

Oil and Gas

Oil and gas is the largest contributor to provincial GDP on an industry basis. Currently, Newfoundland and Labrador is home to three active offshore oil projects: Hibernia, Terra Nova and White Rose. First oil from a fourth major project (Hebron)—estimated to contain the second largest reserves in the province's history—is expected in 2017. Industry is also continuing to drill additional wells (e.g. Hibernia South Extension, North Amethyst and West White Rose) associated with existing projects and fund exploration efforts to discover new resources.

Between 1997—when first oil from Hibernia occurred—and 2010 provincial real GDP grew by 58.8%. It is estimated that almost half of this growth was directly attributable to oil and gas production. The growth of the oil and gas industry has been driven by large infusions of investment, representing 29.0% of total capital expenditures in the province since 1997. In 2010, oil production accounted for approximately 30% of the province's nominal GDP and 19.2% of investment.

Oil Production

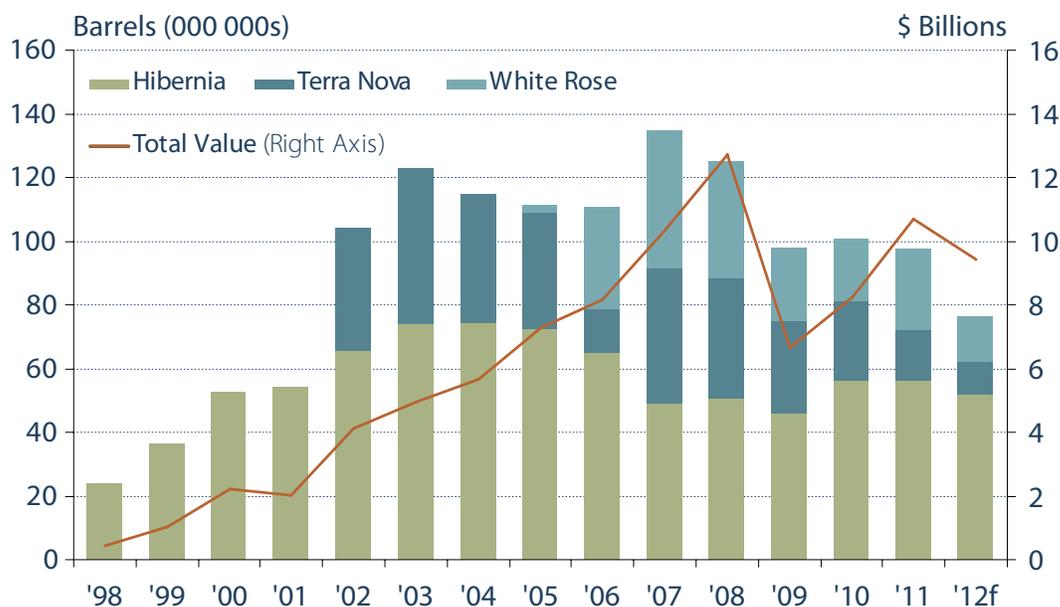
Oil production decreased to 97.3 million barrels in 2011, compared to 100.7 million in 2010, representing a 3.4% decline. The main factor contributing to the decline in 2011 was maintenance work and well shut-ins at Terra Nova to deal with the presence of hydrogen sulphide (sour gas).² Cumulative oil production since 1997 totalled 1.3 billion barrels as of December 31, 2011.

² Sour gas is a toxic, naturally occurring gas in oil and gas geological structures. It can cause stress cracking in industry equipment.



The value of oil production is estimated to have increased by 30.0% to \$10.7 billion in 2011 as a result of higher crude prices (see chart). The price of Brent crude oil, a benchmark for Newfoundland and Labrador oil, averaged US\$111.26/barrel in 2011, compared to US\$79.61/barrel in 2010. The increase reflected improving global economic conditions and supply pressures associated with Middle East unrest.

Offshore Oil Production



f: forecast

Source: Canada-Newfoundland and Labrador Offshore Petroleum Board; Department of Finance

Hibernia

The Hibernia field, consisting of the Hibernia and Ben Nevis/Avalon reservoirs, is among the largest oilfields ever found in Canada. With estimated recoverable reserves³ of 1.4 billion barrels (including oil already extracted), Hibernia boasts the largest reserves of Newfoundland and Labrador's three active projects. Operated by the Hibernia Management and Development Company Ltd. (HMDC) and located in the Jeanne d'Arc Basin 315 kilometres (km) southeast of St. John's (see map), it has been producing oil since late 1997 using a gravity based structure (GBS).

Oil production at Hibernia was 56.3 million barrels in 2011, virtually unchanged from the previous year. Although there was minimal change in production, significant milestones were reached at Hibernia last year. Most importantly, first oil from the Hibernia South Extension Unit (HSE Unit) occurred on June 23, 2011 and production from a second HSE Unit oil producer commenced in September 2011.

³ Recoverable reserves in this usage refers to proven and probable reserves as defined by the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB).

The HSE Unit is part of the larger Hibernia South Extension, which also includes the AA Blocks that came online in late 2009. The Hibernia South Extension has estimated recoverable reserves of 215 million barrels, which will extend the life of the Hibernia project by 5-10 years. Approximately 23.7 million barrels of these reserves were extracted by the end of 2011, including 15.3 million barrels in 2011.

Cumulative Hibernia production from November 17, 1997 to December 31, 2011 was 779.3 million barrels, representing 55.9% of total estimated recoverable reserves.

Terra Nova

The Terra Nova field was the second Newfoundland and Labrador offshore project to commence production, delivering first oil in January 2002. The field, located just southeast of the Hibernia project, is operated by Suncor Energy Inc. using a floating production, storage and offloading unit (*Terra Nova FPSO*). Terra Nova is the second largest producing project in Newfoundland and Labrador's offshore area with an estimated 419 million barrels of recoverable reserves.

The Terra Nova project produced 15.7 million barrels of oil in 2011, a decline of 9.2 million barrels (or 36.9%) over the previous year. Production, while anticipated to be lower than 2010 due to natural declines, was impeded throughout the year by the discovery of sour gas in two producing wells in late 2010. Subsequently these two wells had to be shut in, as well as two additional wells because of flowline linkages to the wells containing sour gas. The shut-in of these four wells led to deferred production equivalent to 23,000 barrels per day.

The production loss at Terra Nova was mitigated somewhat by Suncor re-entering a well in the East Flank region of the field, bringing another production well online (producing approximately 18,000 barrels per day). The company also deferred repairs to the water injection swivel on the *Terra Nova FPSO* to 2012. This repair work, which is planned for Marystown, was first identified in 2006 and had been contemplated for 2011. The maintenance turnaround will also include work to replace flowlines and risers in order to resolve the sour gas problems. In total the maintenance shutdown is estimated to take 21 weeks in 2012, which will have a significant impact on production.

From January 20, 2002 to December 31, 2011 cumulative production at Terra Nova was 327.1 million barrels, representing 78.1% of estimated recoverable reserves. These reserves are currently expected to be fully depleted by 2020.

White Rose (including North Amethyst)

White Rose is the most recent offshore area in the province to be brought into production. The White Rose oilfield and satellite expansions, operated by Husky Energy Inc., are located in the Jeanne d'Arc Basin east of the Hibernia platform. First oil from the South Avalon Pool was produced in November 2005 via use of the *SeaRose FPSO*. Including already extracted oil, recoverable reserves in the White Rose and White Rose Expansion fields (North Amethyst, West White Rose and South White Rose Extension) are estimated at 337 million barrels of oil. Cumulative production at White Rose was 181.7 million barrels as of December 31, 2011, or 53.9% of recoverable reserves.

North Amethyst is the first satellite field development at White Rose and was brought into production on May 31, 2010, less than four years after discovery. It is the first subsea tie-back project in Canada.

September 2011 marked first oil from a second satellite field via the West White Rose pilot producing well, which is currently undergoing flow tests. This pilot production well, along with a pilot water injection well, will give Husky further information on the feasibility of developing the entire West White Rose resource. The West White Rose area is considered to be the most complex, and potentially the largest, of the White Rose expansions. The South White Rose Extension, the smallest of the tie-back developments (24 million barrels in estimated reserves), received regulatory approval in 2007. Husky has not sanctioned investment in the project up to this point.

The White Rose project, including output from the North Amethyst field, produced 25.2 million barrels of oil in 2011, up 5.8 million barrels (or 29.7%) from the previous year. Production was higher as a result of the first full year of production from the North Amethyst field.

The *SeaRose FPSO* is scheduled for repairs in Northern Ireland during an 18-week maintenance shutdown in 2012, which will significantly curtail production this year. The *SeaRose FPSO* is expected back into service in late August.

On October 14, 2011 Husky issued an expression of interest for front end engineering and design (FEED) associated with the development and implementation of a concrete gravity structure wellhead platform (WHP). Where feasible, a WHP would replace the requirement for mobile drilling units for incremental drilling at the White Rose project. It could potentially provide Husky with fewer well interventions and less weather-associated downtime, as well as lower operating costs and a higher resource recovery rate. A decision from Husky on the implementation of a WHP has not been made but is expected some time in 2012. Awarding of the FEED contract could occur in the first quarter of 2012, as well as filing of a project description with C-NLOPB.

Hebron

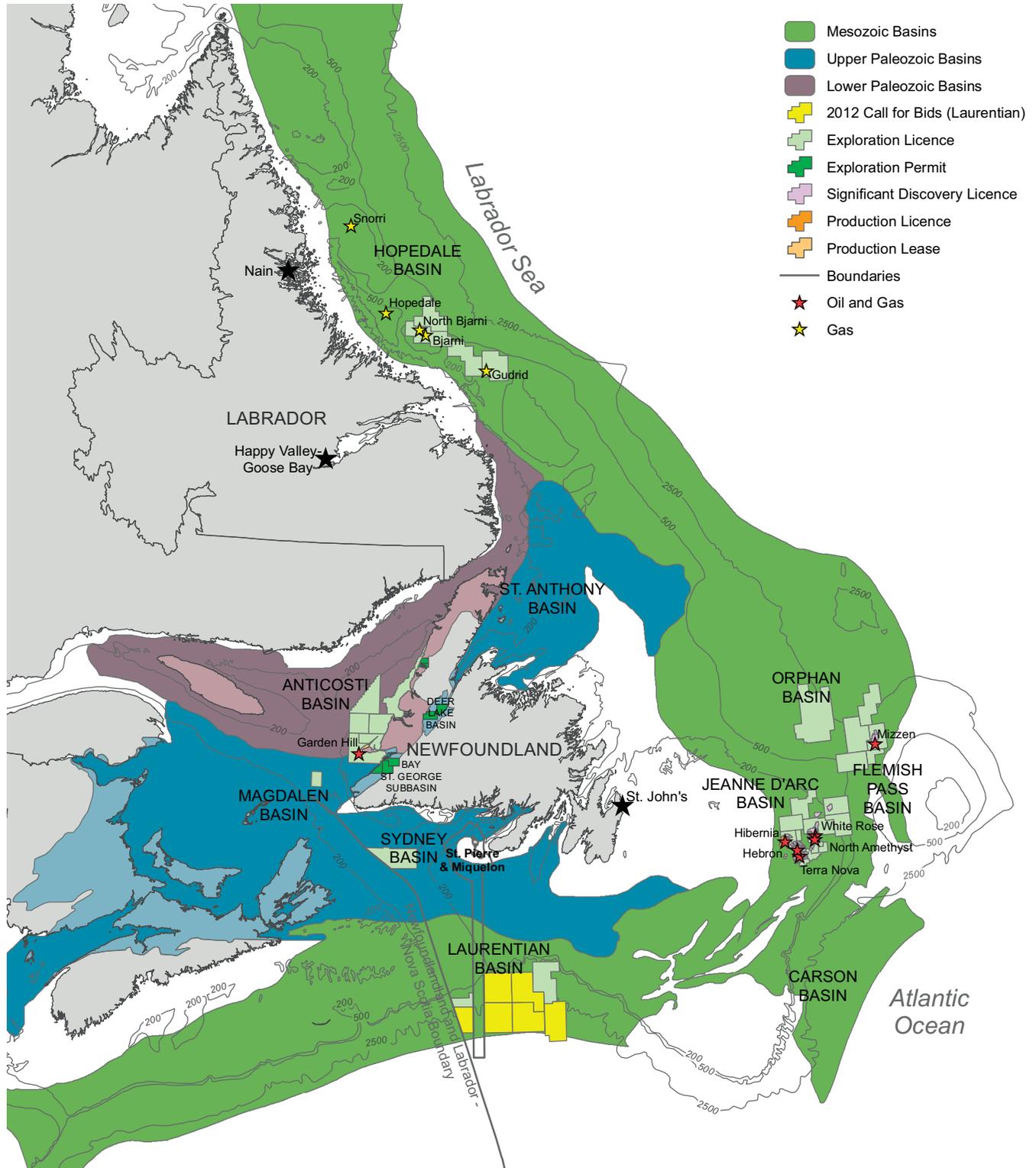
The Hebron field, discovered in 1981, will be Newfoundland and Labrador's fourth stand-alone offshore oil project. Located just to the northwest of the Terra Nova project in the Jeanne d'Arc Basin (see map), Hebron is estimated by the consortium to contain 660-1,005 million barrels of reserves, which would make it the second largest project after Hibernia. Like Hibernia, Hebron will be developed using a GBS, but on a smaller scale. Development activities have been ongoing since 2008, when the province signed the final agreement with the Hebron consortium to develop the oilfield. Based on the current project schedule, first oil is expected in the second quarter of 2017 (see project timeline on page 28).

The province, through Nalcor Energy, purchased a 4.9% equity stake in the Hebron project at a cost of \$110 million. It will pay a proportional share of project costs and receive a corresponding share of production. The remaining Hebron consortium participants include ExxonMobil Canada Properties (36.0%), Chevron Canada Limited (26.7%), Suncor Energy Inc. (22.7%) and Statoil Canada Ltd. (9.7%).

On April 15, 2011 ExxonMobil, on behalf of the Hebron consortium, submitted the Hebron Development Application, including the Benefits Plan and revised Environmental Comprehensive Study Report, to the C-NLOPB. Following a completeness review by the Board, the development plan was referred to public review commissioner Miller Ayre on August 25, 2011. On February 28, 2012 Ayre delivered his report to the C-NLOPB and the federal and provincial ministers of Natural Resources recommending the project be sanctioned, but making 64 recommendations to "increase the value of the Hebron project to both the province and the country." The Canadian Environmental Assessment Agency has already completed its review and declared that the project "is not likely to cause significant adverse environmental effects."

Construction of the Hebron GBS and topside modules is scheduled to commence in 2012. GBS construction will occur primarily at the Bull Arm fabrication facility and is expected to create 4.1 million person hours of employment in the province. Some of the construction work on the topsides is expected to take place at the Kiewit facility in Marystown, however the bulk of topsides construction will likely take place outside the province.

OFFSHORE EXPLORATION BASINS



Exploration

Offshore

Exploration and delineation drilling activity continued in 2011. The drilling rig *Henry Goodrich* was especially active. Under the operation of Suncor, it completed work at Ballicatters M-96Z in the Jeanne d'Arc Basin, which the company confirmed produced a hydrocarbon discovery. The *Henry Goodrich*, under the operation of Statoil, also spudded the delineation well Mizzen F-09 in the Flemish Pass on July 29, 2011 and the exploration well Fiddlehead D-83 in the Jeanne d'Arc Basin on October 4, 2011. Drilling on the Fiddlehead D-83 well was completed in November 2011.

Off the west coast of Newfoundland, Shoal Point Energy drilled the exploration well Shoal Point 3K-39. The company announced on January 17, 2012 that cased hole operations are continuing.

Corridor Resources Inc. holds an exploration licence on the subsea geological structure off the western coast of Newfoundland known as Old Harry. In February 2011 the company filed a project description with the C-NLOPB with respect to a proposed exploration drilling program. An independent review of Corridor's environmental assessment of the drilling program is on hold pending completion of the updating of C-NLOPB's Strategic Environmental Assessment of the Western Newfoundland and Labrador Offshore Area, expected to be completed in early 2013.

Significant seismic surveying also took place last year. Chevron completed a fine grid 2-D survey in the Northern Grand Banks and Flemish Pass on August 15, 2011 and Statoil completed a combination 2-D and 3-D survey project in the Flemish Pass on September 1, 2011. Nalcor is investing \$6 million in a multi-client 2-D seismic survey, focusing primarily on offshore Labrador. The survey is being conducted by Multi Klient Invest (a joint venture of Norwegian companies Petroleum Geo-Science and TGS NOPEC Geophysical Company) using the survey vessel *Sanco Spirit*. Work commenced in September 2011 and as of October 25, 2011 the company had completed 5,144 line kms of surveying.

In terms of new offshore areas available to industry for exploration and development, the C-NLOPB announced winning bids for the 2011 licence auction on November 16, 2011. The areas up for auction comprised 1,599,295 hectares over eight parcels. In the Western Offshore Region two parcels were won by Ptarmigan Energy Inc.; in the Flemish Pass/North Central Ridge area two parcels were won by a consortium of Statoil, Chevron and Repsol E&P Canada Ltd.; and in the Labrador Offshore Region there were no bids received for the four parcels. The four successful bids totalled \$349.8 million in work commitments, the second highest single-year bid total since 1988—the highest total was \$672.7 million in 2003.

Exploration activity looks to remain strong moving forward. Chevron, Statoil and Repsol will team up to drill exploration wells in both the Orphan Basin and Flemish Pass in

OIL and GAS

2012. In the Orphan Basin Chevron will operate with a 65% stake, while Repsol and Statoil will take stakes of 20% and 15% respectively. In the Flemish Pass, Statoil will operate two exploration licences with a 50% stake, while Chevron and Repsol will take stakes of 40% and 10% respectively. These three companies also have plans for 3-D seismic surveys of the Flemish Pass parcels they successfully bid on at the end of 2011. Statoil also has plans of its own for exploration drilling in 2012, which could see the company participating in up to four wells in the region. Off the west coast of Newfoundland, Shoal Point acquired a 100% stake from NWest Energy in a parcel encompassing the opening to the Bay of Islands and the ocean area just west of this location. This adds to the already extensive holdings of Shoal Point off the west coast. The company has until January 15, 2014 to spud an exploration well in the newly acquired licence area.

As of March 1, 2012 there were 33 active exploration licences, 54 active significant discovery licences and 10 active production licences in the province's offshore area.

Onshore

In June 2011, Vulcan Minerals announced plans for a drilling program with regards to the Journois location in its Flat Bay interests. These plans originally included a shallow coring program of 3-5 test holes and the drilling of a 1,000-metre well. The shallow coring program, which commenced on September 27, 2011, has been completed and ultimately included six test holes and wells. The results are currently being analyzed to help develop a pilot project and well location to extract oil from the Flat Bay pool.

Oil production is expected to decline 21.3% to 76.6 million barrels due to reduced production at all three projects.

- Hibernia (including AA Blocks and HSE Unit) is expected to produce 51.8 million barrels, 4.5 million barrels less than 2011.
- Terra Nova is expected to produce 10.5 million barrels, 5.2 million barrels less than 2011 due to natural declines and a 21-week maintenance shutdown.
- White Rose (including North Amethyst and West White Rose) is expected to produce 14.2 million barrels, 11.0 million barrels less than 2011 due primarily to a 18-week maintenance shutdown.

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Annual average crude oil prices are expected to increase by approximately 11% over 2011 levels. Brent crude is expected to average US\$123.45/barrel.

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Capital expenditures are expected to be about \$2.7 billion in 2012, up roughly 46% from 2011, due primarily to work to advance the Hebron project.

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Construction of the Hebron GBS is scheduled to commence, primarily at the Bull Arm fabrication facility.

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Construction of Hebron modules is expected to commence; some work is expected to occur at Marystown.

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Several companies will be pursuing exploration and development opportunities in the offshore area in 2012.

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C-NLOPB is soliciting bids on six parcels in the Laurentian Basin and on one parcel in the Flemish Pass.