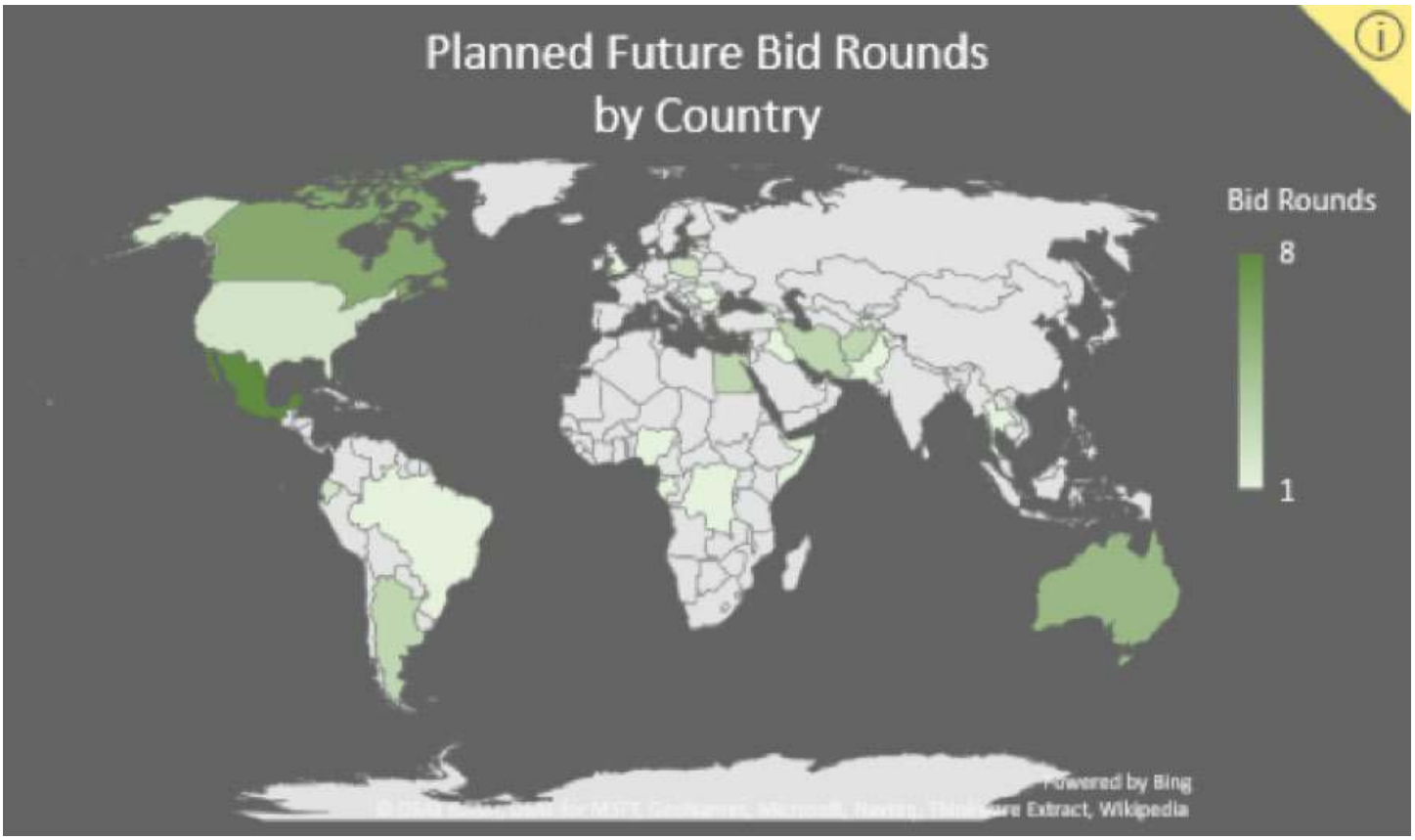


Figure 5: Planned future bid rounds worldwide view showing the number of bid rounds. More information about bid round names and date of bid submission available at Drillinginfo.

Over the next two years, Australia will have their 2018 and 2019 Exploration Bid Rounds. The 37 licenses being offered are scattered offshore Victoria, Western, and Southern Australia plus onshore Queensland and Western Australia. The Nigerian Marginal Fields Licensing Round was moved back from 2017 to an unknown future date due to the awaited approval of the president, who was on medical leave in the UK. The Nigerian Marginal Fields Licensing Round will be for Nigerian companies only, as Western companies are waiting for the offshore round. DI International scouts report that a potential offshore bid round requires the passage of the Petroleum Industries Bill (PIB), which only has one of three parts approved; the bidding process is expected to heavily reply on the terms of the PIB.

In addition to announced, planned bid rounds, Drillinginfo scouts have used their networks to compile information about potential bid rounds (Figure 6), including the information about the potential Nigerian offshore round previously mentioned.

Figure 6: Worldwide look at potential future bid rounds showing number of bid rounds possibly available for licensing. More information about bid round names and date of bid submission available at Drillinginfo.

Moving to another African country just south, phase 2 of the Congo Licensing Round is expected to launch in Q1 2018. Offering both onshore and offshore blocks. Northwest Africa has seen a huge amount of offshore acreage awarded in the last three months, but via negotiations with planned bid rounds being bypassed entirely. Within Mexico, Pemex is actively looking for partners on their blocks onshore and working with the government to improve the fiscal terms, hoping to lead to enhanced production of these older onshore fields, like Cacalilao, Samaria, and Sunuapa.

These indicate that there is opportunity worldwide for companies with the funding and desire to explore

in the offshore and onshore international regime. Figure 7 pulls all the future opportunities together on one map, showing the wide variety of options worldwide.

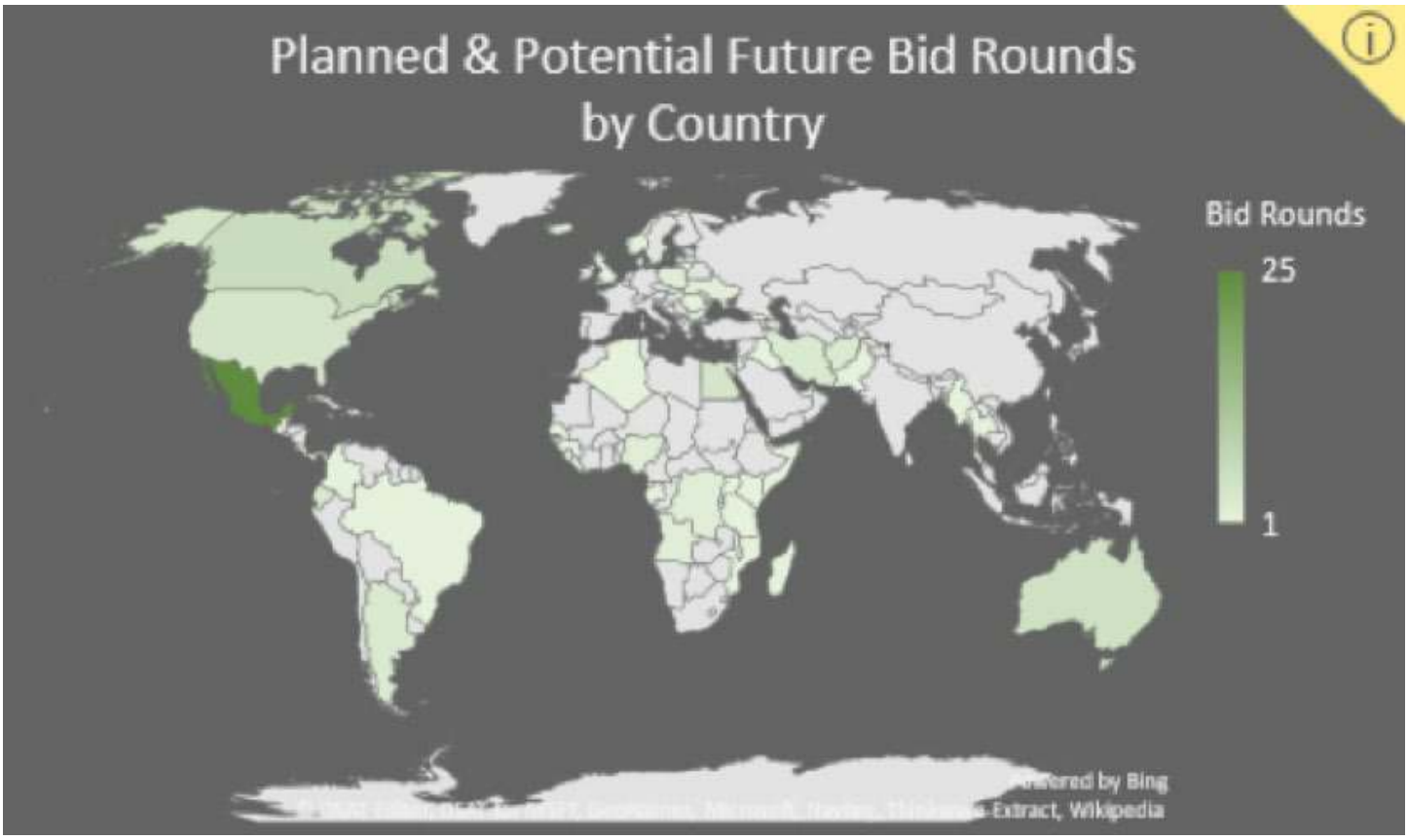
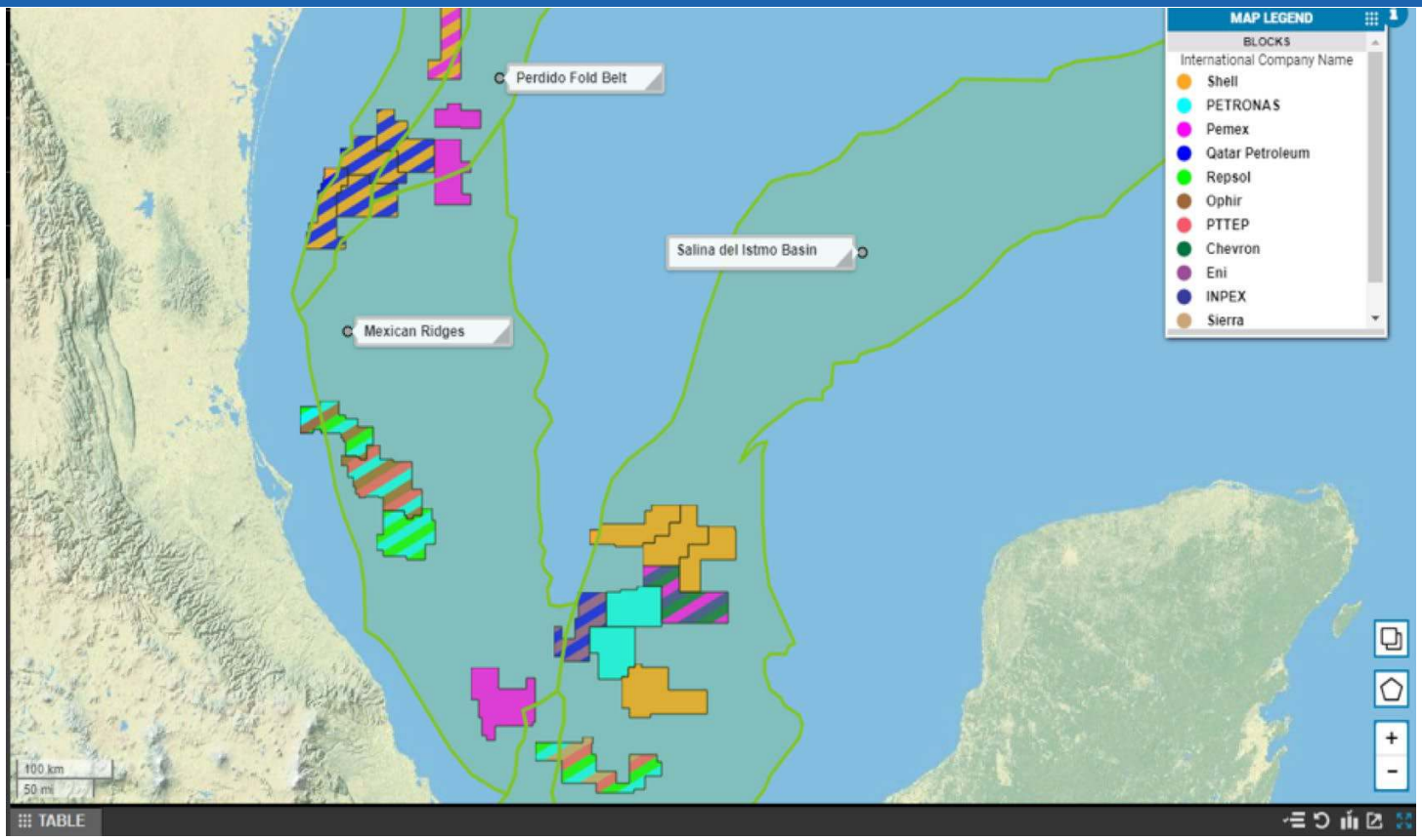


Figure 7: Worldwide look at all future bid rounds, both planned and potential. Information about bid round names, date of bid submission, and more available at Drillinginfo.

With the rising oil prices, will more opportunities become available? Will more companies join the global exploration game? 2018 will be an interesting year to track activity! Plan to be ahead of that activity by using the Drillinginfo International tool.

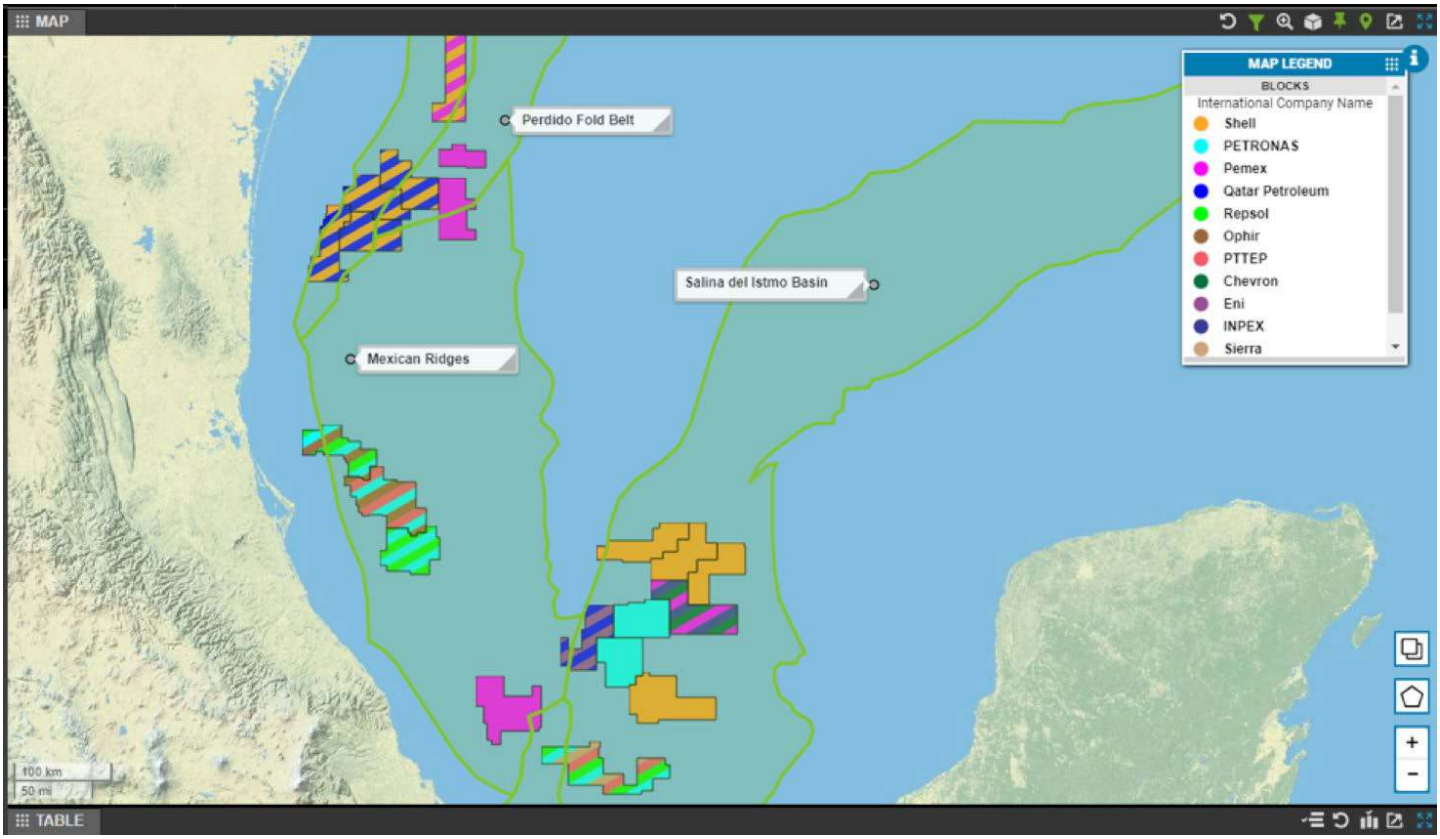
2

Mexico Deepwater Bid Round 2.4 Draws in Big Names



Mexico's Comisión Nacional de Hidrocarburos (CNH) on 31 January 2018 auctioned off 19 areas out of the 29 offered in the country's much anticipated deepwater Round 2.4. The blocks were spread out across the Mexican Ridges, Salina Basin and Perdido Fold Belt plays in the Gulf of Mexico. In the first tranche of nine deepwater blocks to go under the gavel, covering a total area of 18,757.9 sq km in the Perdido Area, Shell, in separate partnerships with Pemex and Qatar Petroleum, came out the big winner. As for the

process in general, two elements made up the bid – an additional investment factor and additional royalty as a contractual value of the hydrocarbons. The additional investment factor to be added to the minimum work programme defined by the CNH is 0 if the equivalent of no additional wells is offered, 1 for one well and 2 for two wells. The minimum and maximum additional royalties for both the Perdido Fold Belt and Salina Basin blocks are 5 and 20% respectively and 3.10% and 20% respectively for the Cordillera Mexicana (Mexican Ridges) blocks.



Mexico Round 2.4 deepwater awardssubmission, and more available at Drillinginfo.

Perdido Area

While no bids were made for Area 1, activity picked up at Area 2. Supermajor Shell and state-run Pemex won Area 2 with a 15.02% additional royalty payment and an investor factor of 1. That bid beat out China National Offshore Oil Corp's (CNOOC) offer of 11.45%. The 2,146 sq km Area 2 is located in the Salina del

Bravo. In Area 3, Shell teamed up with Qatar Petroleum, bidding an additional royalty payment of 10.03%. That eclipsed the additional royalty payment bid local favourite Pemex and its partner, CNOOC. Shell and Qatar Petroleum came out swinging for Area 4, beating Pemex with their 10.03% bid. Pemex offered an additional royalty payment of 5.95%. Pemex, however, walked away with the 2,733 sq km Area 5 tract in the Perdido Fold Belt. The state-run oil interest bid an additional royalty of 6.23%, with an investment factor of 1. Shell and Qatar offered an additional royalty bid of 20% and an investment factor of 1.5 for Area 6, as well as a cash (tiebreaker) bonus of US$10.03 million. Shell and Qatar later beat out a CNOOC and PC Carigali (PETRONAS) partnership for Area 7. Shell and Qatar Petroleum offered an additional royalty bid of 20% and an investment factor of 1.5. Shell and Qatar also offered a cash (tiebreaker) bonus of US$ 90.03 million. No bids were made on the wet gas-prone, 2,062 sq km Area 8 tract. Nor were any bids made on Area 9, a 2,009 sq km tract in the Perdido Fold Belt.

Mexican Ridges

A Repsol, PC Carigali and Ophir consortium beat out a joint bid from Shell and Qatar Petroleum for the 1,999 sq km Area 10 tract in the Mexican Ridges. The Repsol-led group offered an additional royalty payment of 20%, and an investment factor of 1.5, as well as US$ 30.24 million (tiebreaker) cash bonus. Coming in second place, Shell and its partner bid an additional royalty payment of 11.03% and investment factor 1. No bids were made for the 2,002 sq km Area 11 tract. In Area 12, covering 3,099 sq km, PC Carigali (PETRONAS), Ophir and PTTEP bid an additional royalty payment of 20% with an investment factor of 1. That beat out the Shell and Qatar partnership, which offered 9.03% and 1, respectively. No bids were made for Area 13, a block covering 1,967 sq km. Repsol and PC Carigali (PETRONAS) bonded to bid on Area 14, offering a 19.98% additional royalty payment for the 2,242 sq km block. That beat out Shell and Qatar, which bid an additional 5.03% royalty payment. No bids were made for the 2,042 sq km Area 15 tract. Area 16, covering 2,047 sq km and Area 17, likewise failed to draw interest. Pemex, however, scooped up the 2,917 sq km Area 18 tract with its additional royalty bid of 7.11% (with an investment factor of 1). As for the 3,003 sq km Area 19 block, no bids were made.

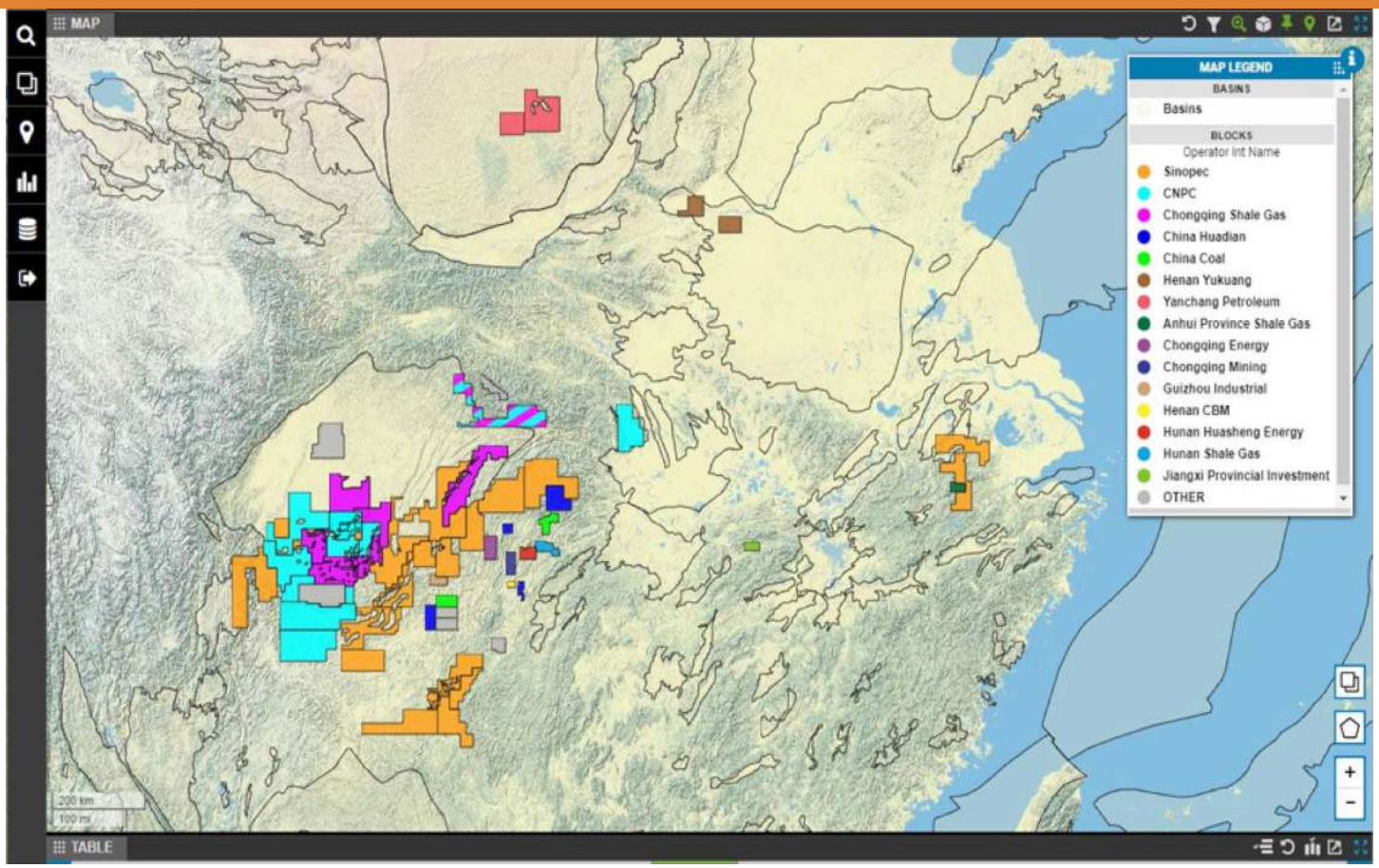
Salina del Istmo

As for Area 20, Shell won the tract with an additional royalty bid of 20% (investment factor of 1.5). That beat out Pemex's additional royalty offer of 6.11%. In Area 21, competition heated up, with Shell going solo to win this block. The Royal/Dutch supermajor bid an additional royalty of 20% with an investment factor of 1.5. Shell's tiebreaker US$ 110.15 million cash bonus won it the block, beating out an offer from a Chevron, Pemex and ONGC Videsh group, which bid the same royalty rate and investment factor. The

consortium's tiebreaker cash bonus was US$ 42.1 million. Turning to Area 22, Chevron, Pemex and INPEX won this tract with their additional royalty bid of 18.44%. This consortium also bid an investment factor of 1. That bested BHP Billiton's offer of 6.55%. Shell picked up Area 23 after it bid an additional royalty of 10.08% with an investment factor of 1. That beat the proposed Chevron, Pemex and INPEX additional royalty bid of 13.44%. Eni of Italy and Qatar Petroleum secured Area 24 with their additional royalty bid of 9.53% and an investment factor of 1. PC Carigali (PETRONAS) won Area 25 after it bid additional royalty rate of 19.98%. PC Carigali (PETRONAS) bested a lower offer from the BP and Statoil partnership for Area 26. PC Carigali (PETRONAS) made an additional royalty bid of 20% with an investment factor of 1 for the 2,030 sq km tract. BP and Statoil bid 13.37%. No bids were made on Area 27. Shell returned to win Area 28 with its additional royalty bid of 20% and investor factor of 1.5, and a tiebreaker bonus of US$ 43.15 million. PC Carigali (PETRONAS) was the second highest bidder with an additional royalty rate of 19.98%. Area 29 saw some of the most heated competition. A consortium including Repsol, PC Carigali (PETRONAS), Sierra and PTTEP won this 3,254 sq km tract. The partners bid an additional royalty rate of 20%; with an investment factor of 1.5 and a tiebreaker bonus totaling US$ 151.25 million. The Eni, Qatar and Citla Energy group were the second highest bidders with bid an additional royalty rate of 20%; with an investment factor of 1.5 and a cash bonus of US$ 86.72 million. The CNH on 25 January 2018 approved the bidders' conformation for Round 2.4. The final list included nine individual company bidders and 17 bidding groups or consortia. In total, 27 bidders from 16 countries were slated to participate. The list was announced during the 4th Extraordinary Session of 2018. As reported that as of 22 December 2017, 29 companies, including some of Mexico's current operators like Eni of Italy, had prequalified to participate in Round 2.4.

3

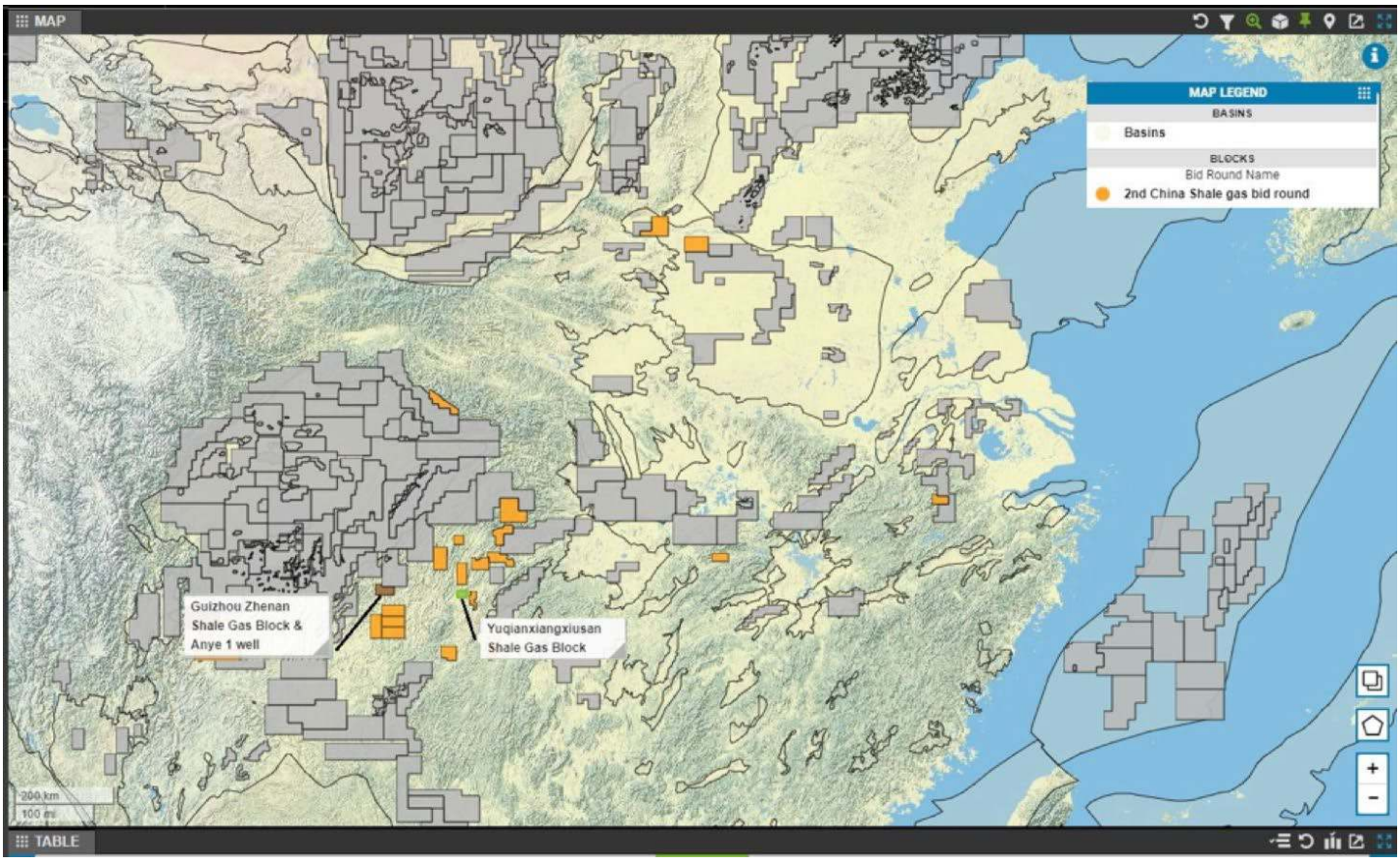
China Reforms Domestic Upstream Business



As part of the objective to enhance oil and gas exploration and exploitation investment, the Chinese Government has been seeking to reform the sector since 2011 with 2017 a breakthrough year. The upstream industry has traditionally been under the hold of the four Chinese National Oil Companies (NOCs), namely CNPC, Sinopec, CNOOC and Yanchang Petroleum with CNPC as the largest holder of

acreage in the country. Both local and foreign oil companies that want access to resources must proceed by entering into a Production Sharing Contract Agreement with the NOCs through private negotiation or in the case of CNOOC through a public tender.

Reform started in 2011 with a shale gas tender round of four blocks, the first time the Chinese Government had allowed licences to be held by companies other than the NOCs. In the tender round, the government allowed two province-owned companies to participate and one of the non-NOCs, Henan Coal Bed Methane Development Co Ltd, was awarded the Yuqianxiangxiusan Shale Gas Block. A second tender round followed quickly in 2012 offering 20 shale gas blocks of which 19 were awarded, surprisingly none of which went to the NOC's. Two possible reasons for this were firstly that the blocks offered were not within the confines of known sedimentary basins thus posing higher risk and secondly the optimism for shale gas had driven non-traditional oil and gas companies to bid more aggressively for the tendered blocks.



Second shale gas round awards and Yuqianxiangxiusan & Guizhou Zhenan

Following the success in 2012 there were plans to quickly make more blocks available for a third shale gas tender round in 2013 but this did not materialize. In 2014, at the end of the initial exploration period of 3 years for the shale gas blocks awarded in 2011, the Chinese government announced that Sinopec and Henan Coal Bed Methane had been penalized and fined for not fulfilling their commitments. At the time there was no known strict enforcement for fulfilling commitments or making relinquishments by the government. This was another step by the government to reform and enforce more stringent monitoring and action and resulted in more than 100 exploration blocks being surrendered by the NOCs between 2014-2017.

With the experience from the shale gas tender rounds, the government launched the first open oil and gas tender round in 2015 in Xinjiang Province. The tender allowed Chinese companies, other than the NOCs, that fulfilled the conditions of being a China registered company (excluding Hong Kong, Macau and Taiwan), with equity of at least RMB 1 billion (~US$ 156.2 million), in a healthy financial position and with the ability to undertake civil liabilities to participate in the tender. A point to note is that companies were to bid as individual entities, thereby eliminating bidding by joint ventures. The blocks offered were in smaller unexplored sedimentary basins and were blocks relinquished by the NOCs. The round was not hugely successful due to the downturn of the industry in 2015 attracting 13 companies to submit bids for the six blocks. Eventually only four blocks were awarded with one dropped before the tender and a second as a result of attracting less than three qualifying bids.

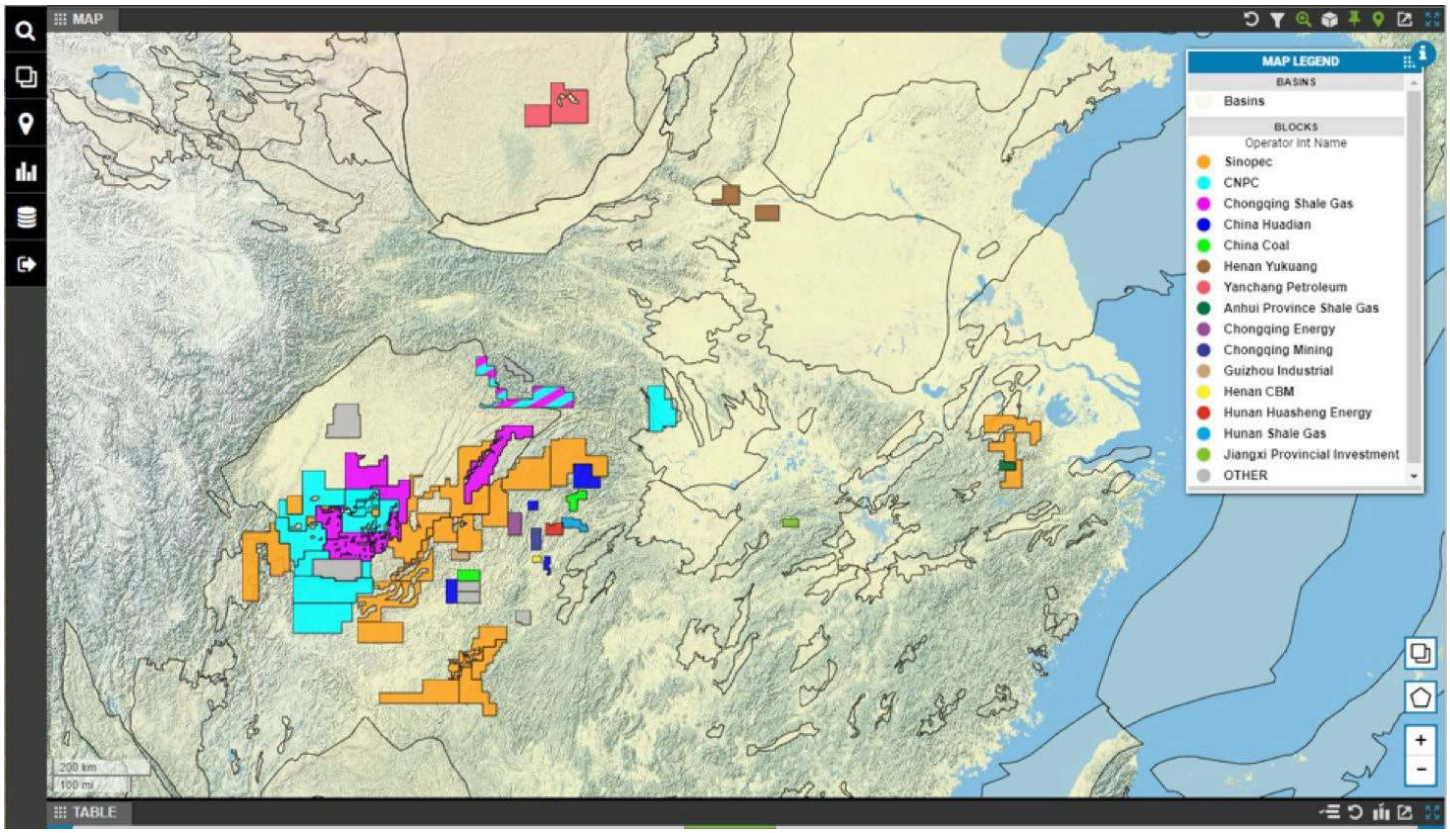
The Chinese Government pushed ahead with the upstream reform in 2017 by offering tender blocks in oil and gas, coal bed methane and shale gas in the same year, further cementing its drive to enhance oil and gas exploration and exploitation investment.

The coal bed methane tender round comprised ten blocks and generated a committed investment of RMB 107.3 million (~US$ 16.8 million) for the initial three-year exploration period. This is the first time that coal bed methane tender blocks have been offered.

The Guizhou Zhenan Shale Gas tender was carried out through competitive cash bidding and won by a Guizhou Province government-owned company with a winning bid of RMB 1.29 billion (~US$ 201.4 million). It is the first competitive cash tender carried out by the Government with the 730 sq km block surrounding the Anye 1 shale gas discovery which was drilled by the China Geological Survey, as a stratigraphic reference well, in 2015/2016 and flowed approximately 3.5 MMcfg/d following fracture stimulation.

The oil and gas tender round once again focused on Xinjiang Province where five blocks were offered.

For this round, the initial exploration period for the blocks was revised to five years compared to three years for prior rounds.

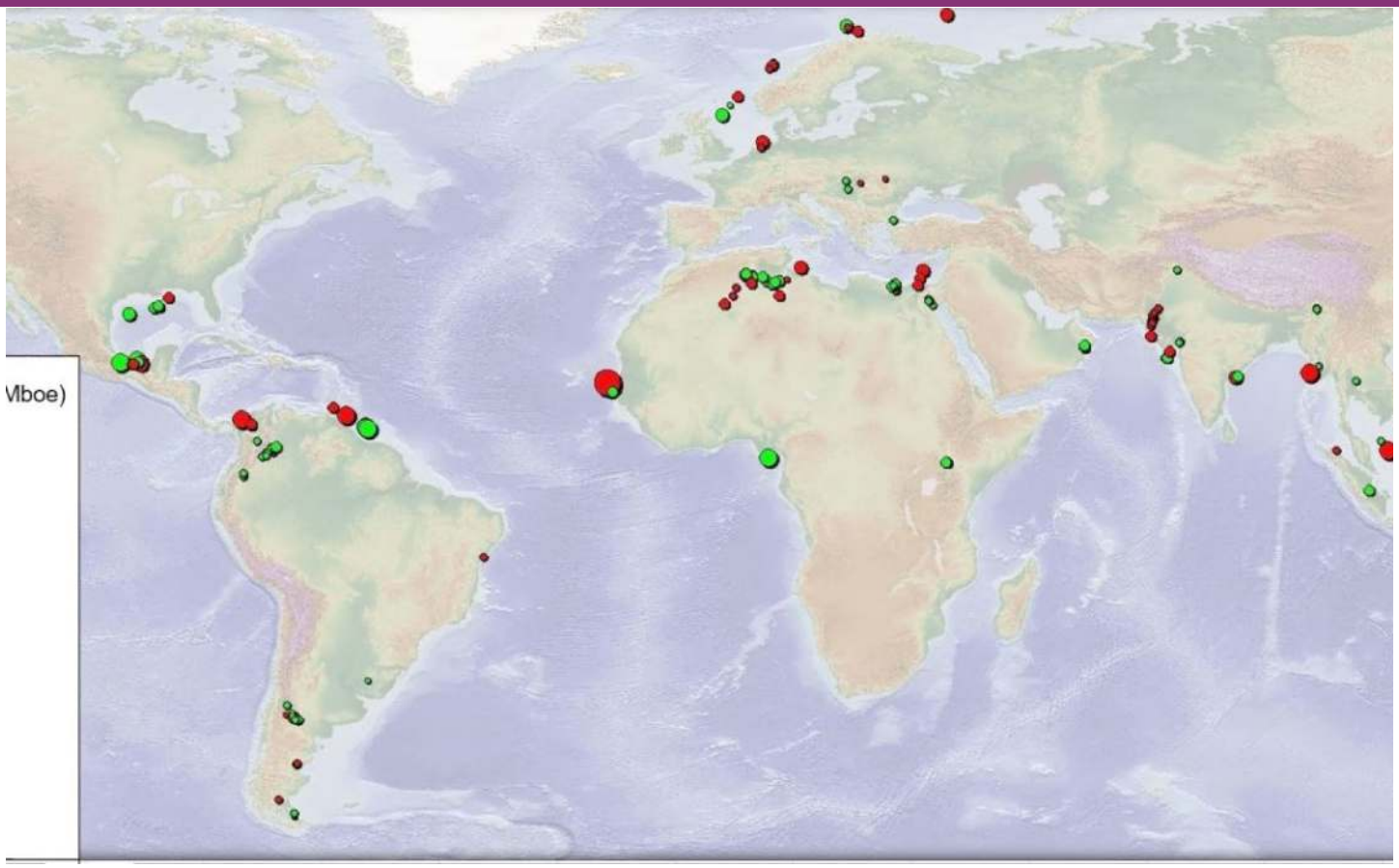


Second shale gas round awards and Yuqianxiangxiusan & Guizhou Zhenan

With the reform breakthrough in 2017, we can see that the Chinese Government is committed to change in opening up the industry. However, there is still a long way to go before the Chinese upstream oil and gas industry is fully opened to the market, especially for direct foreign investment.

4

Top 10 Oil and Gas Exploration Discoveries of 2017



With oil and gas exploration activity at a record low, the number of successful new-field wildcats that completed drilling during 2017 was just over 200, similar to 2016 but down from over 400 in 2014. Offshore West Africa reflected the downturn with only four new discoveries made compared to 16 in 2014. Three of these came in Senegal and the Yakaar 1 deepwater gas discovery heads up the 2017 top ten after operator Kosmos reported 45m of net pay in Lower Cenomanian sandstones giving estimates of approximately 15

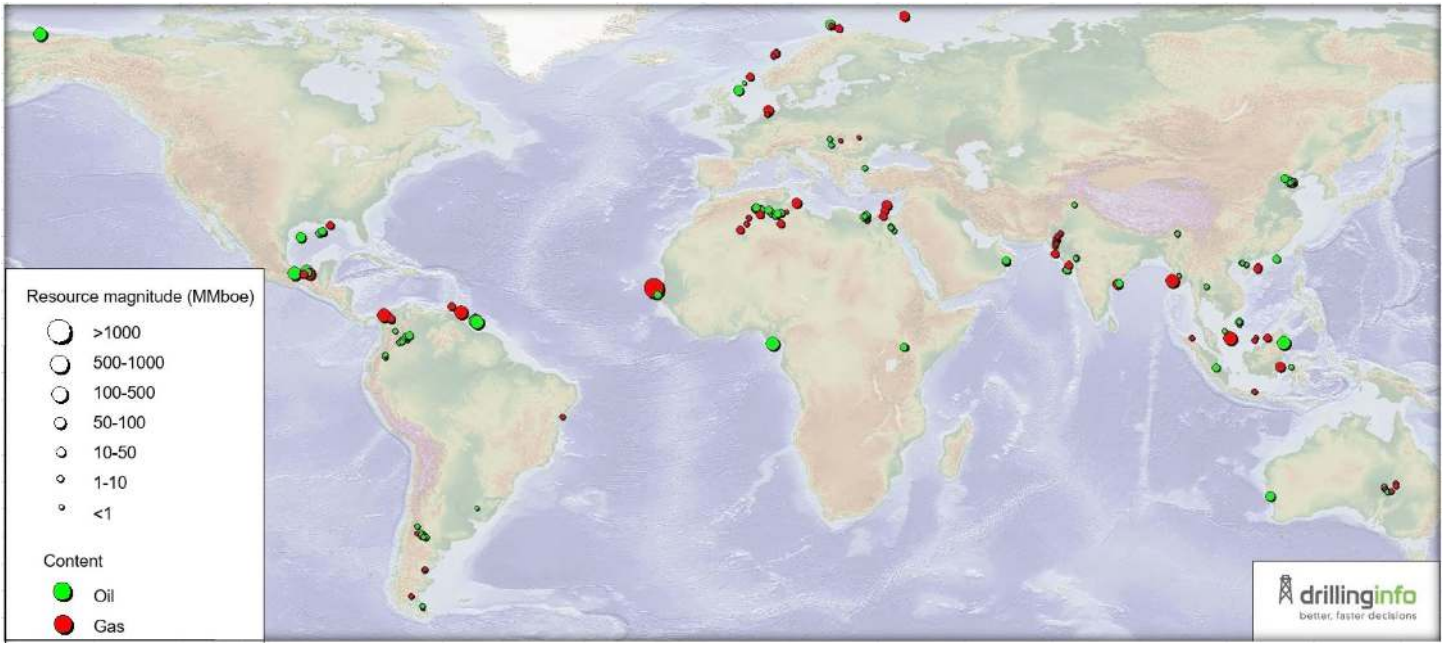
Tcfg Pmean resources.

Country	Basin	Well name	Operator	Environment	End date	Content	Resource magnitude
Senegal	MSGBC Basin	Yakaar 1	Kosmos BP	Deepwater	May-17	Gas	>1000 MMboe
Guyana	Guyana-Suriname Basin	Payara 1	ExxonMobil	Deepwater	Feb-17	Oil	100-500 MMboe
United States	Colville Basin	Horseshoe 1A	Armstrong	Land	Feb-17	Oil	100-500 MMboe
Guyana	Guyana-Suriname Basin	Turbot 1	ExxonMobil	Deepwater	Oct-17	Oil	100-500 MMboe
Mexico	Salina del Istmo Basin	Zama 1	Talos	Shelf	Jul-17	Oil	100-500 MMboe
Indonesia	Tarakan Basin	Parang 1	Pertamina	Shelf	May-17	Oil & gas	100-500 MMboe
Mexico	Veracruz Basin	Ixachi 1	PEMEX	Land	Oct-17	Oil, gas & cond	100-500 MMboe
Myanmar	Rakhine Offshore Basin	Pyi Thit 1	MPRL	Deepwater	Jul-17	Gas	100-500 MMboe
Guyana	Guyana-Suriname Basin	Snoek 1	ExxonMobil	Deepwater	Mar-17	Oil	100-500 MMboe
Trinidad & Tobago	Trinidad Basin	Savannah 1	bpTT	Shelf	Feb-17	Gas	100-500 MMboe

Top 10 discovery wells drilled during 2017 (excludes Former Soviet Union and non-frontier areas of United States and Canada)

Latin America dominated 2017 in terms of discovery size, holding six of the top ten wells. ExxonMobil's Stabroek Block offshore Guyana saw over a billion barrels of recoverable reserves added through the Payara, Snoek and Turbot oil discoveries made in deepwater clastics. Two significant discoveries were made in Mexico, both holding between one and two billion barrels of oil equivalent in place. Operator Talos Energy encountered 170m-200m of net oil pay in Upper Miocene sandstones of the Zama 1 well offshore in the Salina del Istmo Basin while onshore in the Veracruz Basin Pemex reported the Ixachi 1 gas and condensate well as the largest onshore discovery in 15 years. A significant Atlantic Margin offshore gas discovery was made by BP Trinidad in the Savannah 1 well while Anadarko's Gorgon 1 discovery offshore Colombia may also prove sizeable with the operator reporting 80-110m of net gas pay.

In the Colville Basin on Alaska's North Slope, Armstrong Energy made a major onshore light oil discovery with the Horseshoe 1 & 1A wells encountering 45m and 30m of net pay in the Cretaceous Nanushuk Formation. The Armstrong/Repsol partnership estimate contingent resources of approximately 1.2 billion barrels in the Nanushuk play.



2017 discoveries by resource size

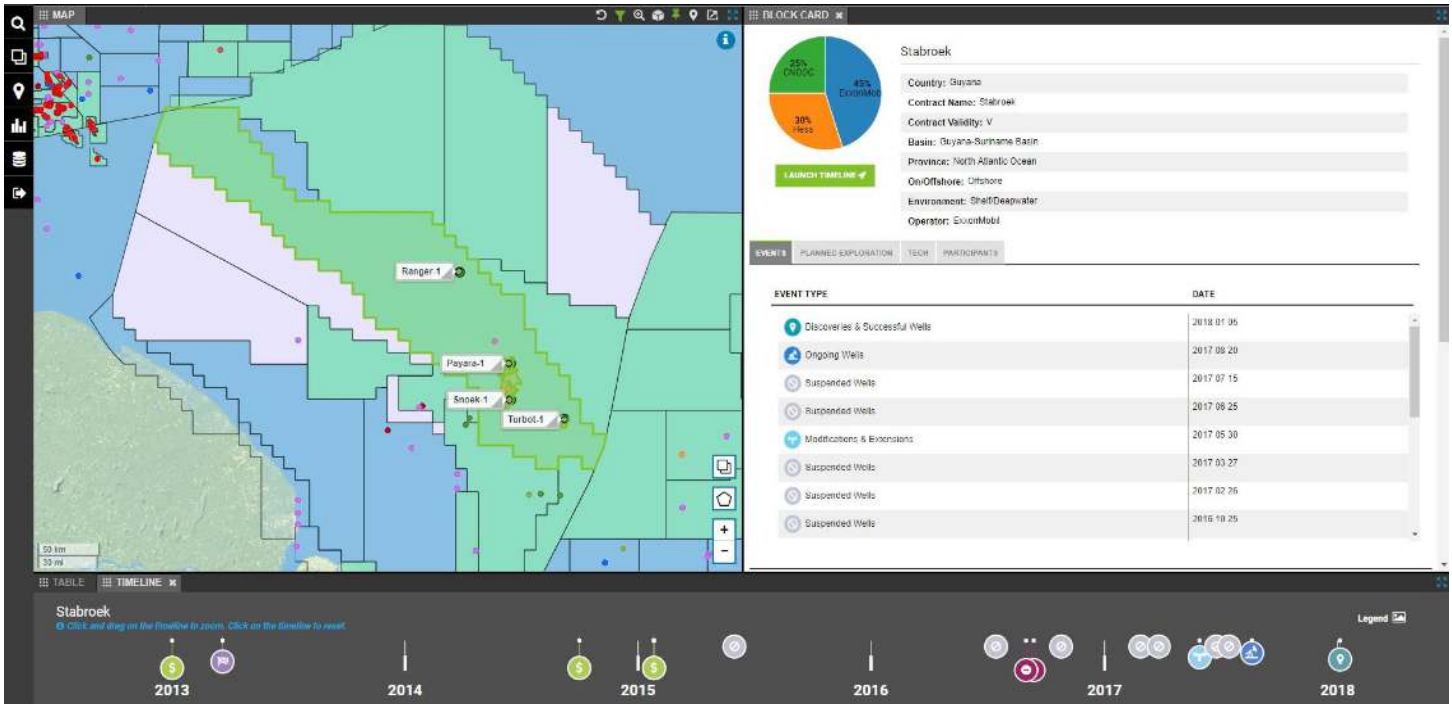
In South East Asia there were 18 discoveries recorded during 2017 with the largest, in excess of 100 MMboe, in Indonesia and Myanmar. Pertamina discovered oil and gas in the Parang 1 well in the Tarakan Basin, offshore Kalimantan, with post-drill estimates of 121 MMbo plus 851.1 Bcfg Pmean recoverable resources after targeting Miocene and Pliocene sandstones. In Myanmar's Rakhine Offshore Basin the MPRL/Woodside partnership drilled the Pyi Thit 1 deepwater new-field wildcat and encountered 36m net gas pay in the objective reservoir which tested at a rate of more than 50 MMcfg/d.

The largest Middle East discovery reported during 2017 came from Lukoil's Eridu 1 new-field wildcat drilled onshore in the Mesopotamian Basin of southern Iraq. Drilling was completed in December 2016 and during February the partnership with INPEX Corp confirmed it had discovered sweet oil in the Cretaceous Mishrif Formation and recorded a flow rate of more than 6,300 bo/d. It was followed up with two successful appraisal wells with the company anticipating recoverable reserves in excess of one billion barrels.

Northwest Europe saw an upturn in exploration drilling during the summer of 2017 but it still remained low overall for the year and only 13 discoveries were reported, all generally under 100 MMboe. Offshore Norway Statoil and Lundin recorded discoveries in the Barents Sea and Statoil was also successful on the Verbier prospect in the United Kingdom's Moray Firth Basin. Offshore Netherlands Oranje-Nassau

and partners Hansa Hydrocarbons reported that the Ruby new-field wildcat was a significant discovery after testing a Permian Rotliegendes sandstone reservoir at a rate of 53MMcfg/d.

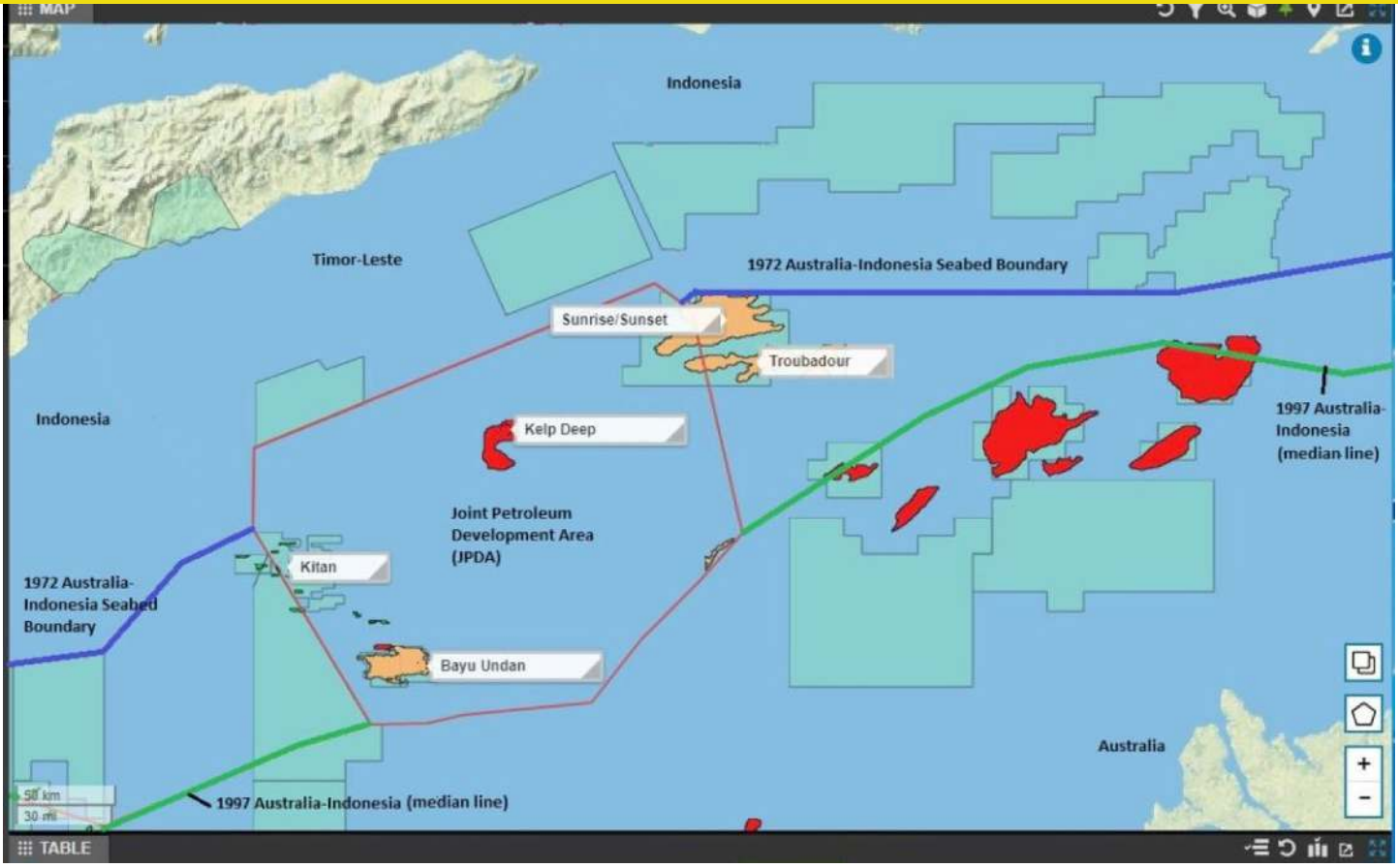
January 2018 commenced with ExxonMobil announcing another potentially significant discovery on Stabroek. Ranger 1, which is the sixth discovery on the block, encountered 70m of high quality oil-bearing carbonates 100km north of the original Liza 1 well and opening a new play.



ExxonMobil's Stabroek Block, offshore Guyana

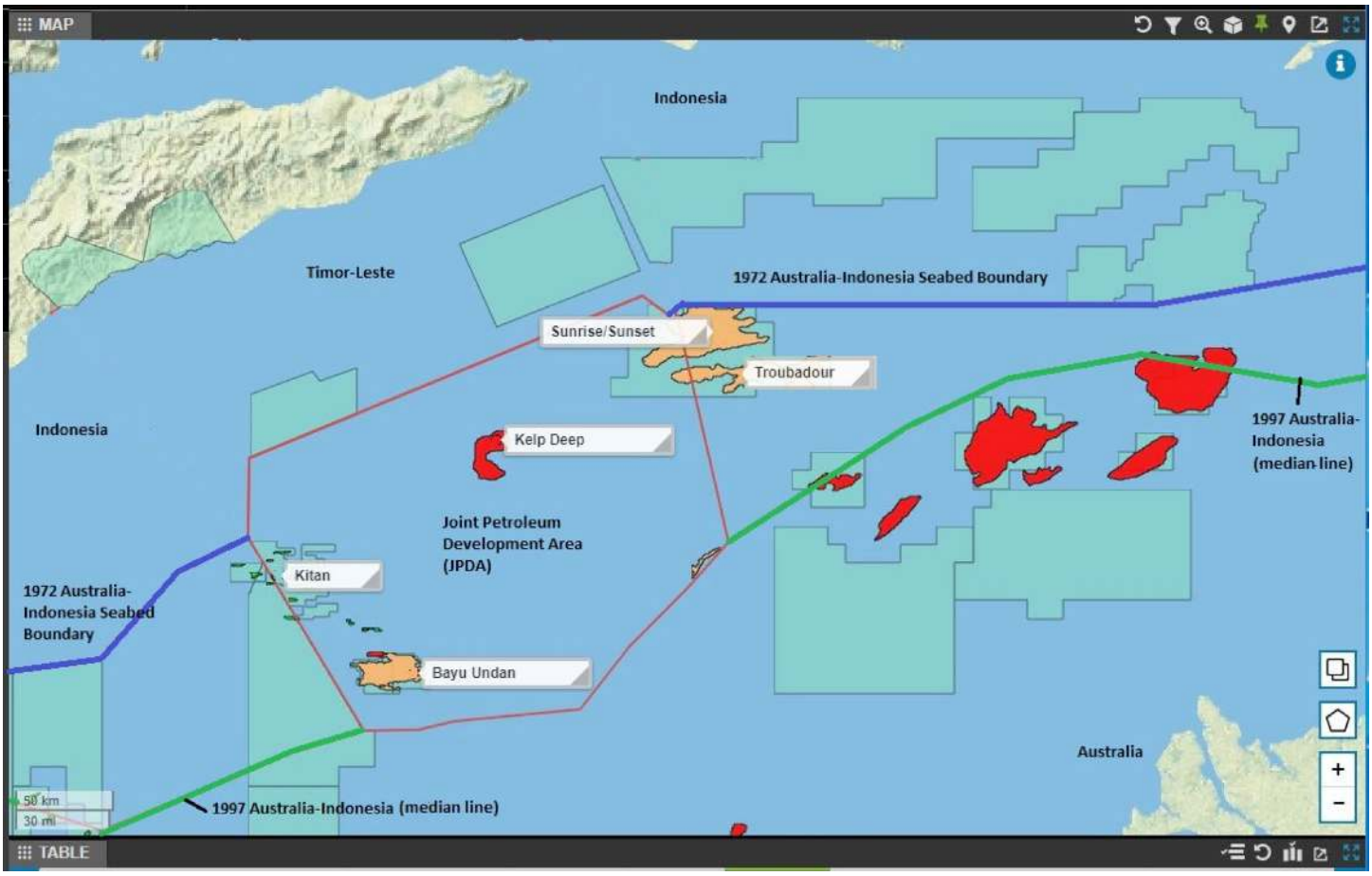
5

New Treaty to Define Timor Leste & Australian Maritime Boundary



In a press release dated 26 December 2017, Permanent Court of Arbitration on behalf of the Conciliation Commission conducting arbitration into the defining of a maritime boundary between Timor Leste and Australia, said that the two countries and the Greater Sunrise Joint Venture (GSJV) had agreed the signature of a maritime boundary treaty in early March 2018.

On 30 August 2017, the governments of Timor Leste and Australia reached agreement on a Comprehensive Package Agreement regarding maritime boundaries in the Timor Sea. This agreement was formalised into a draft treaty and initialled by each government in October 2017 in The Hague.



Timor Leste Maritime boundary

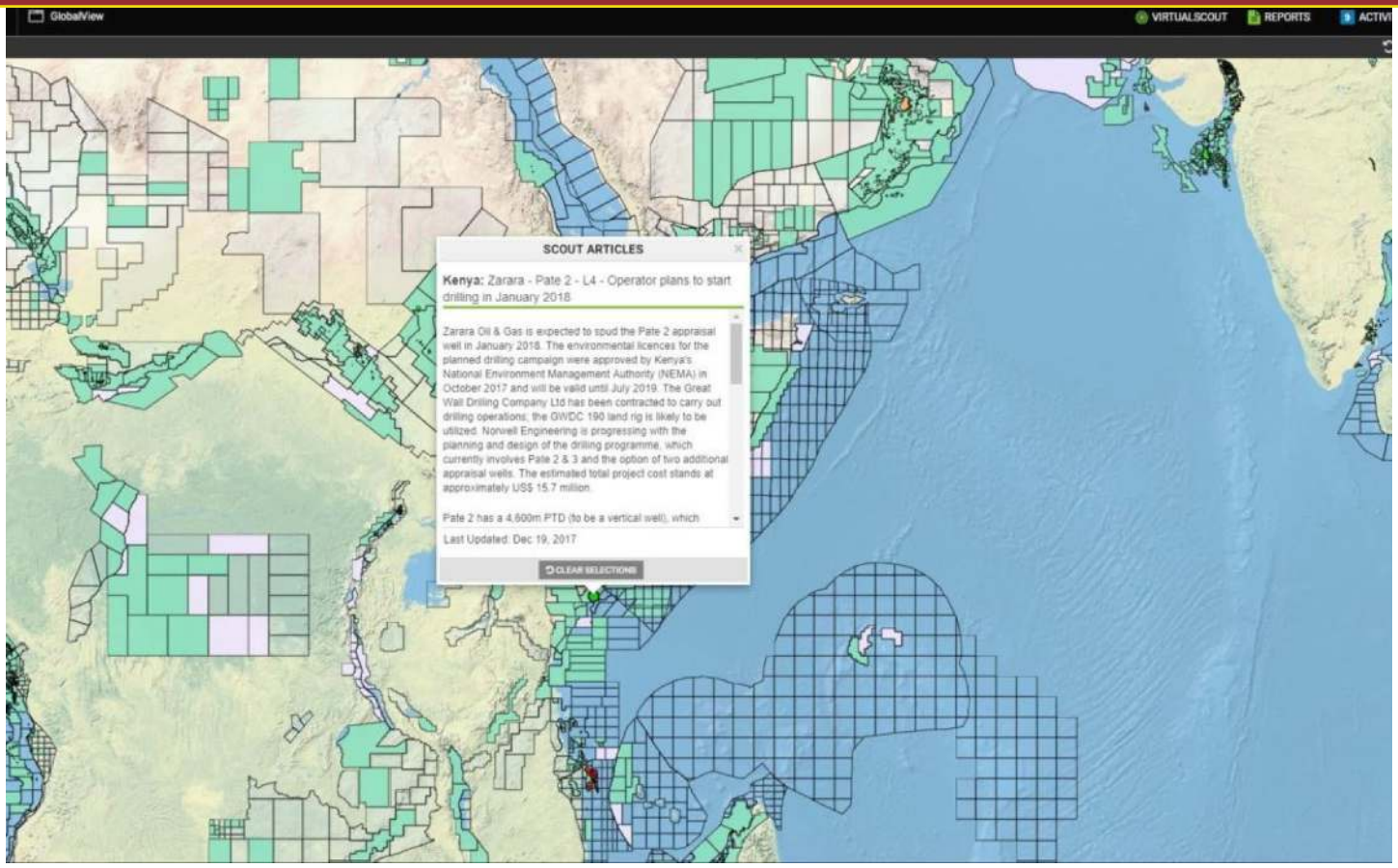
In broad terms, the draft treaty delimits the maritime boundary between Timor Leste and Australia in the Timor Sea and establishes a Special Regime for the area comprising the Greater Sunrise Complex (GSC). The draft treaty also establishes revenue sharing arrangements where the shares of upstream revenue allocated to each country will differ depending on downstream benefits associated with the different development concepts for the GSC.

The GSJV operates the GSC which currently straddles the Australia and Joint Petroleum Development Area (JPDA) boundary in the ratio 79.9:20.1 in favour of Australia. The GSC includes the Sunrise, Sunset

and Troubadour Fields. Sunrise was discovered in 1974 which means the discovery and associated fields have been stranded for some 40 years. In 2010, the GSC total contingent resource was independently certified to be 5.13 trillion cubic feet of dry gas and 225.9 million barrels of condensate. The GSC joint venture comprises: Woodside (operator 33.44%), ConocoPhillips (30%), Shell (26.56%), and Osaka Gas (10%).

6

Zarara's Planned Exploration Wells



Kenya – Pate 2 – L4 – Operator Zarara plans to start drilling in January 2018

Zarara Oil & Gas is expected to spud the Pate 2 appraisal well in January 2018. The environmental licences for the planned drilling campaign were approved by Kenya's National Environment Management Authority (NEMA) in October 2017 and will be valid until July 2019. The Great Wall Drilling Company Ltd

has been contracted to carry out drilling operations; the GWDC 190 land rig is likely to be utilized. Norwell Engineering is progressing with the planning and design of the drilling programme, which currently involves Pate 2 & 3 and the option of two additional appraisal wells.

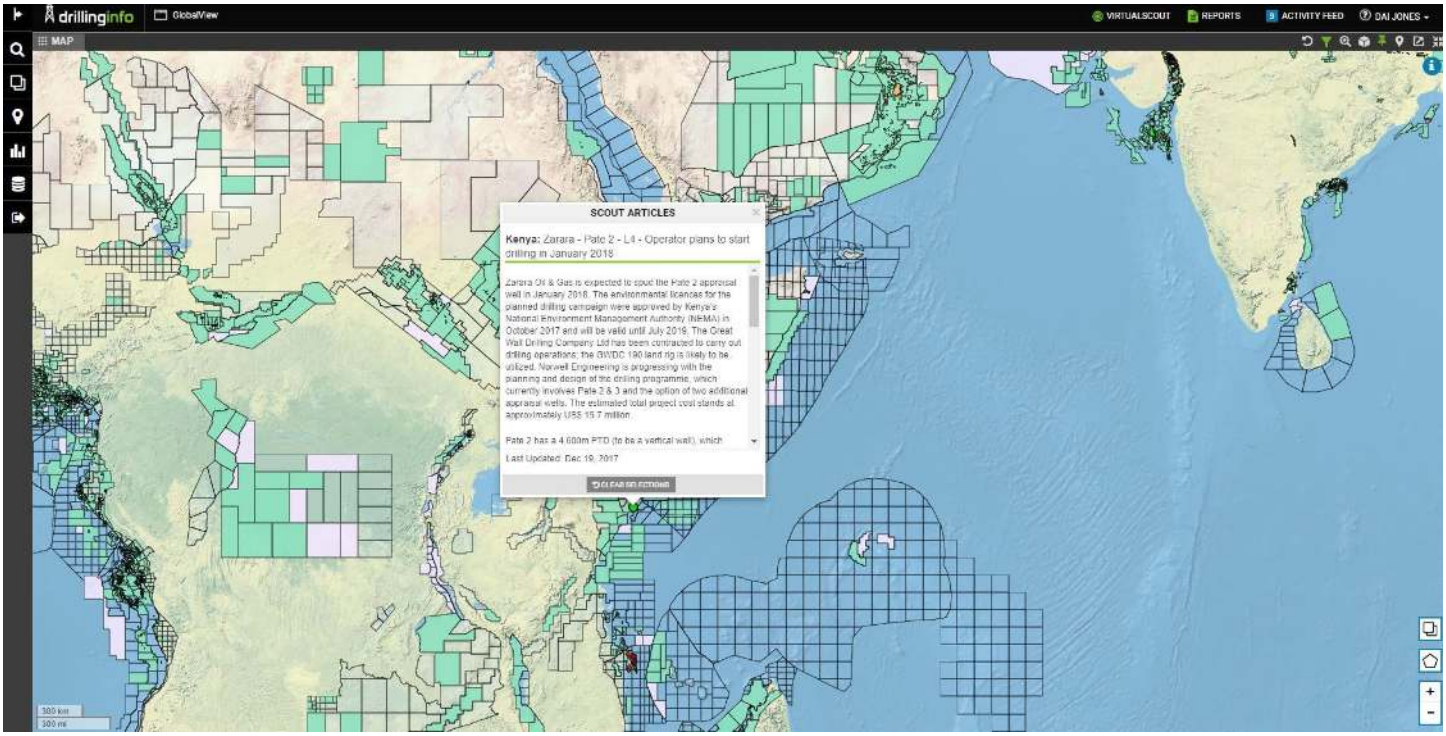


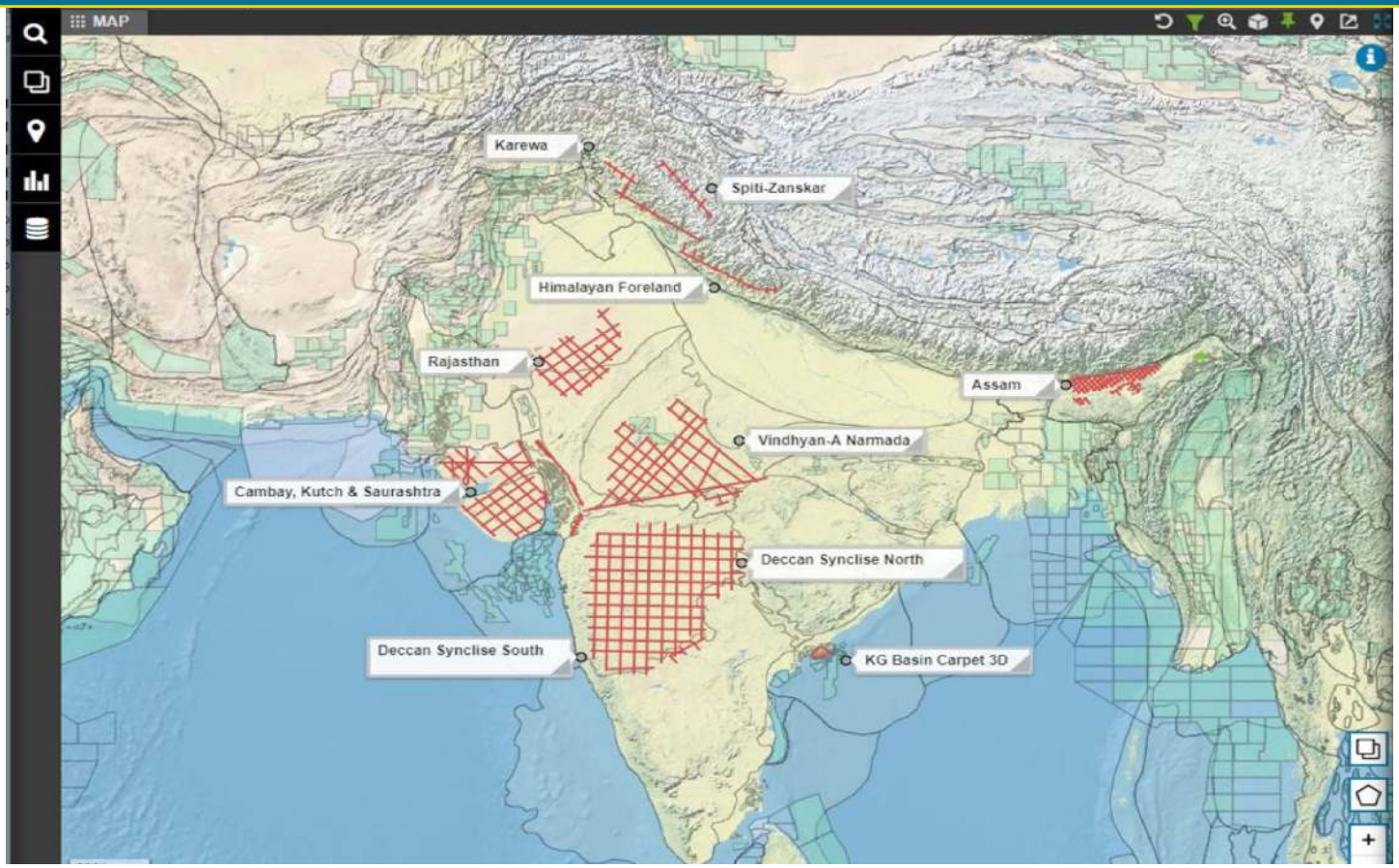
Figure 1: Pate appraisal well location

The estimated total project cost stands at approximately US$ 15.7 million. Pate 2 has a 4,600m PTD (to be a vertical well), which Zarara has estimated will take ~120 days to drill, test and complete. The primary target is the Kipini Sand Group; a fluvial and deltaic facies, which has been described as poorly sorted and unconsolidated, but has also been reported to have good net log porosity. A deeper Upper Cretaceous Kofia sand, which was penetrated by the offset Kofia 1 well, may also be a secondary target. The well is appraising the Pate gas discovery, in the Lamu Basin, which was drilled by the Pate 1 well in 1970. Pate 1 reached a 4,175m MD and encountered an over-pressured 10m gas-charged, Lower Eocene-aged sand (Basal Kipini reservoir) at TD. It was targeting a dip closure on the SW extension of the Mararani-Dodori anticlinal trend, with Lower Tertiary and Upper Mesozoic objectives, which had previously been encountered in the Dodori 1 well (1964, small shows and traces of bitumen in the Palaeocene). However,

due to technical problems during drilling, Pate 1 was neither logged nor tested and failed to fully penetrate the reservoir section. Zarara is a wholly owned subsidiary of Midway Resources International and holds a 75% WI and operatorship for the L4 and L13 licences; the remaining equity is held by SOHI Gas Lamu Ltd (a wholly owned subsidiary of Swiss Oil Holdings International Inc) (15%) and NOCK (10%). The interest held by these companies is free-carried until final approval of planned commercial production. However, Zarara has negotiated a Heads of Agreement for the eventual acquisition of the 15% interest from SOHI Gas Lamu Ltd.

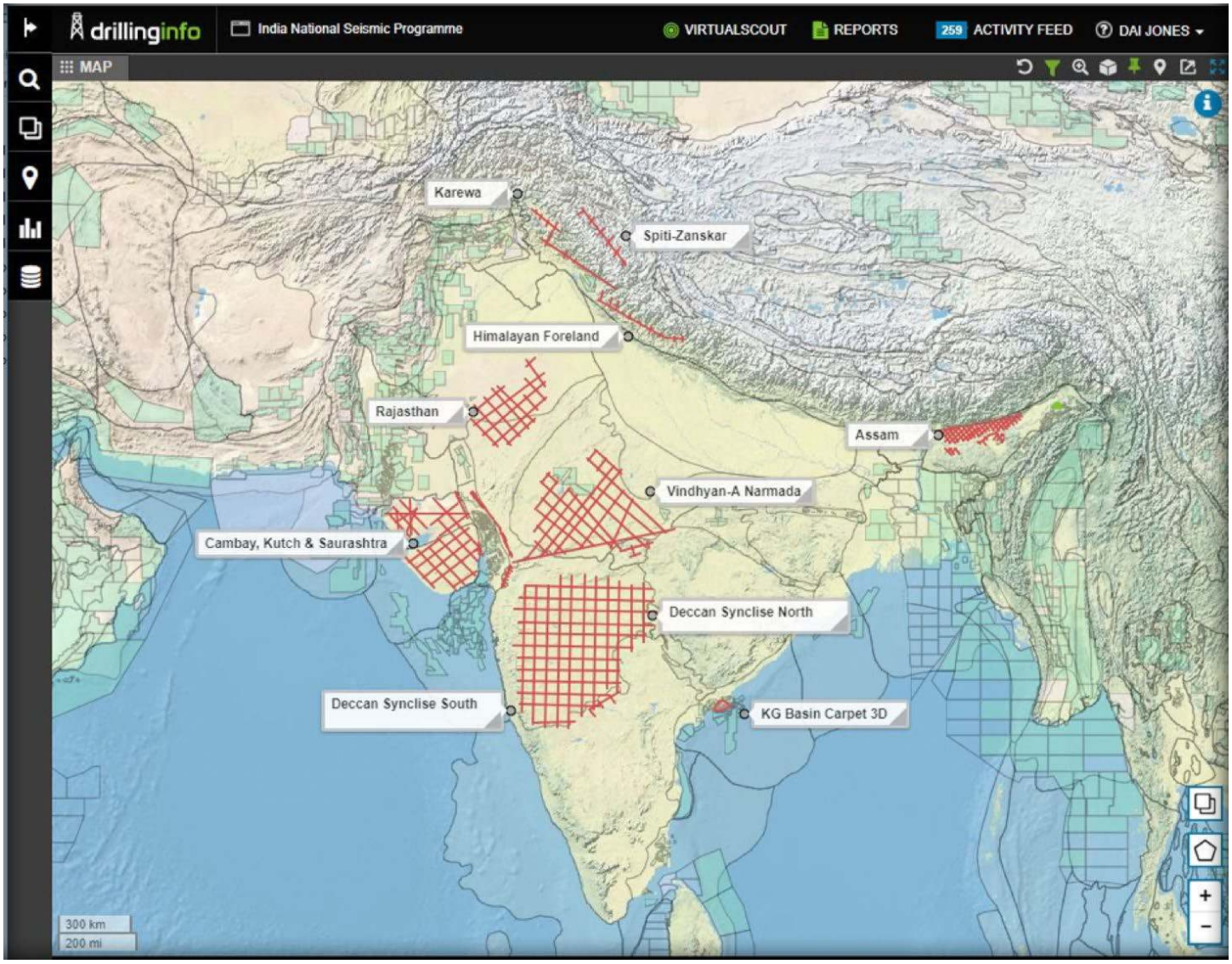
7

India, Current Geophysical & Geological Surveys



Alphageo steaming ahead on National Seismic Programme 2D surveys with 16 crews

Independent contractor Alphageo India Ltd is deploying no fewer than 16 seismic crews on separate surveys within the government funded National Seismic Programme (NSP). Operational work is 25% complete.



NSP surveys currently being undertaken by contractor Alphageo

The NSP programme was formally inaugurated by Minister of Petroleum Dharmendra Pradhan in October 2016; overall, it is designed to investigate and better understand the prospectivity of a number of so-far unexploited onshore sedimentary basins in India. The overall budgetary cost is around US$ 700 million (INR 5000 crore) for some 50,000 line km; and responsibility for supervision of the separate surveys (as well as subsequent management of processing and interpretation) has been devolved from DGH to the state oil companies OIL (for surveys in NE India) and ONGC (for the remainder).

In a snapshot from Q3 2016, Alphageo announced that it had secured the contracts for 30,000 km out of the thus-far 42,000 km awarded to that date.

In its AR 2016-2017, Alphageo proclaims that this (the NSP contract) is the largest order awarded to any Indian seismic survey player, the largest in Alphageo's existence and the largest global order for any seismic survey service provider (by area coverage). It claims to be the largest seismic company globally (excluding Russia and China) in terms of crews.

Other independent contractors securing minor parts of the NSP work include Advent and Asian Oilfield Services. Overall, it is clear that only Indian companies were eligible.

At the November 2017 Society of Petroleum Geophysicists meeting in Jaipur, Rajasthan, officials from the company said that 18 crews were working on the separate surveys, and that about 25% of the operational work had been completed. Alphageo's contract with OIL, valued at around US$ 15 million (INR 102 crore) stipulates completion by March 2018; that with ONGC, valued at around US$ 228 million (INR 1,482 crore) should be completed by March 2019. Inspection of Alphageo's map shows surveys in the following areas:

- Assam (west) — around 400km 2D acquired
- Himalayan Foreland including Karewa and Spiti-Zanskar — around 300km 2D acquired
- Vindhyan-A Narmada — around 1,000km 2D acquired
- Rajasthan — around 2,000km 2D acquired
- Cambay including Kutch and Saurashtra — around 900km 2D acquired
- Deccan Synclise North — around 1,200km 2D acquired
- Deccan Synclise South — around 600km 2D acquired

All surveys are dynamite, apart from the survey in Rajasthan which is Vibroseis. Most of Alphageo's crews (13) are equipped with Sercel recording.

Minister Pradhan has emphasised the need for speed; indeed, the NSP had been initially mooted in the 1990s. India has not seen any major finds in new basins in 25 years, according to the DGH. The government imperative to reduce imported oil dependency by 10% by 2025 will be difficult to meet by production from as-yet untapped sedimentary basins. As a means of speeding up seismic operations, seismic companies

have been granted exemption from the Forest (Conservation) Act 1980 when forest clearance is not needed for operations.

Alphageo was formed in 1987 (with assistance from Alphageo Inc of Houston, TX) and is based in Hyderabad. Chairman is Z P Marshall. It is principally managed and owned (29% equity) by the Alla family (Dr Dinesh Alla, MD); after it obtained these major contracts it gained a private equity injection from Ajay Relan via his vehicle CX Partners.

Innovating the Oil & Gas Industry
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