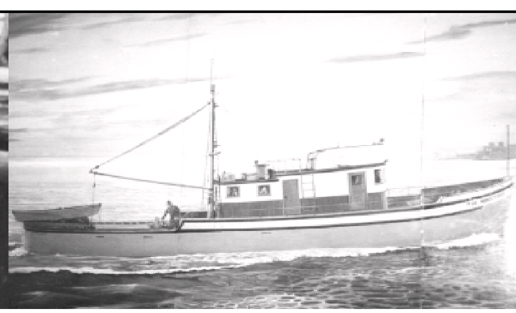
Should BC lift the offshore oil moratorium?

A policy brief on the economic lessons from Hibernia

by Dale Marshall

Part of a series of CCPA research papers on the BC resource sector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PART 1

Introduction

IN 1981, AN ORDER-IN-COUNCIL PLACED A PROVINCIAL MORATORIUM ON THE EXPLORATION and development of oil and gas off BC's West Coast. Recently, the BC government has tested public opinion on the moratorium by openly suggesting its removal. The government's July throne speech mentioned "the enormous opportunities of offshore oil and gas off our North Coast."[1] Minister of Energy and Mines Richard Neufeld echoed those sentiments, stating the government will "look seriously at offshore oil and gas."[2]

The government has followed up these statements with action. Jacques Whitford Environmental Ltd., a corporate consulting firm, was commissioned to update the report they produced for the previous BC government on the potential impacts of offshore oil development. Their report advised that exploration and development could proceed.[3] The province has since set up a three-person panel to provide scientific advice on drilling off the North Coast. A caucus of Liberal MLAs is also consulting with northern communities on the issue of offshore development.

Presumably, the government is contemplating lifting the moratorium in order to create employment in BC and generate royalty revenues for the province. In order to determine the likelihood of either employment or government revenues, it is instructive to take a look at the Hibernia offshore development and investigate the benefits of that project to Newfoundland.

The analysis shows that the economic spin-offs of BC lifting the offshore oil moratorium are not terribly attractive. Offshore oil and gas projects are notoriously expensive and, though they are initially pitched as purely private enterprises, they often require extensive government subsidies to succeed. On an investment basis, offshore oil and gas projects create few jobs, and even fewer local jobs. Furthermore, BC faces unique challenges not faced by Newfoundland. Instead of lifting the moratorium on offshore oil and gas development, the BC government should instead give incentives to other industries, including renewable energy, that will create a greater number of jobs and generate more stability for struggling communities on BC's North Coast.

Conflicting claims to the resource

PART 2

ANY DECISION TO LIFT THE MORATORIUM ON OFFSHORE OIL AND GAS DEVELOPMENT will involve more than just the BC government. The federal government has had its own moratorium in place since 1971, and Environment Minster David Anderson has expressed reluctance to lift it. He states, "I am not going to in any way support lifting of the moratorium until it's clearly shown that the reasons for having it in the first place are no longer valid."[4] According to Minister Anderson's staff, recent events have not tempered this view.

Unlike the Newfoundland government, BC has to navigate more than just federal-provincial jurisdiction. There is also the matter of unresolved First Nations territorial claims.

For many years, Canada and Newfoundland argued over who owned offshore resources. In 1984, the Supreme Court of Canada unanimously decided that resources beneath the territorial waters off Newfoundland belonged to the Government of Canada.[5] Despite this, and because Atlantic Canada was a less developed region, the Canadian government decided to grant Newfoundland and Nova Scotia some regulatory authority.[6] More importantly, they allowed the provinces to collect some of the royalties from offshore oil and gas development. The odds of Canada extending this courtesy to a "have" province such as BC seem less promising.

Unlike the Newfoundland government, BC has to navigate more than just federal-provincial jurisdiction. There is also the matter of unresolved First Nations territorial claims. At least four First Nations (the Council of the Haida, the Tsimshian, the Heiltsuk, and the Kwakiutl) claim rights and title over marine resources in Hecate Strait or Queen Charlotte Sound, where offshore oil reserves lie. The Haida and Tsimshian Nations have publicly stated they want the moratorium maintained, since offshore oil and gas threatens fisheries resources that are vital to their life and culture.[7]

In one way or another, the province will have to resolve who owns the offshore resource. This may involve multilateral negotiations between the federal and provincial government and all the First Nations dependent on marine resources in the area. A more confrontational approach for BC would be to use the courts to argue for provincial jurisdiction in this particular case. The legal route would likely entail the province arguing that Hecate Strait, Queen Charlotte Sound, and Dixon Entrance are not "offshore," but rather inland waters.

PART 3

Costs and benefits to the Newfoundland government

Subsidies

These subsidies highlight the vulnerability of a project so dependent on global commodity prices.

Hibernia was intended to be constructed and operated without government money. In the end, the project relied heavily on government grants, loan guarantees, and tax exemptions (see Table 1).

Most of the subsidies from the Newfoundland government came in the form of tax exemptions. The provincial government first waived the 12% sales tax on start-up capital costs and then, as the project neared completion, waived the provincial sales tax on operating expenses as well. Hibernia Management Development Corporation (HMDC) also received a tax credit on corporate income tax payable to the province. No retail sales tax was paid on the transshipment terminal built at Whiffen Head in Placentia Bay. Finally, a fuel tax exemption was granted to the Hibernia project as well as the Terra Nova project and the transshipment terminal.[8] A conservative estimate of the total tax exemption to date would be $190 million.[9]

The province also collaborated with the federal government to offer grants to the project. Under the Offshore Technology Transfer Fund, the Newfoundland government provided the project with $11 million to ensure that Newfoundland engineers were hired to design the offshore structure.[10] Through the Canada-Newfoundland Offshore Development Fund, the two levels of government also subsidized the Bull Arm facility, where the gravity-based structure was built, to the tune of $95 million.[11]

These subsidies are in addition to the grants, bailouts, and loan guarantees provided by the federal government. In 1988, when the low price of oil put the project in jeopardy, Arne Nielson of Mobil's Canadian unit went to the federal government with a request for a $1.04 billion grant and a $1.66 billion loan guarantee.[12] When the Canadian government agreed, Nielson reportedly gushed, "I personally thought it was the end of Hibernia. But, by Jove, they accepted the terms."[13] Then in 1992, the consortium scrambled to fill the capital void left when Gulf Canada Resources Ltd. pulled its 25% share out of the project. The government of Canada again stepped in, buying an 8.5% share for nearly a billion dollars and guaranteeing over $700 million in loans to Murphy Oil Corp. from Arkansas so that it could pick up a 6.5% interest.[14]

These subsidies highlight the vulnerability of a project so dependent on global commodity prices. However, what most captures this dependence is an interest-free loan extended by the federal government – for as much as $300 million – to help the consortium make interest payments when the price of oil drops below US$25/barrel (in 1987 dollars). At publication, the price of oil was less than US$20/barrel. Ten independent industry analysts forecast the price of oil over the next 15 years ranging from US$14/barrel to US$23/barrel, with the majority predicting an average of less than US$20/barreel.[15]

Table 1: Government contribution to Hibernia project

	Level of government	Amount
Grants		
Re-negotiation of Accord (1988)[a]	federal	$1.04 billion
Offshore Technology Transfer Fund (for Newfoundland design engineers)[a]	federal and Nfld	$11 million
Canada-Newfoundland Offshore Development Fund (for Bull Arm facility)[a]	federal and Nfld	$95 million
Operating grant for Canada-Newfoundland Offshore Petroleum Board[b]	federal and Nfld	$2.6 million/year
Equity position		
Buying 8.5% equity from Gulf (1992)[c]	federal	almost $1 billion
Tax exemptions		
Waiving PST on start-up capital expenditures[d]	Nfld	$186 million
Waiving PST on operating expenditures[e]	Nfld	$1 million/year
Fuel tax exemption on Hibernia, Terra Nova, and transshipment terminal[f]	federal and Nfld	Not calculated
Waiving retail sales tax on transshipment terminal[f]	Nfld	Not calculated
Tax credit on provincial corporate income tax[a]	Nfld	Not calculated
Loans and Loan guarantees		
Loan guarantee, re-negotiation of Accord (1988)[a]	federal	$1.66 billion
Loan guarantee for Murphy Oil Corp. (1992)[c]	federal	$700 million
Interest-free loan, if price of oil below US$25/barrel[a]	federal	up to $300 million

Notes

a. Locke, Wade. 1992. "Economic issues related to taxation of offshore oil projects: Hibernia as a case study." Institute of Social and Economic Research. Memorial University. St. John's, Newfoundland.
b. Average of operating grants for last 6 years. Data from Canada-Newfoundland Offshore Petroleum Board. 2001. "Canada-Newfoundland Offshore Petroleum Board Annual Report 2000-2001." (May 18). p. 35; and Canada-Newfoundland Offshore Petroleum Board. 1998. "Canada-Newfoundland Offshore Petroleum Board Annual Report 1997-1998." Obtained electronically on October 26, 2001 from www.cnopb.nfnet.com.
c. Sullivan, Alanna. 1997. "Oil field off Canada, on ice for 40 years, ready to gush." The Wall Street Journal. (April 4).
d. Estimated by taking total expenses spent in Newfoundland ($2.7 billion), subtracting the cost of Newfoundland labour (41.7 million employment-hours x $27.60/hour) and multiplying by the PST rate (12%). Data from Canada-Newfoundland Offshore Petroleum Board. 2001. "Industrial Benefits." Obtained electronically on Nov. 2, 2001 from www.cnopb.nfnet.com/general/media/benefits.htm.
e. Conservative estimate using provincial sales tax (12%) on total of purchase orders from Newfoundland companies. Data from Shrimption, Mark. 1999. "Economic Benefits of Hibernia." Community Resource Services. Prepared for the Hibernia Management and Development Company. (June).
f. Government of Newfoundland & Labrador. 1996. News release: "Transshipment Terminal for Offshore Oil to be Built at Whiffen Head." (September 5).

Government revenues

On the basis of total investment, employment in the Hibernia project has been dismal. To date, the project as a whole has created – even when including multiplier effects – only 7.5 jobs per million dollars invested.

The Supreme Court ruling in 1984 found that Canada had sole jurisdiction over offshore oil and gas reserves. The original agreement between John Crosbie, representing the federal government, and Clyde Wells of Newfoundland was signed a year later. Newfoundland Premier Brian Tobin renegotiated this agreement in 2000. In exchange for higher royalties, the Premier agreed to allow the Hibernia oil platform to increase its production from 135,000 barrels per day to 180,000 barrels per day. This increased production dropped the life expectancy of the project from 16 years to 12 years.[16]

Royalties, like some of the loan guarantees, are contingent on a high price of oil. HMDC is required to pay the federal government a 10% royalty on the project's net revenue, with that percentage declining as the price of oil drops below US$30 per barrel (in 1987 dollars).[17] With the current price of oil (US$20/barrel), HMDC would pay the federal government 3.3% of net revenues.[18]

Royalties paid to the provincial government are divided into a statutory royalty and a contractual royalty. The statutory royalty equals one cent per barrel of oil produced, which will bring $7.7 million to provincial coffers over the duration of the project. HMDC can deduct this amount when calculating its contractual royalties.

Contractual royalties entail a basic royalty and a net royalty. The basic royalty is paid on sales revenues less transportation costs, with the percentage paid increasing from 1% on the first portion of oil to 7.5% on the last portion.[19] Again, these royalty percentages are indexed to the price of oil. Even when ignoring transportation costs and discounts for oil prices below US$30/barrel, the basic royalty will total CAN$1.5 billion over the life of Hibernia – less than the amount the two governments put into the project.[20] Net royalties will only be paid if the project's revenue exceeds its eligible costs including a15% rate of return for HMDC.[21]

Another source of revenue for the federal and Newfoundland governments are corporate income taxes. However, HMDC can use expenditures on petroleum projects unrelated to Hibernia to reduce or eliminate its income tax obligations.[22] Finally, both the provincial and federal governments will collect personal income taxes from Newfoundlanders who work on the Hibernia project.

Jobs

Different phases of offshore oil projects create different levels of employment. The exploration phase, though expensive, has "limited opportunities for local involvement" since exploration contractors bring in work crews from elsewhere.[23] For example, Chevron estimated employment for a 3-year West Coast exploration program peaking at 202 employees, with a maximum of 81 local hires, but a more likely total of 27, since locals often do not possess the requisite skills.[24]

The construction phase of offshore projects is the most expensive and creates the most jobs. The $5.2 billion Hibernia construction project, for example, created 26,000 person-years of employment, or about 5,000 jobs for a five-year period.[25] The province of Newfoundland insisted on a gravity-based structure since that design would create the most jobs. However, a floating platform design – requiring considerably less investment and employment – is increasingly being relied upon, allowing construction to occur in distant locations.[26] For example, Newfoundland's Terra Nova main structure was built in South Korea and proponents of Newfoundland's White Rose project are suggesting that it be built entirely in international shipyards.[27]

Operational employment for offshore oil projects is significantly lower. According to the Canada-Newfoundland Offshore Petroleum Board, less than 800 workers are required to operate Hibernia's offshore platform and oil tankers and the transshipment terminal at Whiffen Head.[28]

Somebody living in a depressed area of the country might be impressed with these employment totals. On the basis of total investment, however, employment in the Hibernia project has been dismal. The exploration and construction phase of the Hibernia project created, on average, 5.5 person-years of employment per million dollars invested (jobs per million, or JPM). In 1998, the first full year of operation, the $299 million in investment led to 960 jobs, or 3.2 JPM.[29] Last year, a further $321 million investment created 2.5 JPM.[30] To date, the project as a whole has created – even when including multiplier effects – only 7.5 JPM.[31] Two-thirds, or 5 JPM, of those went to Newfoundland residents.[32]

The Hibernia project was successful in generating some employment for Newfoundlanders. The HMDC agreed to employ 70% of their workforce from Newfoundland[33] and though parts of the Hibernia platform were constructed in Italy, South Korea, and elsewhere in Canada, 66% of employment went to Newfoundlanders.[34]

The North American Free Trade Agreement, however, makes local employment targets for West Coast offshore development more difficult to achieve. The *Canada-Newfoundland Atlantic Accord Implementation Act* (which enshrined the Atlantic Accord, the regulatory and royalties agreement between Newfoundland and Canada) was specifically exempted from NAFTA.[35] With respect to future projects, NAFTA significantly restricts the ability of governments to impose performance requirements – such as requiring a company to hire locally – on any investor except in exchange for a subsidy.[36] In other words, if the BC government wants to ensure that offshore oil jobs will go to British Columbians or that offshore platforms will be built in BC, it better be ready to pay oil companies for that concession.

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The Jacques Whitford report clearly outlines the options open to offshore oil and gas companies operating in a global environment: "Companies can terminate their efforts for a variety of reasons including…a local jurisdiction being 'unreasonable' in its requirements for local preference, taxation, and/or environmental performance."[37] Asian shipyards such as China's and South Korea's are especially attractive as platform construction sites due to their generous production subsidies and extremely low labour costs.[38] Furthermore, neither Kitimat, Prince Rupert, nor any other deep sea port on BC's northwest coast has any shipbuilding or large steel fabrication facility, making these communities improbable locations for short-term construction projects.

Even if British Columbians are hired for construction or operations, the location of these jobs within the province is important in determining potential socio-economic benefits. With Hibernia, for example, a social impact assessment suggested that the short-term nature of construction employment would have disruptive consequences for any community in Newfoundland. The decision was made, therefore, to house the employees in a temporary work camp outside existing communities. This plan essentially turned construction-phase employees into migrants. Now during operations, only 38.6% of the remaining jobs are onshore.[39]

PART

4 Alternatives to offshore oil and gas

Compared to offshore oil projects, renewable energy projects create 60% more jobs and energy efficiency/conservation projects create almost five times more jobs.

GIVEN THE SUPREME COURT RULING OF 1984 AND THE RELUCTANCE ON THE FEDERAL government's part to lift the moratorium, it is unlikely that the federal government will be willing to turn over significant royalties to the province, or pour billions into offshore projects as it did in Newfoundland. These factors decrease the likelihood of revenues to the provincial government substantially exceeding costs.

However, there is clearly a need for community economic development projects in rural and resource-dependent communities in British Columbia, particularly on BC's central and North Coast and northern Vancouver Island. Lifting the moratorium on offshore development will definitely create jobs, but so will any project that uses government incentives to create investment in the province. We need to consider not only how many jobs could be created by an investment in offshore oil drilling, but also the opportunity cost of such an investment – meaning, how many jobs could be created by a similar-sized investment in another endeavour. The challenge is for the government to induce investment that will create the maximum number of permanent jobs, that will confer stability to rural communities like Prince Rupert and Port Hardy, and that will protect the environmental quality that British Columbians want and that fisheries resources need.

There are other potential energy projects that would better meet these criteria than offshore oil and gas. A recent literature review commissioned by Environment Canada compiled published research on the job creation potential of various energy projects and concluded "energy efficiency and renewable energy should be aggressively pursued as important positive contributors to the federal government's job creation strategy."[40] That conclusion was based on the fact that conventional energy supply creates 7.3 JPM[41], consistent with the 7.5 JPM calculated for the Hibernia project. By comparison, renewable energy projects create 60% more jobs and energy efficiency/conservation projects create almost five times more jobs.[42] The reason for the large job creation potential of conservation is two-fold: retrofitting buildings so that they need less energy is highly labour-intensive; and decreased energy use means people have more money to spend in the local economy, which creates jobs.

If investment in renewable energy and conservation creates more jobs, the task for the provincial government is to leverage investment in those areas. There are many ways in which this can be done. The BC government recently increased tax exemptions for mining exploration in order to stimulate exploration for mineral resources.[43] The equivalent to mineral exploration for renewable energy is research and development. The provincial government should be extending special tax incentives to companies that undertake research in renewable technologies – electricity generated from wind, solar, tidal, biomass, and geothermal technologies. The market for these technologies is expected to grow from US$7 billion this year to

US$82 billion in 2010, continuing the double-digit growth from the last decade.[44] Actually manufacturing renewable technologies here in BC would maximize the job creating potential.

As the United Fishermen and Allied Workers Union has suggested, the province could establish a renewable energy research institute that would help develop and test leading-edge energy technologies, and engage in pilot projects. Given the already calculated potential for both tidal and wind power generation in Prince Rupert (and the depressed state of its economy), that community might be a good one to choose as a base for such an institute.

In addition to developing renewable energy technologies, the federal and BC governments should be giving incentives for the *implementation* of these technologies. There are a few small pilot projects being developed. BC Hydro has completed a wind energy resource map for the province[45], is implementing a wind energy project on Vancouver Island[46], and is studying other green energy resources. However, other technologies that have been found to be economically viable – for example, tidal power technology developed by a homegrown BC company[47] – are yet to be implemented. A small subsidy for electricity produced through renewable technologies would encourage the implementation of these projects. The state of Texas, for example, subsidizes wind power generation by 1.5 cents/kWh.

Finally, an extremely successful program to use as a model for conservation is the Toronto Atmospheric Fund, established in 1992 by the City of Toronto with a $23 million endowment.[48] A mere $2 million of that was used to establish the Better Buildings Partnership, a program that retrofits public and private buildings, decreasing greenhouse gas emissions and saving their owners energy and money. A similar conservation project would be viable for BC as well and would create an estimated 700 jobs.[49] Jobs in energy efficiency and conservation necessarily exist in the communities where people live and work, not in a remote part of the province or on an offshore platform.

There are at least two options that the provincial government can pursue to generate revenue for a renewable energy and conservation fund. The first is to work with the federal government to implement an excess profits tax on oil and gas companies operating in Canada. The other is to use a portion of windfall royalty revenues during times of high oil and gas prices.[50]

This is a watershed moment for British Columbia. We can focus on the production and export of crude oil, which provide very few value-added opportunities (only two relatively small oil refineries exist in BC) and few local jobs, leaving the province vulnerable to international commodity price swings. Or we can shift our attention to technologies that are not part of sunset industries, that in fact promise tremendous growth in the future, and that provide a greater number of more stable jobs for British Columbians.

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PART
5

Lessons for British Columbia

CLEARLY, THERE ARE IMPORTANT LESSONS that can be drawn from the Hibernia experience:

- offshore oil and gas exploration and development is an extremely expensive endeavour;
- even though no public money was supposed to be used for the Hibernia project, in the end the provincial and federal governments contributed billions;
- most of the employment created was temporary construction jobs;
- the total number of local jobs created was low, especially compared to the same investment in renewable energy or energy efficiency projects;
- BC faces unique challenges – First Nations title claims and the North American Free Trade Agreement to name two – not found in the Newfoundland experience; and
- there are alternatives, namely renewable energy and conservation projects, that offer more jobs for British Columbians and more hope for rural communities searching for economic development opportunities.

Notes

[1] Official Report of Debates of the Legislative Assembly (Hansard), July 24, 2001, Vol.2 No.1. Obtained electronically on October 26, 2001 from www.legis.gov.bc.ca/hansard/37th2nd/h10724p.htm.

[2] Voice of BC. (August 22, 2001).

[3] Jacques Whitford Environmental Ltd. 2001. "British Columbia Offshore Oil and Gas Technology Update". Prepared for the BC Ministry of Energy and Mines. (October 19). Burnaby, BC.

[4] Quoted from Tsimshian and Haida Nations. 2001. Press Release: "Tsimshian and Haida Statement on the Moratorium on North Coast Oil and Gas Exploration." (May 14).

[5] *Reference Re: The Seabed and Subsoil of the Continental Shelf Offshore Newfoundland*

[6] Peach, Ian. 2000. "Can federal states survive the twin tensions of regionalism and globalization?" Presentation to Conference on Co-operative Federalism, Globalization and Democracy, Brasilia, (May 9).

[7] Tsimshian and Haida Nations. 2001. Press Release: "Tsimshian and Haida Statement on the Moratorium on North Coast Oil and Gas Exploration." (May 14).

[8] Government of Newfoundland & Labrador. 1996. News release: "Transshipment Terminal for Offshore Oil to be Built at Whiffen Head." (September 5).

[9] See notes for Table 1 for explanations of the numbers.

[10] The original design proved so complicated that a foreign design team was brought in halfway through construction to redesign the structure.

[11] Locke, Wade. 1992. "Economic issues related to taxation of offshore oil projects: Hibernia as a case study." Institute of Social and Economic Research. Memorial University. St. John's, Newfoundland. p. 20.

[12] The grant and loan guarantee were for a given percentage (25% and 40% respectively) of pre-production capital expenditures, up to a maximum. The maximum was reached in both cases. Details of the agreement from Locke, Wade. 1992. "Economic issues related to taxation of offshore oil projects: Hibernia as a case study." Institute of Social and Economic Research. Memorial University. St. John's, Newfoundland. p. 20.

[13] Sullivan, Alanna. 1997. "Oil field off Canada, on ice for 40 years, ready to gush." *The Wall Street Journal.* (April 4).

[14] *ibid.*

[15] Energy Information Administration. 2001. "International Energy Outlook 2001." U.S. Department of Energy. Washington, D.C. p. 41.

[16] Life expectancy calculated by dividing proven and probable reserves (770 million barrels) by annual production totals (49.2 and 65.7 million barrels/year respectively).

Reserves data from Canada-Newfoundland Offshore Petroleum Board. 2001. "Canada-Newfoundland Offshore Petroleum Board Annual Report 2000-2001." (May 18).

Production data from Canada-Newfoundland Offshore Petroleum Board. 2000. "Decision 2000.01 Respecting the Amendment to the Hibernia Development Plan." (March).

[17] Locke, Wade. 1992. "Economic issues related to taxation of offshore oil projects: Hibernia as a case study." Institute of Social and Economic Research. Memorial University. St. John's, Newfoundland. p. 21.

[18] US$20/barrel in 2001 dollars is equivalent to US$28/barrel in 1987 dollars, which is 6.7% below the US$30/barrel benchmark.

[19] Watkins, G.C. 2001. "Atlantic Petroleum Royalties: Fair Deal or Raw Deal?" Atlantic Institute for Market Studies. Halifax. (June). p. 23.

[20] Calculated using the royalty formula by taking 1% of the value of the first 50 million barrels of oil, 2.5% of the next 50 million barrels, 5% of the next 100 million barrels, and 7.5% of the last 570 million barrels (proven and probable reserves total 770 million barrels) and assuming US$20/barrel. Formula from Watkins, G.C. 2001. "Atlantic Petroleum Royalties: Fair Deal or Raw Deal?" Atlantic Institute for Market Studies. Halifax. (June). p. 23.

[21] Eligible costs include capital and operating costs, plus 1% of capital costs, plus 10% of operating costs, plus gross royalties paid, plus a 15% rate of return. From Locke, Wade. 1992. "Economic issues related to taxation of offshore oil projects: Hibernia as a case study." Institute of Social and Economic Research. Memorial University. St. John's, Newfoundland. p. 22.

[22] *ibid.*

[23] Jacques Whitford Environmental Ltd. 2001. "British Columbia Offshore Oil and Gas Technology Update". Prepared for the BC Ministry of Energy and Mines. (October 19). Burnaby, BC. p. 142.

[24] Chevron Canada Resources Ltd. 1985. "West Coast Offshore Exploration – Response to requirements for additional information." (Feb. 20), Table 8.

[25] Kealey, Gregory and Michelle McBride. 2000. "Training at the Hibernia Project: An Investigation of Labour, Management and Government Roles". Memorial University, St. John's, Newfoundland.

[26] Jacques Whitford Environmental Ltd. 2001. "British Columbia Offshore Oil and Gas Technology Update". Prepared for the BC Ministry of Energy and Mines. (October 19). Burnaby, BC. p. 145.

[27] *ibid*

[28] Canada-Newfoundland Offshore Petroleum Board. 2001. "Canada-Newfoundland Offshore Petroleum Board Annual Report 2000-2001." (May 18). p.18.

[29] Shrimption, Mark. 1999. "Economic Benefits of Hibernia." Community Resource Services. Prepared for the Hibernia Management and Development Company. (June).

[30] Canada-Newfoundland Offshore Petroleum Board. 2001. "Canada-Newfoundland Offshore Petroleum Board Annual Report 2000-2001." (May 18). p.18.

[31] Feehan, James and L. Wade Locke. 1988. *Multiplier Effects in Perspective: An Application to Hibernia.* Institute of Social and Economic Research. Memorial University. St. John's, Newfoundland. p.19.

[32] Canada-Newfoundland Offshore Petroleum Board. 1998. "Canada-Newfoundland Offshore Petroleum Board Annual Report 1997-1998." (March 31), Obtained electronically on October 26, 2001 from www.cnopb.nfnet.com.

[33] This percentage included Newfoundland expatriates who returned from other parts of the country.

[34] Canada-Newfoundland Offshore Petroleum Board. 1998. "Canada-Newfoundland Offshore Petroleum Board Annual Report 1997-1998." (March 31), Obtained electronically on October 26, 2001 from www.cnopb.nfnet.com.

[35] Government of Canada. 1993. *North American Free Trade Agreement.* Minister of Supply and Services, Ottawa. p. I-C-25.

[36] Appleton, Barry. 1994. *Navigating NAFTA: A Concise User's Guide to the North American Free Trade Agreement.* Carswell Thomson Professional Publishing. Scarborough, Ontario. p.85.

[37] Jacques Whitford Environmental Ltd. 2001. "British Columbia Offshore Oil and Gas Technology Update". Prepared for the BC Ministry of Energy and Mines. (October 19). Burnaby, BC. p. 142.

[38] Shipyard General Workers Federation of BC. 2001. "Submission to The Fast Ferries Project and BC Ferry Corporation Inquiry." (October). p. 8.

[39] Canada-Newfoundland Offshore Petroleum Board. 2001. "Canada-Newfoundland Offshore Petroleum Board Annual Report 2000-2001." (May 18). p.18.

[40] Campbell, Barbara, Larry Dufay, and Rob Macintosh. 1997. "Comparative Analysis of Employment from Air Emission Reduction Measures." The Pembina Institute for Appropriate Development, for Environment Canada-Global Air Issues Branch. (January 31). p. 10.

[41] *ibid*, Appendix D, Table 3.

[42] *ibid*, Appendix D, Table 2 and 3.

[43] Mulgrew, Ian. 2001. "Province open for exploration, minister says." *Vancouver Sun.* (Oct.20). p.E1.

[44] Makower, Joel and Ron Pernick. 2001. "Clean Tech: Profits and potential." Clean Edge, Inc. (April). p. 1.

[45] BC Hydro. 2001. "The Journey to Sustainability: Triple bottom line report 2001." Burnaby, BC. p. 54.

[46]BC Hydro. 2001. "Press Release: BC Hydro selects Quebec's Axor for wind energy demonstration project." (October, 29).

[47] See H.N. Halverson Consultants Ltd. 1994. "Evaluation of Nova Energy Ltd's Hydro Turbine." Prepared for BC Ministry of Employment and Investment. (December 9). Victoria, BC.

[48] See website for the Toronto Atmospheric Fund: www.city.toronto.on.ca/taf/

[49] Jaccard, Mark and David Sims. 1991. "Employment effects of Electricity Conservation: The case of British Columbia." *Energy Studies Review*, Vol. 3, No.1. p.40.

[50] Both these ideas were suggested for natural gas companies in Wilson, Fred. 2001. "Who's Making Money on Natural Gas Prices? What Should Governments Do?" in "Costly Energy: Why Oil and Gas Prices are Rising and What We can do About it." Edited by Seth Klein. Canadian Centre for Policy Alternatives. (February). p.14-15.

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