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Sustainable development issues and strategies for Alberta's oil industry

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Abstract

This paper discusses the sustainable development issues for the Alberta oil industry and suggests strategies for its long-term survival. While oil and gas are finite resources, Alberta's massive non-conventional reserves are a virtual assurance that it can meet all the fossil fuel demands for Canada and its export market in the foreseeable future. This makes it a sustainable resource in practical terms. Despite its large economic contribution, this industry will face many challenges to remain viable over the next 50 years. Large investments will be required and it must improve its public consultation process and environmental record if it is to become sustainable. In recent years, stakeholder pressure, tougher regulations and better enforcement has made the industry more environmentally friendly, but its track record suggests that continued regulation will still be required.

There is a growing realisation that sustainable development can no longer remain a low priority for those organisations with aspirations for long-term survival, and this makes it a bone fide strategic issue. Concern over environmental protection has become a critical issue for the industry, and must be addressed in terms of the natural regenerative capacity of the environment, and the legitimate need for an economically viable sector. As such, sustainable development inextricably links environmental protection with economics and stakeholder interests.

In the longer term, competition from less polluting alternate fuels is likely to intensify and this will force contraction of the industry and a loss of market share. This smaller, more competitive environment of the future will likely favour those companies that can best integrate growth with a low cost strategy and environmental protection. As such, size is likely to be important insofar that it usually correlates with financial resources and the ability to achieve economies of scale. © 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Sustainable development; Oil industry; Alberta

1. Industry background

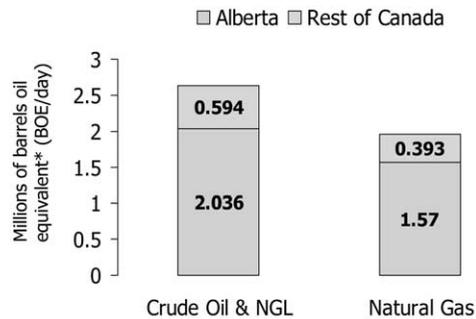
Crude oil and natural gas, collectively known as the oil industry, has emerged over the last century as the world primary fuel source. Its production and use have generated tremendous economic, social and environmental impacts, though these have not always been positive. The industry is made up of three components: the upstream sector; responsible for exploration and production; a transportation or mid-stream sector; and the

down-stream sector which refines and markets oil, gas and their derivatives. Most people are only familiar with the later, and it is this sector that is mostly scrutinized in the debate over gasoline consumption, green house emissions, global warming and alternate fuel technology. But the upstream sector faces many of the same challenges and others that are unique to that environment.

The Canadian oil industry began in 1949 with the Leduc discovery in Alberta. Fig. 1 shows that the Province's production has grown to a current level of over 2 million barrels per day (bpd) of crude oil and natural gas liquids (77% of total Canadian production) and almost 16 billion cubic feet/day (bcf/d) of natural gas (80% of total). The product stream of the upstream sector is conventional crude oil, bitumen, synthetic crude, natural gas

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(*): 1 million cubic feet of natural gas is equivalent to 100 barrel of oil equivalent (100BOE).

Fig. 1. Year 2000 Alberta crude oil and natural gas production. Source: Lunan, 2000.

and natural gas liquids. Conventional crude is made up of light and heavy components, and the cut-off between the two is a density of 970 kg/m³. Bitumen is an extremely viscous, heavy crude that can be converted by high temperature catalytic reactions into synthetic crude that has most of the physical characteristics of conventional crude oil. Bitumen is produced by surface mining (tar sands production), while deeper deposits are produced by thermal methods such as high-pressure steam injection. Natural gas liquids (NGLs) are the condensable liquid phase components of natural gas streams. Refineries convert these crude oil mixtures into liquid fuels, lubricants, solvents, greases, waxes and tars. Natural gas on the other hand, is a primary fuel but is also used extensively as feedstock for the petrochemical industry.

The export markets for Alberta's oil and gas is shown in Table 1. The data was obtained from the Alberta Energy and Utilities website (www.eub.gov.ab.ca). Canada is self sufficient in its energy needs, and 60% of the provinces conventional crude oil, over 80% of its conventional heavy crude and bitumen, and 53% of its

Table 1
Markets for Alberta's crude oil and natural gas (1998)

	Crude oil (thousands bpd)	Natural gas (millions cubic feet/day)
Alberta	397.5	1950.0
British Columbia	41.5	136.5
Saskatchewan	115.7	429.0
Manitoba	3.2	282.8
Ontario	97.5	2593.5
Quebec	0	516.7
Domestic markets	655.3	5908.5
Western US	222.7	2583.7
Mid-west US	693.8	2057.2
Eastern US	54.1	1998.7
US Exports	970.6	6639.6
Total Alberta production	1629.9	12548.1

natural gas production is exported to the US. That market is therefore of critical importance to the industry and is a primary determinant of its future prospects. Domestically, the oil industry has become a mainstay to the Alberta economy and an important contributor to the national economy. But these economic benefits come from investments which must now compete with other opportunities in other provinces and overseas. As such, sustainable development of the industry in Alberta will require continued close collaboration between government and industry.

The Western Canadian Sedimentary Basin (WCSB) is the primary geological target for exploration in Alberta, but with over fifty years of development, it is now maturing, and discoveries are getting harder to find and are less prolific than in the early days of development. However, enormous potential exists as coal gas, in gas hydrates, and in the Athabasca tar sands. These non-conventional reserves will require very large capital commitments to bring into production, and they will be technically challenging. Unless these megaprojects are carefully managed, their sheer size could also potentially result in large-scale environmental degradation.

At the other end of the scale, an average Alberta oil well today produces only about 40 bpd, less than half of the global average according to the Alberta Chamber of Resources, and there are many better production opportunities overseas. Many foreign governments are increasingly receptive to the idea of joint ventures and foreign-controlled production contracts with smaller companies, many of them Canadian. Scarcity of investment capital and discoveries of large reservoirs worldwide make international energy investment highly competitive despite the logistical and geo-political risks, and so globalization of the industry has given Alberta producers investment options that were unavailable as little as 5 years ago. Domestically, the East Coast, the Arctic and NE British Columbia also hold promise for very large reserves and excellent development opportunities, and these regions are already competing with Alberta for investment capital.

Despite its shortcomings on environmental protection, the Alberta industry still serves as a good model for progress and has been an important competitive advantage in securing foreign leases for Canadian companies. But individual companies with poor track records continue to undermine industry image and have forced regulation, especially for environmentally sensitive areas. Poor environmental consciousness and a lack of commitment to compliance have been problems in the past, and the industry continues to be criticised by interest groups for ignoring legitimate health and environmental concerns, its railroading tactics, and operational practices which continue to pollute the environment (Marr-Laing and Severson-Baker, 1999). This has resulted in stricter regulations, which has had a critical role in improving the

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