



Norway Oil Industry Seen At Risk If New Areas Not Opened

Norway's oil and gas production and industry risk going into serious decline by the mid-2020s if a ban on exploration in unexplored offshore areas in the North isn't lifted quickly, oil chiefs say.

Combined oil and gas production from Norway, the second-biggest gas exporter to Europe after Russia, and the world's fifth-largest oil exporter, is at a peak that operators hope to sustain until at least 2015, while stemming the decline beyond that.

To achieve that, industry leaders say areas currently off-limits - Nordland VI, VII and Troms II - will need to be opened up. But there's strong opposition to drilling in the region off northwest Norway, which has important fishing grounds as well as a natural beauty that attracts many tourists.

A Norwegian parliamentary vote on the integrated management plan for the area decreed it closed to oil companies for the lifetime of the current parliamentary session. But that ends in September, when there's a general election, so the issue will come up for review in spring 2010. It's expected to be a divisive topic

during the election run-up.

With an average lead time of 18 years between the award of licenses and production coming onstream, "there's no time to waste" in opening Norway's most prospective blocks offshore the archipelagos of Vesteraalen and Lofoten, said Per Terje Vold, the chief of Norway's oil industry association, or OLF.

Together those areas are estimated to hold 3.4 billion barrels of oil equivalents in remaining resources.

Norwegian producers face a sea change in 2013-14, as they respond to the challenges of dwindling output from mature oil fields, which means Norway's steadier gas production will soon overtake oil volumes.

Oil output has fallen from a peak of 3 million barrels a day in 2000 to 2.1 million barrels a day now, although gas output will continue to rise for the next couple of years as large new fields like Ormen Lange and Snoehvit ramp up.

Production on the NCS would fall to around 1.6 million barrels of oil equivalents a day by 2030, roughly 60% below current levels, unless new acreage is made available, the OLF estimates.

"I think that Norway (could) supply

Europe with significant volumes of gas for many, many years to come and play the same important role in energy supply as it has done," Vold said.

But to do that, OLF says half the country's potential oil and gas output by 2030 still needs to be found and brought on stream.

"Time is limited. We need to use this scenario to demonstrate why we need new acreage for oil companies now. Those three areas are the most promising, with the possibility of making some (decent) mid-sized discoveries," he said.

If the blocks were opened for exploration between 2010-14, drilling would start in time to replace Norway's dwindling oil - and soon gas - reserves.

StatoilHydro ASA (STL.OS), Norway's biggest oil and gas company, said it's necessary to open the areas to maintain production and activity. "The timeline is left up to the government, but as an industry we obviously hope to get permission for exploration," StatoilHydro spokesman Geir Gjervan said.

"The number of exploration targets is declining in the next few years. So to maintain the same level of exploration activity we need to have new acreage,"

he said.

Marathon's Norway managing director Kristin Faerovik said her company is also supporting the OLF's efforts. "We think the industry is mature enough to take that responsibility, but of course it's very important to win the trust of the people (in those areas)," she said.

A recent survey by Visendi for online financial newspaper DN.no showed that 40.7% of north-Norway respondents think oil exploration should be allowed, while 35.5% want it banned. Of those questioned 23.9% were undecided, demonstrating the oil industry still has work to do to persuade politicians to open the areas.

Environmental and fisheries organizations, including the Norwegian arm of The World Wildlife Fund and Bellona are staunchly against opening up for oil activity. They say the fish and bird life in the area would be damaged by oil activity.

Bellona is calling for a permanent moratorium on oil activity in the sea off Lofoten. "Both the natural resources in the area, the fisheries and the landscape and nature are too precious to take any risk with petroleum activity in the area," said

deputy director Marius Holm.

"We also believe petroleum activity in general will need to be reduced to limit consumption of fossil fuels and limit climate change. Norway is very rich and well developed and if we can't afford to leave any oil in the ground, then who can?" Holm said.

Lofoten is the spawning ground of one of the largest remaining cod stocks in the world, supporting a large fishery of 400,000 metric tons annually, according to the WWF.

But while the region depends on income from fishing and tourism, OLF argues it would get an economic boost from the trickle-down effects of oil developments.

A report by Konkraft for OLF showed that extending petroleum access could boost investment in Norway by NOK200 billion-250 billion between 2022 and 2040.

On the other hand, leaving the acreage closed would hasten the future decline in capital spending, leading to an investment decline to just 20% of today's level after 2030 based on a long-term oil price of \$60-100 a barrel, the report said.

OLF estimates that NOK127 billion

will be invested in the oil and gas industry in Norway in 2009, down from an earlier figure from October of NOK137 billion, although it remains at historically high levels. The petroleum sector contributes around a third to the government's revenues.

Norway's oil and gas industry is facing the challenge of lower oil prices and high oil services costs, which are squeezing margins. A number of companies have said they have delayed or temporarily canceled developments because they aren't economic in the current climate.

The composition of the industry is also undergoing a massive change as major oil companies consolidate portfolios, European utilities like Centrica Plc (CNA.LN) and Poland's PGNIG (PGN.WA) move in to secure upstream needs, and smaller players struggle with low oil prices, prompting a wave of mergers.

Amid these additional challenges, Vold stressed: "You can't really isolate any of these things from the need to get new acreage in the coming year. If we don't get new acreage that's a big problem. All the challenges for the next years lie in that issue."

ANALYSIS

ANALYSIS



OPEC decreases March output, still over target

OPEC oil supply fell in March, for a seventh consecutive month, but remained above its target as some members of the group pumped more than agreed levels, a Reuters survey showed.

Supply from the 11 members of the Organization of the Petroleum Exporting Countries bound by output targets declined to 25.72 million barrels per day (bpd) from a revised 25.83 million bpd in February, according to the survey of oil

firms, OPEC officials and analysts.

The survey suggests OPEC has delivered on 79 percent of its supply cutbacks promised since last year, less than expected after the group agreed at a March 15 meeting to leave output targets unchanged and enforce output curbs more strictly.

Oil has climbed to around \$48 a barrel from below \$33 in December due in part to OPEC's move to lower output by 4.2 million bpd since September. Analysts said cutbacks made so far would be enough to drain high inventories and sup-

port prices.

"It's become increasingly clear since the meeting that they don't have any plans to cut any real production," said Mike Wittner of Societe Generale.

"They don't actually need to, so it's not a bearish story. Even if they hold production flat, on our balances we've still got a modest stockdraw in the second quarter."

Supply from OPEC members with output limits, all except Iraq, in March was 880,000 bpd higher than their collective target of 24.84 million bpd, the survey found, meaning OPEC has lowered output by 3.32 million bpd of the promised 4.2 million.

That gives a 79 percent compliance rate, up slightly from a revised 76 percent in February. Reuters initially estimated that OPEC delivered on 81 percent of the cutbacks in February.

OPEC's Secretary General Abdullah al-Badri told reporters on March 16, a day after its oil ministers met in Vienna, that compliance above 93 percent would be successful.

Oil prices fell U.S. crude was down \$1.25 at \$48.41 a barrel by 1240 GMT.

COMPLIANCE MIXED

Compliance within the group remained mixed, with OPEC's Gulf producers showing the highest rates of adherence.

Saudi Arabia, OPEC's top producer, has led the cutbacks. It kept output steady at 7.95 million bpd in March and below its OPEC target of 8.05 million bpd, the survey found.

But Iran, the second-largest, trimmed supply only slightly to 3.66 million bpd, still more than 300,000 bpd higher than its target. Some sources estimated Iranian supply in March as high as 3.75 million bpd.

Angola, holder of the OPEC presidency this year, has yet to reach its target of 1.52 million bpd. Exports in March totaled 1.62 million bpd, according to loading schedules, and preliminary programs imply little change in April.

Nigeria's output slipped after Royal Dutch Shell's (RDSa.L) Nigerian venture shut some oil installations following explosions on a pipeline that may have been due to sabotage.

The blasts damaged the trans-Escravos pipeline, which sends crude from Shell's Forcados fields to the Escravos terminal.

Libya and Algeria, having lowered oil supplies to foreign oil companies earlier this year, trimmed output slightly in March, as did the United Arab Emirates, Kuwait and Qatar.

With Iraq's production at 2.23 million bpd in March, all 12 OPEC members pumped 27.95 million bpd last month, down from 28.09 million bpd in February, the survey found.

Following is oil output in millions of barrels per day.

	March	Feb	Implied	total	Implied
Algeria	1.24	1.25	0.2	1.2	1.68
Angola	1.68	1.7	0.24	1.52	0.47
Ecuador	0.47	0.47	0.07	0.43	0.43
Iran	3.66	3.68(R)	0.56	3.34	3.34
Kuwait	2.24	2.25(R)	0.37	2.22	1.54
Libya	1.54	1.55(R)	0.25	1.47	1.78
Nigeria	1.78	1.8	(R)	0.32	1.67
Qatar	0.74	0.75	0.12	0.73	8.05
Saudi Arabia	7.95	7.95	1.32	8.05	2.23
UAE	2.23	2.24	0.38	2.22	2.19
Venezuela	2.19	2.19	0.36	1.99	25.72
OPEC	11	25.72	25.83(R)	4.2	24.84
Iraq	2.23	2.26			27.95
TOTAL OPEC	27.95	28.09(R)			

(R) = Revised

*Includes latest cut of 2.2 million bpd starting from January 1 and 2 million bpd of existing curbs. The breakdown was obtained by Reuters during OPEC's December 2008 meeting in Algeria and was not officially released by OPEC.

OPEC quotas exclude condensate and natural gas liquids and apply to supply rather than wellhead output, defined to exclude movements to, but not sales from, storage. Saudi and Kuwaiti data includes Neutral Zone. Saudi data excludes oil produced for Bahrain. Venezuelan data includes upgraded synthetic oil.

Oil at Less Than \$50 After 2% Surge on Economic Hopes

Oil fell back to less than \$50 a barrel in April 16th, after surging more than 2% as equity markets rallied on signs the US recession was easing, boosting hopes of a demand recovery in world's top energy consumer.

The market will be eyeing US weekly jobless claims, due later in the day, for further signs that the speed of contraction in the economy was abating.

Guardedly positive comments on the US economy from the Federal Reserve's Beige Book report outweighed bearish government data showing that US crude inventories rose to the highest level in nearly 19 years, sparking a rally on Wall Street overnight and Asian shares.

But oil pared some gains after China released mixed economic data. The world's second-largest energy consumer said that its economy grew a slower-than-expected 6.1% in the first quarter, but posted other data, such as industrial output, that signalled some optimism.

By 04.06 GMT, US crude for May delivery was up \$0.63 to \$49.88 a barrel, after rising to \$50.30 earlier. ICE Brent crude for the new front-month of June was up \$0.53 at \$52.97 a barrel.

"The US inventory stats were really, really bad and we expected oil to fall to around \$43 to \$48, but the bottom was pretty firm even with the terrible data, and it's trading around plus or minus \$50," said Tony Nunan, risk manager at Tokyo-based Mitsubishi Corp.

"It looks like the market has found its bottom, but it's going to struggle to go up

from here."

Mixed economy outlook

The Energy Information Administration's (EIA) weekly inventory report showed a 5.6m-barrel rise in US crude stocks, to 366.7m barrels - the highest since September 1990 - beating analysts' expectations of a 1.9m-barrel build.

The Fed's Beige Book showed that the US economy continued to weaken in March and early April, but the pace of decline was easing amid scattered signs the country's recession may be nearing an end.

Wall Street stocks took heart from the report's cautiously reassuring tone, which broke a string of depressing news from the closely watched Beige Book, and the Dow Jones industrial average closed 1.38% higher after a choppy session.

After an early lift from Wall Street, Asian stocks pulled back from a six-month high on Thursday, after China posted its slowest-ever quarterly growth.

US jobless claims, due at 12.30 GMT, are forecast to hit a total of 655,000 new filings, versus 654,000 in the previous week, a *Reuters* poll of economists showed.

Crude prices have tumbled nearly \$100 per barrel since last July, as the global recession dented oil demand, but they have recovered in recent months from a low of \$32.40 in December.

The Organization of the Petroleum Exporting Countries said that world oil demand would fall by 1.37m barrels per day (bpd) in 2009, revised from its previous forecast for a fall of 1.01m bpd.

Venture capital money down to 1997 levels-reports

Venture capital investment into start-ups dropped to its lowest level since 1997 in the U.S., with clean technology hit the worst, new figures showed.

Two separate surveys showed venture capitalists backed away from putting money into new companies. Instead, they are nursing their existing companies through a tough period.

"The first quarter saw double digit declines in every major industry sector, marking the lowest levels for U.S. venture investment since 1997," said Matthew Toole, director of research for Thomson Reuters' Investment Banking content, in a conference call on The MoneyTree report.

The report, issued by the National Venture Capital Association and PriceWaterhouseCoopers, showed investment sliced nearly in half -- to \$3.0 billion in the first quarter of this year compared to \$5.7 billion in the previous quarter.

DowJones VentureSource used slightly different methodology but came to the same conclusions, finding a nearly 50 percent cut in the first quarter in 2009 compared to one year earlier.

The health care sector came off the best, dropping to its lowest levels of new investment since 2003, at \$1.35 billion for 118 deals, Dow found.

By contrast, the renewable energy sector, known as "clean tech," declined 73 percent to \$117 million in nine deals, compared to one year earlier, Dow found. The reports found investors preferred to put money into existing ventures rather than start new ones.

"The question is what to do in this uncertain exit environment," said Noubar Afeyan of Flagship Ventures, an early stage venture capital firm in Cambridge, Mass. An exit would be a sale of start-ups to a large company, or an initial public offering.

Iraq proposes crude oil lines to Jordan

Iraq is seeking to increase its crude exports through the construction of two oil pipelines to Jordan, according to a senior Iraqi official.

Sa'd al-Hayyani, Iraq's ambassador in Amman, told Jordan's Al-Sabil newspaper that one pipeline would extend from Iraq to Jordan's Port of Aqaba, while the other would extend from Bayji in Iraq to the refinery at Zarqa.

Al-Hayyani said the line to Zarqa would provide Jordan with the opportunity to "secure its oil needs" of 100,000 b/d, while the line to Aqaba

would generate needed transit revenues for Amman.

Al-Hayyani said the two projects would be discussed during the visit of Jordanian Prime Minister Nadir al-Dhahabi to Baghdad before the end of April.

Jordan received 11,000 bbl of Iraqi oil, the first delivery under a new agreement, which revises the subsidy the kingdom receives in the light of increased world prices.

Jordan's Energy Minister Khaldun Qteishat said 41 tanker trucks loaded with 11,000 bbl of Iraqi oil crossed the border Apr. 6, while another 88 tankers with 35,000 bbl were scheduled to arrive 24 hr later.

The deliveries were the first under a new agreement Jordan reached with Iraq that changed the baseline to \$104/bbl from \$75/bbl for the discount the kingdom receives on its purchases.

Under an agreement signed in August 2006, Jordan received an \$18/bbl subsidy that has since been raised to \$22/

bbl following a visit by King Abdullah II to Baghdad in March.

Qteishat said Jordan currently receives 10,000 b/d or 10% of its needs at the subsidized price from Iraq, but he hoped that amount would be increased to 30,000 b/d "in the future."

Meanwhile, Jordan Petroleum Refinery Co.—the country's sole refinery—announced plans in early April to move ahead with an expansion aimed at raising capacity to 130,000 b/d from 100,000 b/d.

JPRC said it signed a memorandum of understanding with an unnamed "strategic partner" to carry out the \$1.5 billion expansion, pending the outcome of a further study of the project.

The proposed expansion would enable Jordan to meet 100% of its domestic needs for refined products, up from the current 80%.

Jordan currently consumes more than 4.7 million tonnes a year of refined products, but demand is said to be rising at a rate of 22%.





ChevronTexaco which acquired Unocal in August 2005 is by far the countrys largest Natural Gas producer and has continued to increase its production with the development of new reserves

Natural Gas Reserves

• Indonesia

Indonesia LNG Exports

Indonesia is facing a declining share of global LNG markets, despite its past status as the worlds leading LNG exporter. The decline can be attributed partly to questions over the reliability of Indonesian supply and lower investment in the Indonesian energy sector. Uncertainties over political support for the sanctity of contracts, regulatory transparency, and relatively unfavorable PSC terms have undermined investment support. As a result, Indonesian LNG exports have been partially replaced by exports from Oman, Qatar, Russia, and Australia on world markets. Since early 2005, exports from the export terminal at Arun in Aceh have been cut back below the level of contractual commitments, due to continuing production problems in the area, despite the end of the insurgency there. The sector has also faced restructuring under the terms of Indonesias World Bank and IMF lending agree-

ments, with BP Migas taking over the supervisory and management roles formerly filled by Pertamina.

Despite Pertamina's reduced authority, the company's key role in the gas sector was reinforced in June 2004 when BP Migas announced that PT Pertamina has been appointed as the sole sales agent for LNG sales to South Korea and Taiwan.

Pertamina will negotiate sales for Total, Unocal, Vico and BP Indonesia. Current contracts with South Korea and Taiwan are due to expire in 2007 and 2009, respectively.

One project that holds tremendous promise for Indonesias future in worldwide LNG markets is BPs Tangguh project in Papua province (also known as Irian Jaya).

Tangguh contains over 14 Tcf of Natural Gas reserves found onshore and offshore the Wiriagar and Berau blocks. The project will involve two trains with a combined capacity of 340 billion cubic feet per year (Bcf/y), expandable to 680 Bcf/y. BPs current plans call for the project to be completed by 2008. Initial planning was stalled when BP lost the bids to supply Guangdong Province and Taiwan in early 2003.

However, in late 2003 and early 2004, BP secured supply agreements with Fujian, China for 127 Bcf/y, with leading Korean steel producer POSCO for 75 Bcf/y, and with Sempra Energy for 180 Bcf/y over 15 years to begin in 2008. These supply agreements made possible the \$2.2 billion investment to develop the fields. Under the new Oil and natural gas legislation enacted earlier in 2005, the Indonesian government in March 2005 extended BPs contracts to 35 years for three natural gas production blocks associated with Tangguh.

Undersea Gas Pipelines in the World

The 400-mile Natuna Pipeline is one of the longest undersea gas pipelines in the world, bringing Natural Gas from blocks operated by Premier Oil, ConocoPhillips,

and Star Energy to customers in Singapore. Singapore is a major consumer of Indonesian gas, which it uses for its growing electricity generation needs. New pipeline proposals that would link East Natuna with the Philippines are under consideration, but the high financing costs and security concerns in regions to be traversed by the lines make the projects unlikely.

In another possible use for Indonesias natural gas resources, Shell is examining the possibility of building a gas-to-liquids (GTL) plant in Indonesia. The plant, if the project goes forward, would produce 70,000 bbl/d of diesel and other middle Distillates using the Fischer-Tropsch GTL process.

Coal Reserves in Indonesia

Indonesia has 5.9 billion short tons of recoverable Coal reserves, of which 58.6% is lignite, 26.6% is sub-bituminous, 14.4% is bituminous, and 0.4% anthracite. Sumatra contains roughly two-thirds of Indonesias total coal reserves, with the balance located in Kalimantan, West Java, and Sulawesi. According to U.S. Embassy reports, Indonesia produced 132 million short tons of coal in 2003, up 16% from 2002. More than three-quarters of the countrys coal production is exported, primarily to Japan and Taiwan, but also South Korea, the Philippines and Hong Kong. With coal exports from China declining over the last two years, Indonesia is now the worlds second-largest coal exporter.

Indonesia plans to double coal production over the next five years, mostly for export to other countries in East Asia and India. The new capacity will come primarily from private mines. The Clough Group of Australia was awarded a \$215 million contract for improvements at the Indonesian firm GBPs Kutai mine in East Kalimantan.

Another foreign firm with major interests in Indonesian coal mining is Australias Broken Hill Proprietary (BHP).

July, 2003 saw the divestment of Aus-

tralian mining company Rio Tinto and BP from their joint venture in Kaltim Pima Coal (KPC). The shares were sold to Indonesian firm, PT Bumi Resources for \$500 million. According to several reports, the divestment was prolonged and acrimonious as the government objected to Rio Tintos divestment plan, and threatened to mobilize public action to block the mines operations. Ultimately, Rio Tinto and partner BP sold their combined 100% stake for about half of its assessed value.

• Thailand

Natural Gas Production Fields in Thailand

ChevronTexaco which acquired Unocal in August 2005 is by far the countrys largest Natural Gas producer and has continued to increase its production with the development of new reserves. The Pailin gas field which came onstream in August 1999 added 165 million cubic feet per day (MMcf/d) to Thailands gas production.

Unocal also started production at the Trat field in 1999. Unocal undertook a second phase of development at its Pailin field beginning in 2002 which brought production to around 330 MMcf/d.

ChevronTexaco is currently producing about 145 MMcf/d from its offshore Block B8/32. The company has put its estimated gas reserves in the block at 2.5 Tcf and has plans to expand production in the future to about 250 MMcf/d.



Drilling off Alaska cant proceed without further environmental review

An appeals panel rules that the Interior Department didn't adequately analyze a Bush administration plan to auction off leases in the Arctic seas.

A federal appeals court dealt a blow Friday to oil and gas industry efforts to allow drilling in the fertile energy-producing regions in the icy seas north of Alaska.

The Bush administration had started

of oil, more than the known reserves of Nigeria, Kazakhstan and Mexico combined and enough to supply U.S. demand for 12 years, according to the U.S. Geological Survey.

But in Inupiat Eskimo communities preparing to go on their spring hunt for whales near some of the areas targeted for drilling, there was a sense of relief.

"That's great news. We've been requesting a moratorium until more research is done," said Doreen Lampe of Barrow, Alaska, a whaling town on the far northern tip of the continent, on the Beaufort and Chukchi seas. "I truly hope they will do a better job of studying this."

Native groups and conservationists

the Outer Continental Shelf beyond the Alaska coast.

President Obama has wrestled with the issue of offshore drilling since it surfaced prominently in the presidential campaign last year, when gas prices were spiking. At the time, he pledged to consider drilling as part of a comprehensive energy plan.

Since taking office, Obama's Interior secretary, Ken Salazar, has overseen lease auctions for drilling in the Gulf of Mexico. But the department also froze another five-year Bush administration plan to open even more areas -- including potential swaths of the California, Atlantic and Gulf coasts -- to drilling. Salazar instead called for months of public comments and launched a four-state listening



to auction off leases in the Arctic waters along Alaska's coast, which are expected to produce billions of barrels of oil. But a three-judge U.S. Court of Appeals panel in Washington ruled that the Interior Department had failed to properly assess the environmental impact of the leases. The court halted the program pending a full review. The decision comes at a time of increased pressure to tap new sources of oil and gas globally. The Bush White House had pursued the leasing program after Congress thwarted its efforts to drill in Alaska's Arctic National Wildlife Refuge. "It would be a disservice to all Americans -- and a devastating blow to the economy -- if this decision were to delay further the development of vital oil and natural gas resources," the American Petroleum Institute, a leading industry trade group, said in a statement.

The Arctic may hold 90 billion barrels

have argued that it is reckless to drill in the relatively unexplored northern seas without knowing how imperiled they are by climate change and the rapid shrinking of the Arctic ice pack. An oil spill there, they argue, would be difficult to clean and could wipe out wildlife's toehold in the region.

Environmental groups also hailed the decision, saying it would allow the Interior Department to thoroughly study the effects offshore drilling could have on the Arctic ecosystem. "Really what this does is provide an opportunity for the new administration to look holistically at all the decisions about oil and gas that the Bush administration did," said Michael LeVine, an Oceana lawyer. The court held that the Interior Department's five-year plan, initiated in 2005, did not "properly consider the environmental sensitivity" of different areas of

tour on offshore energy issues, which wrapped up in San Francisco this week.

Interior spokeswoman Kendra Barkoff said that the department was carefully reviewing the court ruling: "Secretary Salazar believes that we need a comprehensive approach to an offshore energy plan, based on sound information about our resources and extensive public input."

This year, Sen. Lisa Murkowski (R-Alaska) proposed a bill that would allow oil exploration in the Arctic National Wildlife Refuge, provided the drilling originated outside refuge boundaries. Salazar said he would consider such a policy if the region's environment and wildlife went undisturbed.

Murkowski criticized the court's decision, saying it "may now cause a further delay in the development of the oil and gas resources that America still requires to fuel its economy."



Endeavour Well Drilling Project, Trinidad and Tobago

The Endeavour well drilling project is located approximately 60 miles offshore, off the east coast of Trinidad.

The field is one of the world's largest gas fields, which will result in a significant gas reserve, meeting the energy needs of Trinidad and Tobago.

Endeavour well is the third in a three-well programme being drilled by Challenger and its partners on block 5(c), which is approximately 80,000 acres in size. The other two wells are Victory and Bounty which were discovered in 2008, on 14 January and 13 August, respectively. Combining the three wells, the estimated recoverable reserves could cross over four trillion cubic feet (tcf) of natural gas.

The three wells were selected from the interpretation of a 760km² three-dimensional (3D) seismic data set covering the block and offsetting producing fields.

The project is developed by Canadian-based oil and natural gas company Challenger Energy Corporation in association with its partners Canadian Superior Energy and BG International. The production from the Endeavour well is expected to start by 2012.

Endeavour project background

Trinidad has proved to be a basin with

a great deal of potential with multiple and large exploration and development opportunities. Natural gas from the country easily accesses the world's largest natural gas markets and supplies about 80% of the US's liquefied natural gas (LNG), which is very important to the North American natural gas supply.

In 2004, Challenger Energy entered into a participation agreement with Canadian Superior Energy to explore for oil and gas on the Mayaro / Guayaguayare bay block with the Petroleum Company of Trinidad and Tobago.

The block was awarded to joint venture companies in May 2004 and the company commenced exploration activity in Trinidad and Tobago during 2007 on its block 5(c) holding. On 20 February 2008, the company began operations on the second exploration well (Victory). \$290m has already been spent on the project.

Development in drilling

Challenger Energy Corporation, along with its partners, started drilling operations for the Endeavour well on 28 August 2008. It is being done by the Kan Tan IV semi-submersible drilling rig in about 1,000ft of water.

The drilling process faced many challenges. After reaching a depth of approximately 16,921ft subsea in the final section of the well, the drilling was stopped due mechanical failure in the Kan Tan IV's drilling equipment -- the travelling block.

The fault was repaired by the rig owner Sinopec and drilling started again in mid-December 2008 in a separate section, as

the previously drilled final section was no longer practicable due to well bore damage that occurred during the well control operations. Well control operations were initiated to manage an uncontrolled flow into the well that occurred during routine drilling operations while replacing a worn drill bit.

The Endeavour well has been drilled to a final total depth of approximately 17,426ft subsea. The geological data obtained from the drilling indicates that the machine has penetrated the main targeted zone and, that the well has encountered approximately 162ft of gross reservoir quality sands over a 168ft interval to this point.

Flow testing

Canadian Superior started extensive preparations of flow testing of the Endeavour well offshore Trinidad on block 5(c) at the end of January and testing commenced on 1 March 2009.

During the initial flowing period of approximately 16 hours, a peak flow rate of 60.1 million standard cubic feet of gas a day (mmscf/d) was obtained -- the maximum rate allowed under the testing equipment specifications.

A final flow rate of 56.4mmscf/d was measured with a 48/64in choke with a flowing well head pressure of 4,122psi. Dry natural gas with a gas gravity of approximately 0.584 and 0.3% CO₂ flowed from the well, with no production of water and condensate or solids during the initial flow period.

Expenditure

Challenger is paying one third of the costs of the initial exploration programme on block 5(c) to earn a 25% interest in the production sharing contract covering the block, while Canadian Superior is paying 26% and BG International 40% to maintain a 45% and 30% working interest, respectively.

Endeavour completion

All drilling operations on the Endeavour well are expected to be over by the first half of 2009, followed by the release of the drilling rig.

Preamble of ECOWAS - Promote Economic Development and Growth in West Africa

The Establishment of ECOWAS

Regional leaders created the Economic Community of West African States (ECOWAS) on May 28, 1975 in Lagos, Nigeria. ECOWAS is comprised of 15 countries, which include: Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The leaders established ECOWAS to promote regional integration and economic growth in West Africa, as well as to create a monetary union in the region. However, ECOWAS has encountered problems in the process of regional integration including: political instability and lack of good governance that has plagued many member countries, the insufficient diversification of national economies, the absence of reliable infrastructure, and the multiplicity of organizations for regional integration with the same objectives. The Authority of Heads of State and Government is the governing body of ECOWAS. The Authority determines the general direction and

development of the Community, as well as the realization of the Communities objectives. The Authority elects an annual Chairman, with the 2006 Chairman being Niger's President, Mamadou Tandja. Under the Authority is the Council of Ministers, which is responsible for the proper functioning of the Community. In April 2002, the Council approved a procedure for the ECOWAS Trade Liberalization Scheme (TLS). The TLS entitles the manufacturers of approved products to customs duty exemption within ECOWAS member states. The procedure uses National Approval Committees, set up by member states, to handle the approval of products to be granted exemption under TLS. The 2002 decision by the Council abrogates a previous decision and grants the Council a monopoly for approving applications for such exemptions. In 1990, ECOWAS established the Economic Community Monitoring Group (ECOMOG), a multilateral military peacekeeping force to intervene in the civil war of Liberia. Since 1990, ECOMOG has been deployed in civil conflicts in Sierra Leone, Guinea-Bissau



and CÔ te devoir.

The CÔ te devoir disarmament and peace mission included ECOMOG troops from Benin, Ghana, Niger, Nigeria, Senegal and Togo. Overall, Nigeria has contributed the largest amount of troops, materials and financial support to ECOMOG missions. ECOWAS is seeking international support to enable it to train and equip the 15 battalions of troops pledged by member states. The training of the composite units facilitates their effectiveness in peacekeeping, humanitarian assistance and other missions for which they could be deployed.

Economic Overview in ECOWAS

In 2005, the combined Gross Domestic Product (GDP) for ECOWAS was estimated at \$139 billion. Economies within the Community are at varying stages of development. Nigeria's economy is larger than the combined GDP of all other ECOWAS countries, with a GDP of \$78 billion. In 2005, the Communities economies grew at a combined weighted average rate of 5.0 percent. However, substantial external debt within individual states remains one of ECOWAS greatest challenges. In addition, internal strife has adversely affected economic performance in several states.

Total regional exports, including intra-regional exports, were \$68.4 billion in 2005 and ECOWAS had a \$17.5 billion trade surplus. The regions major export commodities were energy products (crude Oil and refined Petroleum products), minerals (gold, diamonds, and bauxite) and agricultural products (cocoa, coffee, groundnuts, and cotton). The primary U.S. import from the region was Nigerian Crude Oil. As of January 1, 2006, President Bush approved the designation of 37 sub-Saharan African countries as eligible for tariff preferences under the African Growth and Opportunity Act (AGOA). As required by the legislation, this annual deter-

mination signifies which countries are making continued progress toward a market-based economy, the rule of law, free trade, economic policies that will reduce poverty, and protection of workers rights. CÔ te devoir, Liberia, and Togo were the only countries in the region not approved for the AGOA. In 1994, ECOWAS Francophone members Benin, Burkina Faso, CÔ te devoir, Mali, Niger, Senegal and Togo, with Lusophone Guinea Bissau, created the West African Monetary Union (UEMOA) in Senegal. UEMOA is a regional economic and monetary union which shares a common currency (the CFA Franc). Five ECOWAS Anglophone-members, The Gambia, Ghana, Guinea, Nigeria and Sierra Leone, have proposed setting up a second West African Monetary Zone (WAMZ) in December 2009 and launching a new common currency, the Eco. All five states signed the 2000 Accra Declaration for the creation of the second monetary zone, agreeing to reform their economies to meet specific targets prior to the introduction of the Eco. It is planned that the Eco would circulate simultaneously with the CFA Franc, with the ultimate goal of creating a single monetary zone for the entire Community. Both Liberia and Cape Verde have shown interest in becoming members of the WAMZ.

Energy Overview in ECOWAS

Commercial energy resources in ECOWAS, primarily Petroleum and Natural Gas, are concentrated in coastal and offshore regions. Electricity in West Africa is generated through thermal (57.8 percent of installed capacity) or hydroelectric (42.2 percent) resources. Natural gas could take a more significant role in the Communities energy sector as fields in Nigeria and CÔ te devoir are developed. Due to a relatively small urban population in ECOWAS (approximately 33.9 percent) and lack of infrastructure, access to commercial energy sources

is limited. In 2005, Nigeria had petroleum exports of 2.3 million barrels per day (bbl/d), while CÔ te devoir, exported 39,000 bbl/d of petroleum. All other ECOWAS countries are net energy importers. In 2003, ECOWAS consumed 1.43 quadrillion British thermal units (Btu) of commercial energy (0.4 percent of total world consumption) and produced 5.82 quadrillion Btu (1.4 percent of total world production). Also in 2003, the region generated 33.2 million metric tons of Carbon equivalent (0.5 percent of the world total). Nigeria accounted for 66.7 percent (0.99 quadrillion Btu) of energy consumption in ECOWAS, 96.3 percent (5.6 quadrillion Btu) of energy production, and 76.9 percent (33.16 million metric tons) of the Communities carbon emissions.

ECOWAS has plans to create a \$50 billion fund that will be used to boost energy services for the West African population and to curb energy shortfalls that are seen as a hindrance to economic development and regional integration. ECOWAS has set December 2007 as the target for the creation of the fund. By 2015, with the help of additional energy, ECOWAS would like to see a 50 percent reduction in poverty within the Community.

Oil Reserves in ECOWAS

Nigeria, West Africa's only significant Oil producer, had oil production averaging 2.6 million barrels per day (bbl/d) in 2005. According to the Oil and Gas Journal (OGJ), Nigeria's estimated proven crude reserves are 35.9 billion barrels, and this constitutes 96 percent of the Communities estimated proven crude reserves. Smaller reserve deposits are located in the Gulf of Guinea (offshore Benin, CÔ te devoir and Ghana). In 2005, Petroleum consumption in West Africa averaged 487,000 bbl/d, with Nigeria being the Communities largest oil consumer (63 percent of total consumption).

By Braden Reddall, Reuters.

Small Oil Companies see Little Scope for M&A

Smaller oil and gas producers often face too many obstacles to mergers for there to be much chance of a flurry of deals among them, according to a top Occidental Petroleum executive.

Stephen Chazen, president and chief financial officer of the fourth-largest US oil company, said provisions attached to their debt, which is usually greater than their market value, could require payback upon a change of control.

In an interview on the sidelines of the Howard Weil Energy Conference in New Orleans, he also said combinations among some of these smaller exploration and production (E&P) companies would not alter their underlying value.

"Sometimes these small companies have bad results because they have poor assets," he told Reuters. "If you put a good management in with poor assets, the reputation of the assets usually emerges intact."

He saw the C\$18.4bn sale of Petro-Canada to Suncor Energy as more reflective of the challenges facing the industry in Canada, with its "big mismatch" between costs and the oil price, than a sign of things to come.

Suncor said on Monday it would buy rival Petro-Canada to create Canada's biggest oil company, dominant in the Alberta oil sands and able to slash costs as it looks to weather a period of low oil prices.

"You've got two companies that...have their issues, and by combining them they'll have a bigger Canadian champion, and I'll think eventually, they'll get their costs in line."

As for refining, which also has been particularly hard hit by the collapse in energy demand, he saw little cause for optimism since the US would probably be consuming fewer refined products in a decade.

"The problem with downstream is it's really a bad business that occasionally is good," he said. "People fooled themselves a few years ago thinking it was a good business that's occasionally bad."

"You really have to be good to be in the refining business, and I think we're sort of average on a good day."

Oil supply imbalance lingers

Noting that a recent rise in oil prices was driven partly by the weaker dollar, Chazen said there was still a supply imbalance and he expected no confidence to return to the oil business until the world economy improved.

So Occidental has cut something in the "order of magnitude" of 5% of its workforce this quarter, targeting "bottom performers" who were kept on during the recent boom, he said.

"I think we gained a little weight around the waist during the last couple years, so, a small diet," he said.

Occidental has more than 9,000 employees, according to its website. It reported 10,400 employees at the end of the year, according to regulatory filings.

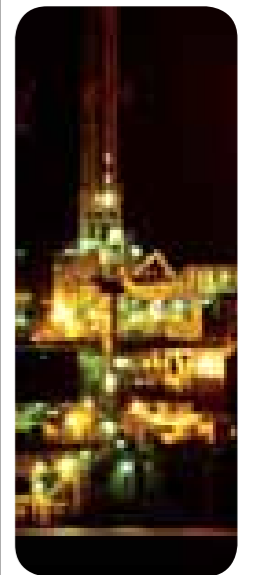
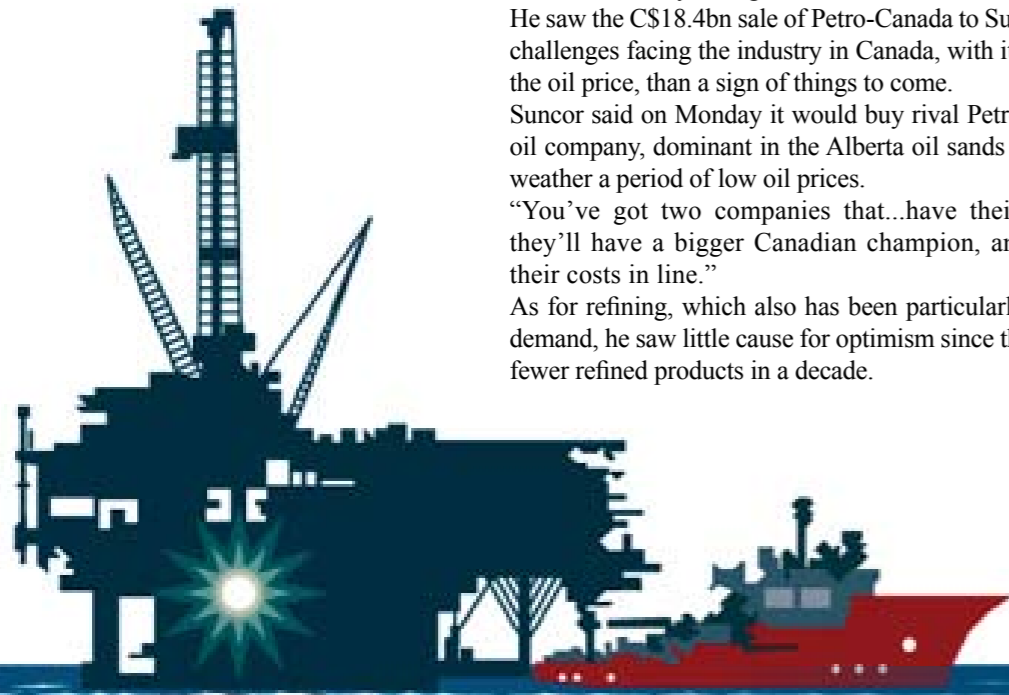
Addressing a regular complaint among E&Ps about the fact that oilfield service costs have doubled since 2004, Chazen said they were unsustainable at current oil and gas prices and he expected them to rebalance by this time next year.

"Whatever that balance is," he added. "It could be higher oil prices and you'd be in balance, but you'll be at a point where you can drill profitably."

He said wrangling with contractors over price and looking after costs was what the oil business was usually like, with last year's record price for a barrel of oil throwing everything out of kilter. "At \$140, everything works, so you don't need to have any managers," he said, smiling.

"You're back to what I would view (as) a normal set of circumstances. You're looking at your costs, you're saying you can't do everything because the returns don't work," he added.

"This is the way the oil business is most of the time. We had two great years, and before that some awfully good years, and I think we'll be back to awfully good years."



Drilling for Oil Way, Way Offshore



Anyone who ever doubted the centrality of oil and natural gas to the global economy should have been convinced by the political events of the past few months. As petroleum prices have risen to record levels, the spiraling price of gasoline has become issue number one in the American Presidential election. That's prompted Republican candidate John McCain to make expanded offshore oil drilling a focus of his campaign. For years, offshore drilling has been illegal outside parts of the Gulf of Mexico due to environmental concerns, with public support. But that has reversed in recent months, with even green Californians moving in favor of drilling. Barring a sudden national move to adopt alternative fuels, we can expect that reversal to continue — as oil prices rise, so will pressure to “drill here and drill now,” as McCain has put it. Whatever that means for offshore drilling in the U.S., the real

victims of the global thirst for petroleum will be overseas — areas that, until the recent price rise, were too remote and forbidding to be worth drilling. Case in point: the vast, impenetrable western reaches of the Amazon. Touching parts of Bolivia, Peru, Ecuador, Columbia and Brazil, the western Amazon has remained relatively unscathed compared to the eastern stretches of the rainforest, which have been ravaged by logging. With few roads, the western Amazon has remained so undisturbed that there are still new indigenous tribes living somewhere inside the jungle who have never encountered the outside world.

According to a new report by Matt Finer of the green group Save America's Forests, however, the western Amazon could be on the brink of an energy bonanza — and that could be bad news for the rich array of plants and wildlife the forest supports. Finer points out that there are approximately 180 separate

zones of development for oil and gas exploration in the western Pacific, run by at least 35 multinational energy companies. The area covers almost 700,000 sq. km. and it's growing fast. In 2003 Peru cut oil and gas royalties in an effort to kick start energy investment; that discount, compounded by the rapidly rising price of oil, sparked a mini-boom in energy exploration. Oil and gas zones now cover some 72% of the Peruvian Amazon, up from a little more than 20% a few years back. The story is much the same in neighboring countries. “Ten new projects were approved last year in Peru alone,” says Finer. “We can see the land being eaten up.” (Hear Finer talk about the ecological implications of the energy rush in this week's Greencast.)

New oil and gas projects represent a vital source of government revenue for impoverished nations like Peru or Bolivia, but they may come at a high environmental cost. The reason much of the

western Amazon remains intact — quite unlike the rainforest to the east — is simply because there are still relatively few roads into the forest. But oil and gas projects will require new roads, and roads destroy forests and damage wildlife habitats. Roads also invite in the most formidable agent of ecological disruption: humans. That means an influx of hunters and loggers, along with the heavy equipment and personnel needed for oil exploration. “Our attention has always been focused on the rainforest in eastern Brazil, because that's where the road network is,” says Finer. “But the roads being put into the western Amazon have the potential to open up the area.”

There are ways to extract oil and gas without building an extensive network of roads — in fact, Finer points out that the energy company Petrobras plans to use helicopters to transport all personnel and material to and from a site in

Yasuni National Park in Ecuador. That move came at the behest of the Ecuadorian government, and it's representative of the sort of smart energy policies that South American governments will need to follow if the western Amazon isn't going to be sacrificed for oil. Just as important are the environmental impact assessments that can accurately gauge just how destructive a new oil or gas project might be, not just to the land that's being drilled, but also to adjacent areas — in Peru, 20 development zones overlap with protected areas. An accident in one zone could easily contaminate neighboring land.

Ultimately, however, the global demand for oil and gas is so great that it is difficult to see any South American country passing up the potential revenue in favor of keeping the Amazon pristine. It's also a reminder that, as we fight over a little offshore drilling in the

U.S., rising energy prices will impact far more vulnerable ecosystems overseas, from the Amazon in South America to the vast Arctic stretches of Siberia. For now, the best we might be able to expect — until alternative fuels make oil and gas unnecessary — is adherence to the best safety standards for new exploration. After all, keeping the oil and gas in the ground may be better for the environment and the climate, but it seems unlikely. In April 2007 Rafael Correa, the President of Ecuador, made a bold proposal: to permanently forgo excavation of the country's largest untapped oil reserve, located beneath a national park, if the international community would compensate the country for its lost revenue. No one has taken him up on the offer yet.



Peak Oil-True or False

The arguments are so one-sided, it's practically a given that "peak oil" is real and threatening. Or is it? This article examines both sides. It lets readers decide and deals only with supply issues, not crucial environmental ones and the need to develop alternative energy sources. First some background.

The name most associated with "peak oil" is M. King Hubbert. He became the world's best known geologist when he worked for Houston-based Shell Oil Company from 1943 to 1964. His theory goes something like this. Oil is a finite resource. Peak oil, or Hubbert's peak, is the point at which maximum world production is reached, after which its rate terminally declines.

Hubbert first presented his theory in a February 4, 1949 *Science* magazine article called "Energy from Fossil Fuels." He gained prominence, however, from his 1956 American Petroleum Institute presentation titled "Nuclear Energy and the Fossil Fuels." In it, he predicted that US production would peak between the mid-1960s and early 1970s, and he was largely right (for the wrong reasons at the time) about cheap or what's called light sweet oil.

Most analysts believe US output peaked in 1970 and has since declined.

Others, like economist and author F. William Engdahl, disagree. He's been researching oil issues since the early 1970s and believes US output peaked at the time but not because of resource depletion. It's "because Shell, Mobil, Texaco and the other partners of Saudi Aramco were flooding the US market with dirt cheap Middle East imports, tariff free, (and) at prices so low (that) many Texas domestic producers could not compete and" had to shutter their operations. But Hubbert went further as well. He predicted a worldwide peak in "about half a century" that would progress in bell-shaped curve fashion, now called "Hubbert's curve." Here's how it works for all fossil fuels. Hubbert theorized that after discovery, production increases exponentially, but at some point peak output is reached, after which an expo-

ponential decline ensues. Hubbert's curve is symmetrical, it peaks when half of all oil (or other fossil fuel) has been produced, and there's only a single peak after which output declines.

Hubbert's analysis was at a time oil nominally cost under \$3 a barrel. Inflation-adjusted that's around \$23 in 2008 dollars. Today it's around \$100, and some analysts see it heading much higher as the supply of cheap oil declines in the face of growing demand. True or false will only be known in the fullness of time, but consider what Hubbert, in fact, said in his 1956 paper. He estimated:

--a "total ultimate potential reserve of 150 billion barrels of crude oil for both land and offshore areas of the United States" and acknowledged he was "in substantial agreement with Pratt's figure of 170 billion barrels....," and -- a potential of 1.250 trillion "barrels (for) the whole world."

So far, Hubbert was referring to what's called "light sweet" or cheap oil. But he went further as well, yet his comments have been largely ignored. He mentioned other type oils and estimated:

-- "the oil obtainable from oil shales in the United States" is one trillion barrels based on current (1956) US Geological Survey figures; outside the US, he estimated oil shale potential in Brazil at between 300 to 500 billion barrels with "negligible" amounts present in other countries;

-- the Athabaska tar sands in north-eastern Alberta, Canada are the "largest known deposit(s)...in the world;" its "extractable oil content...is still not accurately known, but current estimates range from about 300 to 500 billion barrels....;" and

-- "other large (nonconventional oil) deposits of uncertain magnitude exist in eastern Venezuela and in Mesopotamia (Iraq);" these and others like them in the world "might be as much as (another) 800 billion barrels."

Hubbert then stated: "...the culmination of world (oil) production (of the cheap variety)...should occur within about half a century (and within) the

United States....within the next few decades." However: "This does not necessarily imply that the United States or other parts of the industrial world will soon become destitute of liquid (oil) and gaseous fuels, because these can be produced from other fossil fuels (including tar sands, heavy and extra-heavy oils and shale) which occur in much greater abundance." In 1956, his and other estimates of their amounts were far below today's figures. More on that below.

Current Opposing Views on Peak Oil

The German-based Energy Watch Group (EWG) believes peak oil is real. It's an "international network of scientists and parliamentarians" that published an October 2007 report with that view. It stated world oil production peaked in 2006, output is now declining by several percent a year, and by 2020 to 2030 global oil reserves will be substantially lower than today and a supply gap will exist.

Daniel Yergin's Cambridge Energy Research Associates (CERA) disagrees. Its analysis finds that "the remaining global oil resource base is actually 3.74 trillion barrels - three times as large as the (claimed) 1.2 trillion barrels by (peak oil) proponents." CERA argues further that peak oil reasoning is faulty and, "if accepted, (may) distort critical policy and investment decisions and cloud the debate over the energy future." It states as well that the "global resource base of conventional and unconventional oils... is 4.82 trillion barrels and likely to grow" and bases its analysis on fields now in production and those "yet-to-be produced or discovered."

Its chairman, Daniel Yergin, noted that: "This is the fifth time that the world is said to be running out of oil. Each time... technology and the opening of new frontier areas has banished the specter of decline. There's no reason to think that technology is finished this time."

The Paris-based International Energy Agency (AIE) agrees. It's an energy policy advisor to its 27 member countries that was founded by the OECD in 1974 in the

It's nightmarish and so environmentally destructive that northern Alberta residents want all oil sands plants shuttered because they've displaced native people, destroyed boreal forests, caused livestock deaths and increased the level of miscarriages.

wake of that period's oil crisis. It believes peak oil notions are extreme, says there's "no shortage of available oil and gas in the ground," but new technologies must be found to curb "the world's thirst for them (and to) tap reserves" to increase production. AIE believes as much as 10 trillion barrels of "oil equivalent" conventional oil and gas exist and at least as much non-conventional oil.

In a 2005 report it stated that: "The hydrocarbon resources in place around the world are sufficiently abundant to sustain likely growth in the global energy system for the foreseeable future. The doomsayers are again conveying grim messages through (the media). The AIE has long maintained that none of this is cause for concern."

AIE considers all type oils - the easy to find and produce "light sweet" kind that's likely running out plus potentially huge untapped deposits of heavier oils that will become more important when it does. With this in mind, the Middle East doesn't have two-thirds of world oil reserves as many analysts, the industry, and US Department of Energy claim. It has two-thirds of "proved" cheap oil reserves.

The US Geological Survey (USGS)

collects data on all type oils and estimates their amounts. For the year 2000, the US Department of Energy (DOE) and oil industry estimated remaining "proved" light sweet reserves at slightly over one trillion barrels. USGS, however, placed "identified" reserves at 1.1 trillion barrels and "recoverable" reserves at nearly 2.3 trillion or more than double the industry and DOE amounts. In addition, USGS estimates combined non-conventional heavy and tar sands deposits at around 4.250 trillion barrels with about 3.6 trillion of them in the two countries with most of them - Canada and Venezuela. Other "unconventional" oil estimates differ widely, so take your choice on who to believe. Dutch economists Peter Odell and Kenneth Rosing had an earlier view in their 1980 book "The Future of Oil." They noted predictions of total world reserves ranged from two to 11 trillion barrels and said three trillion was "the more realistic figure" for conventional oil plus another two trillion from unconventional heavy oil and tar sands.

Petroleum Economist magazine calls itself "the authority on energy." It says tar (or oil) sands reserves are huge, they occur in over 70 countries, and Canada has most of them (around 81%) in four regions: Athabasca, Wabasca, Cold lake and Peace River in areas covering around 77,000 km. It estimates technically recoverable reserves at between 280 - 300 billion barrels with total non-recoverable (based on current technology) amounts at between 1.7 - 2.5 trillion barrels. Other than shale, USGS categorizes oil as light, heavy, extra-heavy and natural bitumen or tar/oil sands.

Some analysts believe oil sands can replace conventional oil when its supply runs out while others disagree. One of them is Richard Heinberg, who's written extensively on ecological and peak oil issues. He says that although estimated oil sands reserves equal or exceed all conventional oil extracted to date, processing them reduces their potential for reasons geologist Walter Youngquist explains: because "it takes the equivalent of two out of each three barrels of oil recov-

ered to pay for all the energy and other costs involved in getting oil from the oil sands."

Then, there's the environmental cost. It takes two tons of sand mined to yield one barrel of oil, and extracting it requires huge amounts of natural gas and water. In addition, each barrel recovered yields 2.5 barrels of oily waste that must be disposed of. It's done by pumping it into huge ponds, and Heinberg describes a Syncrude Canada Ltd. one that's 14 miles in circumference in which 20 feet of murky water floats on a 130-foot-thick slurry of sand, silt, clay and unrecovered oil.

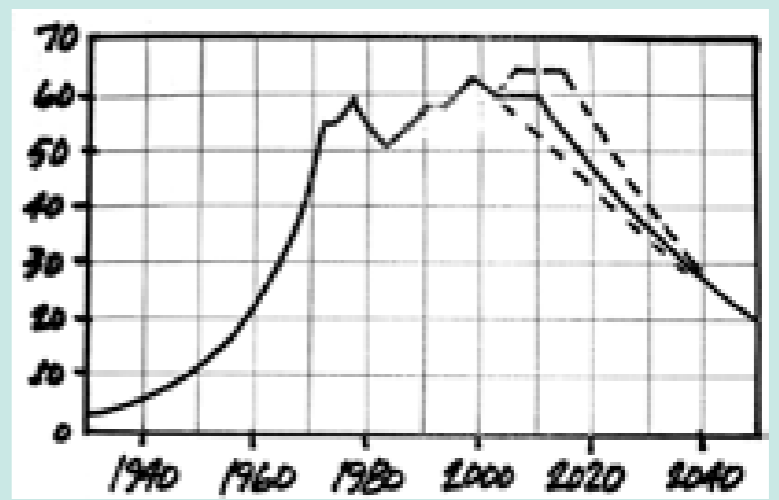
It's nightmarish and so environmentally destructive that northern Alberta residents want all oil sands plants shuttered because they've displaced native people, destroyed boreal forests, caused livestock deaths and increased the level of miscarriages. Moreover, Heinberg believes it would take about 700 plants the size of a Syncrude Athabasca one to process enough tar sands to replace conventional oil, and their environmental damage would be unimaginable and too great a cost to bear.

Another resource assessment comes from Petroleum Equities. It's a management consulting firm specializing in oil and gas exploration and production. It estimates combined heavy oil and tar sands worldwide reserves at around 5.4 trillion barrels with 80% of them in the western hemisphere.

For extra-heavy oil alone, the US Department of Energy (on its web site) estimates Venezuela has 1.36 trillion barrels, or 90% of the world total. That's more than all "proved" world reserves combined and in addition to Venezuela's "proved" light sweet resources of around 80 billion barrels that alone ranks it seventh in the world behind the five largest Middle East producers and Canada.

Potential Arctic Oil Reserves

On its web site (arcticoag.com), the Arctic Oil and Gas Corporation states it's "an oil exploration venture company that has filed for the exclusive exploitation,



development, marketing and extraction rights to the oil and gas resources of the seafloor and subsurface contained within the 'Arctic Claims.'"

It calls the Arctic "the last giant oil frontier on Earth (with its) vast reserves of untapped oil and natural gas (that will) become accessible (when) new deep-sea drilling and hydrocarbons production technology (is) available."

In addition, it states that a preliminary USGS assessment "suggests the Arctic seabed may hold as much as 25 percent of the world's undiscovered oil and natural gas reserves (or around 400 billion barrels of oil alone.)" It further says that Arctic oil source rocks may contain "untold billions of tons of organic sediments" and calls the 80 million acre Arctic Ocean Commons Prospect Claim "the world's largest (potential) material prize."

Here's what USGS, in fact, said in October 2007. It called the above claim "a reporter's mistake" but doesn't rule out that it's true. It explained that the 25% figure came from an assessment of seven oil and gas basins that weren't precisely in the Arctic. One of them in East Siberia lies entirely south of it.

Exclude it and what's left is 14%. However, because a 2000 USGS assessment didn't include undiscovered resources from all north of the Arctic basins (numbering many more than seven), the area's potential is vast but undetermined.

USGS explained that it didn't fully assess the area in 2000 because it lacked enough data at the time. However, it's now investigating all Arctic regions, using available geologic information and "a methodology adapted to a general shortage of well and seismic data." USGS concludes that the region's potential is vast, it's largely unexplored, its resources are "poorly understood," and it can only produce a "broad view" of the region's potential "because the (area's) geologic uncertainties are very high and the technical uncertainties (of) oil and gas extraction (feasibility) even higher."

Two Notable Peak Oil Proponents

There's no shortage of peak oil proponents, many are prominent figures, two among them stand out, and one is a media regular on his views, right or wrong.

He's Matthew Simmons, chairman and CEO of Simmons & Company, an industry-insider, close associate of Dick Cheney and advisor and possible secret member of Cheney's Energy Task Force representing Big Oil interests.

He's also a major Republican donor and author of the 2005 book "Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy."

In it, Simmons is alarmist about the world's largest producing country, and he's widely heard and believed. Right or wrong, he states that Saudi oil fields are "at or very near (their) peak sustainable





Introduction to Environmental Regulatory Frameworks for Offshore Oil and Gas Industry

Source: United Nations Environment Programme (UNEP)
Introduction to Regulatory Profiles

The profiles were compiled via contacts from UNEP, the Exploration and Production Forum (E&P Forum), World Wide Web, literature searches and a survey questionnaire.

The Offshore Oil and Gas Environment Forum' is one of a number of activities initiated by the United Nations Environment Programme (UNEP), the United Nations Commission on Trade and Development (UNCTAD) and the petroleum industry to help facilitate information exchange. The 'Environmental Regulatory Frameworks for Offshore Oil and Gas Industry' is one component that has worldwide application. The informa-

tion is presented as a series of national profiles and demonstrates the variety of mechanisms- regulatory, co-regulatory and voluntary, in place between industry and governments.

How the profiles were developed

The profiles were compiled via contacts from UNEP, the Exploration and Production Forum (E&P Forum), World Wide Web, literature searches and a survey questionnaire. The survey was forwarded to government bodies responsible for environment and industry issues and non-government bodies including industry associations and oil companies. The draft profiles were checked by country regulators and industry associations before being uploaded to the Forum website. Several profiles have been completed. If you can provide further information on other countries or wish to update information on those countries already on the Forum, please contact UNEP with the information. A number of the countries profiled border the north Atlantic region. It is no coincidence that a region subject to serious environmental pressure has also attempted to find innovative and cost effective forms of operation and regulation.

Overview

As the petroleum industry has expanded exploration and production in all continents, so too has attention on the impact of its activities. There has also been a growing recognition that industry must operate within the scope of social, cultural, economic and physical factors at the local level, while remaining in the global context of Agenda 21. Industry has recognized that future access to petroleum resources depends on finding methods of exploiting resources in an environmentally sustainable manner and in cooperation, rather than in conflict, with regulatory bodies. The need to minimize environmental impact has been one of the most significant changes occurring in the upstream petroleum industry during the 1980's and environmental regulation of the petroleum industry is therefore a

The profiles were compiled via contacts from UNEP, the Exploration and Production Forum (E&P Forum), World Wide Web, literature searches and a survey questionnaire.

relatively recent phenomenon. (1) The profiles show that government and industry are attempting to explore innovative strategies that go beyond the traditional adversary approaches to environmental management. The concept of sustainable development also calls for a different approach, to extend the debate about environment and development from that of simply reducing pollution from operations. Strategies must provide sustainable multiple use solutions to solve many of the conflicts surrounding conservation and resource use in the marine environment.

Types of Regulatory Approaches

A recent International Expert Meeting (Noordwijk, Netherlands, November 1997) on 'environmental practices in offshore oil and gas activities', noted that there are primarily two approaches to regulating the environmental performance of industry- the 'prescriptive' approach and the 'performance based' approach. (2) The prescriptive or 'command and control' approach is based on specific requirements made by government, to be met by operators. Technical prescriptions make it clear what is required and give the regulations legal certainty. This makes it relatively easy for government to determine, via an inspection procedure, whether an operator is meeting the requirements. (3) Performance based approaches place a greater emphasis on setting an objective or goal to be reached by industry. An example is a legally binding environment plan or covenant that is subject to reporting and auditing requirements. Concurrent with the shift in regulatory focus has been a greater acceptance by industry of the principle of voluntary

The profiles were compiled via contacts from UNEP, the Exploration and Production Forum (E&P Forum), World Wide Web, literature searches and a survey questionnaire.

considerations at every stage of the production process. They are also demanding on regulatory resources.

A number of countries and regulatory regimes are experimenting with an alternative approach which gives industry greater flexibility and autonomy over how it achieves better environmental performance, but within a framework designed to “make industry think” about its environmental challenges and to establish systematic solutions. This is achieved principally by encouraging or requiring industry to adopt certain processes and an environmental management system (EMS). An EMS is a potentially powerful management tool, which involves the assessment and control of risks and the creation of an in-built system of maintenance and review. It is capable not only of assisting an organisation to achieve its environmental goals but also of building in continuous improvement and embedding cultural change on environmental issues within the organisation. In future, the most popular form of EMS will almost certainly be one that complies with the International Standards Organisation’s (ISO) EMS standard, ISO 14000. (Visit also the OEF section on EMS, and the International Standard Organisation (ISO) and on Eco-Management Audit Scheme (EMAS).

Two options are available to policymakers who want to make regulations interface effectively with environmental management systems. First, they can make the use of such systems mandatory in prescribed circumstances. This ap-

proach could involve an environmental management system being developed by the rig operator and submitted to the regulator for scrutiny and approval. This must not only explain strategies but also demonstrate the adequacy of hazard control and environmental management. The regime should be accepted and technologically challenged by the relevant authority.

The other approach is ‘two track’ regulatory system whereby enterprises are offered a choice between a continuation of existing forms of regulation on the one hand (track one), and the adoption of an EMS-based approach on the other (track two). Track two would put primary responsibility on the operator to find the best means of reducing environmental harm built around an EMS and subject to government and third party oversight. It would provide considerable flexibility and enable enterprises to devise their own least-cost solutions, and give them direct incentives to go “beyond compliance” with minimum legal standards. Experience in the USA suggests that few enterprises will adopt track two unless considerable incentives are provided to do so. These might include regulatory flexibility (reducing the likelihood of inspections and prosecutions, less prescriptive regulatory requirements; reductions in penalties if prosecutions take place) and logo or other publicity or public relations benefits to participating enterprises.

If an EMS, such as ISO 14001, is used as a regulatory tool, it will still be necessary to maintain a variety of oversight and regulatory fall back mechanisms to ensure that the system actually delivers improved environmental performance to a prescribed level or beyond (because ISO 14001 emphasizes processes but not particular environmental outcomes, and does not require independent verification). Regulatory flexibility initiatives must be based on “ISO Plus” rather than merely on conformity with ISO 14001 itself. Four key components are necessary to the successful implementation of such



regulatory flexibility initiatives. These are:

(i) That those enterprises must commit to outcome-based requirements, the achievement of which can be measured through specific performance indicators;

(ii) That there should be independent verification both of the functioning of their management system and of environmental performance under it (e.g. by a third party environmental auditor or regulator), with the results or a summary of the results available both to the regulator and third parties such as community groups; That there should be an ongoing dia-

logue with local communities (where such communities exist) concerning compliance goals and the means of achieving them, thereby ensuring the credibility and legitimacy of the process and third party input and oversight; and That there should be an underpinning of government intervention; acting as a safety net which only “kicks-in” when triggered by the failure of the other less intrusive mechanisms described above.

an approach is a form of co-regulation whose goal, rather than regulating prescriptively, is to encourage enterprises to establish processes of internal self-regulation to self-inspect, monitor, control and

continually improve their environmental performance. Enterprises subsequently report to the regulator on all these issues. The result is to move the burden of auditing and inspection from government to the industry. The well-documented failures of pure self-regulation (which is often ineffective in bringing laggards up to acceptable standards) are overcome by building in transparency and government and third party oversight mechanisms.

If successful, this approach will be a more cost-efficient and cost-effective way of dealing with environmental problems, it will streamline procedures, provide more reliable and verifiable report-

ing, and encourage industry to go ‘beyond compliance’ with fixed standards. It will also substantially reduce the cost of regulatory enforcement. However, not all-regulatory flexibility initiatives using EMS have been successful and careful regulatory design will be essential if such an approach is to achieve better economic and environmental outcomes than traditional regulation. It will also be important to identify best practice models and to learn from them.

As regards smaller enterprises, including some contractors and suppliers, it is less clear that an EMS (even in a simplified form) is the most appropriate regula-



Norway Oil Industry Seen At Risk If New Areas Not Opened

Norway's oil and gas production and industry risk going into serious decline by the mid-2020s if a ban on exploration in unexplored offshore areas in the North isn't lifted quickly, oil chiefs say.

Combined oil and gas production from Norway, the second-biggest gas exporter to Europe after Russia, and the world's fifth-largest oil exporter, is at a peak that operators hope to sustain until at least 2015, while stemming the decline beyond that.

To achieve that, industry leaders say areas currently off-limits - Nordland VI, VII and Troms II - will need to be opened up. But there's strong opposition to drilling in the region off northwest Norway, which has important fishing grounds as well as a natural beauty that attracts many tourists.

A Norwegian parliamentary vote on the integrated management plan for the area decreed it closed to oil companies for the lifetime of the current parliamentary session. But that ends in September, when there's a general election, so the issue will come up for review in spring 2010. It's expected to be a divisive topic

during the election run-up.

With an average lead time of 18 years between the award of licenses and production coming onstream, "there's no time to waste" in opening Norway's most prospective blocks offshore the archipelagos of Vesteraalen and Lofoten, said Per Terje Vold, the chief of Norway's oil industry association, or OLF.

Together those areas are estimated to hold 3.4 billion barrels of oil equivalents in remaining resources.

Norwegian producers face a sea change in 2013-14, as they respond to the challenges of dwindling output from mature oil fields, which means Norway's steadier gas production will soon overtake oil volumes.

Oil output has fallen from a peak of 3 million barrels a day in 2000 to 2.1 million barrels a day now, although gas output will continue to rise for the next couple of years as large new fields like Ormen Lange and Snoehvit ramp up.

Production on the NCS would fall to around 1.6 million barrels of oil equivalents a day by 2030, roughly 60% below current levels, unless new acreage is made available, the OLF estimates.

"I think that Norway (could) supply

Europe with significant volumes of gas for many, many years to come and play the same important role in energy supply as it has done," Vold said.

But to do that, OLF says half the country's potential oil and gas output by 2030 still needs to be found and brought on stream.

"Time is limited. We need to use this scenario to demonstrate why we need new acreage for oil companies now. Those three areas are the most promising, with the possibility of making some (decent) mid-sized discoveries," he said.

If the blocks were opened for exploration between 2010-14, drilling would start in time to replace Norway's dwindling oil - and soon gas - reserves.

StatoilHydro ASA (STL.OS), Norway's biggest oil and gas company, said it's necessary to open the areas to maintain production and activity. "The timeline is left up to the government, but as an industry we obviously hope to get permission for exploration," StatoilHydro spokesman Geir Gjervan said.

"The number of exploration targets is declining in the next few years. So to maintain the same level of exploration activity we need to have new acreage,"

he said.

Marathon's Norway managing director Kristin Faerovik said her company is also supporting the OLF's efforts. "We think the industry is mature enough to take that responsibility, but of course it's very important to win the trust of the people (in those areas)," she said.

A recent survey by Visendi for online financial newspaper DN.no showed that 40.7% of north-Norway respondents think oil exploration should be allowed, while 35.5% want it banned. Of those questioned 23.9% were undecided, demonstrating the oil industry still has work to do to persuade politicians to open the areas.

Environmental and fisheries organizations, including the Norwegian arm of The World Wildlife Fund and Bellona are staunchly against opening up for oil activity. They say the fish and bird life in the area would be damaged by oil activity.

Bellona is calling for a permanent moratorium on oil activity in the sea off Lofoten. "Both the natural resources in the area, the fisheries and the landscape and nature are too precious to take any risk with petroleum activity in the area," said

deputy director Marius Holm.

"We also believe petroleum activity in general will need to be reduced to limit consumption of fossil fuels and limit climate change. Norway is very rich and well developed and if we can't afford to leave any oil in the ground, then who can?" Holm said.

Lofoten is the spawning ground of one of the largest remaining cod stocks in the world, supporting a large fishery of 400,000 metric tons annually, according to the WWF.

But while the region depends on income from fishing and tourism, OLF argues it would get an economic boost from the trickle-down effects of oil developments.

A report by Konkraft for OLF showed that extending petroleum access could boost investment in Norway by NOK200 billion-250 billion between 2022 and 2040.

On the other hand, leaving the acreage closed would hasten the future decline in capital spending, leading to an investment decline to just 20% of today's level after 2030 based on a long-term oil price of \$60-100 a barrel, the report said.

OLF estimates that NOK127 billion

will be invested in the oil and gas industry in Norway in 2009, down from an earlier figure from October of NOK137 billion, although it remains at historically high levels. The petroleum sector contributes around a third to the government's revenues.

Norway's oil and gas industry is facing the challenge of lower oil prices and high oil services costs, which are squeezing margins. A number of companies have said they have delayed or temporarily canceled developments because they aren't economic in the current climate.

The composition of the industry is also undergoing a massive change as major oil companies consolidate portfolios, European utilities like Centrica Plc (CNA.LN) and Poland's PGNIG (PGN.WA) move in to secure upstream needs, and smaller players struggle with low oil prices, prompting a wave of mergers.

Amid these additional challenges, Vold stressed: "You can't really isolate any of these things from the need to get new acreage in the coming year. If we don't get new acreage that's a big problem. All the challenges for the next years lie in that issue."