

## **Incentives for Renewable Energy:**

The writing is on the wall... but our policy-makers  
choose to be illiterate.

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*“We do not inherit the earth from our parents, we borrow it from our children”*

- Saint Exupéry

This paper is the product of the Vancouver Island Public Interest Research Group’s research internship program.<sup>1</sup> The area of research proposed by their client, Friends of Renewable Energy BC (FOREBC)<sup>2</sup> is a “survey of incentives for renewables that can inform policy.”<sup>3</sup>

There are numerous examples of state-sponsored incentives that have resulted in the proliferation of diverse forms of renewable energy. This paper highlights select examples of such incentives and recommends for their adoption by the provincial government of British Columbia and the federal government of Canada.

Before discussing various incentives for renewables, two critical questions must be answered: Why renewable energy? And why state intervention? Without exploring the assumptions that underlie the research question, the subsequent recommendations for renewable energy incentives are indefensible. In a sense, these questions ask: What “incentive” do governments have for adopting incentives that promote renewable energy? As the latter portion of this paper demonstrates, there is no shortage of creative incentives that promote wider use of renewables. The greatest challenge is in persuading policy makers to adopt such incentives.

## **Why Renewable Energy?**

A necessary component to a successful energy policy is a conservation strategy. While there are substantial efficiencies to be gained from such strategies it is beyond the scope of this paper. Also, conservation can only take us so far - human activity will always consume energy. There are two primary reasons for adopting greater use of renewable

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<sup>1</sup> Vancouver Island Public Interest Research Group <<http://www.vipirg.ca/>>

<sup>2</sup> Friends of Renewable Energy BC is a non-profit renewable energy advocacy group based in Victoria, British Columbia. For more information, contact FOREBC at [forebc@shaw.ca](mailto:forebc@shaw.ca) or to join their email list and receive up-to-date news on renewable energy please visit <<http://groups.yahoo.com/group/forebc/>>

<sup>3</sup> Description under “final product” in the Research Internship Program Contract (28 January 2005)

energy: (1) an exhaustible supply of the alternative, non-renewable energy, and (2) the earth's limited assimilative capacities.

**(1) Non-renewable is by definition exhaustible.**

An excessive reliance on non-renewable energy is short-sighted. Non-renewable energy is, by its very definition, exhaustible. In 1956, Marion King Hubbert predicted that United States crude-oil production would peak somewhere between 1966 and 1972. Though his prediction was widely dismissed, the peak did actually occur in 1970. Hubbert pointed out the obvious when he said “you can only use oil once.”<sup>4</sup> This is true of all fossil fuels. The US Department of Energy has predicted that global oil production will peak in 2037. Renowned geologist, Colin Campbell, has predicted peak oil production in 2010, while another authority, Kenneth Deffeyes, believes global production has already peaked.<sup>5</sup> Amos Nur, a professor of geophysics at Stanford University, agrees that “we’re in the neighbourhood” of peak oil production.<sup>6</sup> In the face of record highs for crude and gasoline futures,<sup>7</sup> Nur suggests that “oil prices are not coming back down.”<sup>8</sup> While there is debate as to when the peak will occur, given the fact that reserves of oil are finite, a peak is inevitable. Former British Energy Minister, Michael Meacher, predicts that as oil demand gradually outpaces oil supply, the consequences will be “the sharpest and perhaps the most violent dislocation (of society) in recent history.”<sup>9</sup>

A common misconception is that hydro generates most of BC's energy. While hydro generates approximately 85 percent of *electricity* produced in BC, electricity accounts for only 11 percent of the *energy* produced in BC.<sup>10</sup> Therefore, hydro accounts for just over

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<sup>4</sup> Richard Heinberg “The end of the oil age” *Earth Island Journal* Vol. 18 No. 3 (Autumn 2003) at 27

<sup>5</sup> Richard Gwyn “Demand for oil outstripping supply” *Toronto Star* (28 January 2004) [“Gwyn”]  
<[http://www.independent-media.tv/item.cfm?fmedia\\_id=5337&fcategory\\_desc=Oil](http://www.independent-media.tv/item.cfm?fmedia_id=5337&fcategory_desc=Oil)>

<sup>6</sup> David Lazarus, “ChevronTexaco's CEO banking on peak oil situation” *San Francisco Chronicle* (8 April 2005) [“Lazarus”]<<http://energybulletin.net/5223.html>>

<sup>7</sup> Roma Luciw, “Oil, gas prices hit record” *The Globe and Mail* (1 April 2005)

<<http://www.theglobeandmail.com/servlet/story/RTGAM.20050401.woilrecord0401/BNSStory/Business/>>

<sup>8</sup> Lazarus, *supra* note 6.

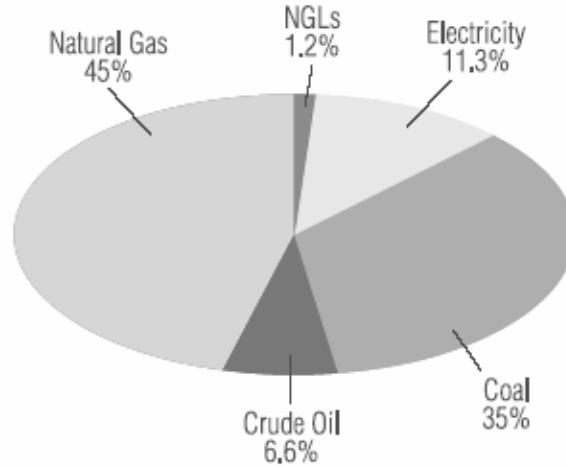
<sup>9</sup> Gwyn, *supra* note 5.

<sup>10</sup> Ministry of Energy and Mines “Fact Sheet: BC Electricity Resources”

<[http://www.gov.bc.ca/em/popt/factsheet\\_electricity.htm](http://www.gov.bc.ca/em/popt/factsheet_electricity.htm)>

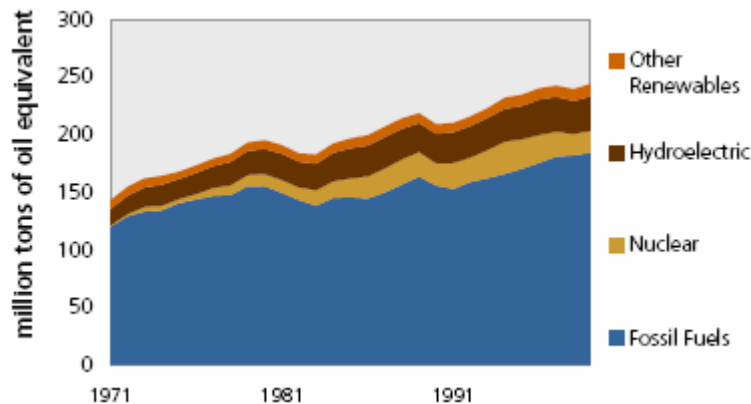
9 percent of energy production in BC. The remainder of BC’s energy comes from fossil fuels. The graph below shows the composition of energy production in BC.

**BC Primary Energy Production in 2000<sup>11</sup>**



The pattern of consumption for Canada closely parallels production in BC. It also demonstrates our increasing reliance on fossil fuels.

**Energy Consumption by Source, Canada, 1971-1999<sup>12</sup>**



The upward trend for non-renewables illustrates our general disregard for the laws of thermodynamics. Low-entropy fossil fuels represent a depletable capital stock. The

<sup>11</sup> British Columbia Ministry of Energy and Mines “Energy Plan for our Future: A Plan for BC” (November 2002) at 13 [“*BC Energy Plan*”] <[http://www.gov.bc.ca/em/down/energy\\_for\\_our\\_future\\_sept\\_27.pdf](http://www.gov.bc.ca/em/down/energy_for_our_future_sept_27.pdf)> (note: while much of this production is exported, the outcome - overexploitation of a finite resource - is the same. Unfortunately, export only hastens the exhaustion of such resources and compromises energy security in BC).

<sup>12</sup> EarthTrends: World Resources Institute “Energy and Resources - Canada” <[http://earthtrends.wri.org/pdf\\_library/country\\_profiles/Ene\\_cou\\_124.pdf](http://earthtrends.wri.org/pdf_library/country_profiles/Ene_cou_124.pdf)>

combustion of fossil fuels that releases the energy to power our economy results in a high-entropy output.<sup>13</sup> The second law of thermodynamics, the entropy law, substantiates Hubbert's words, "you can only use oil once." To the extent that our economy is based on fossil fuels then it too is unsustainable.

According to a 2003 BC Ministry of Energy and Mines report on hydrocarbon reserves cited in *Running on Empty: Shifting to Sustainable Energy in BC* ("*Running on Empty*"),<sup>14</sup> oil and natural gas reserves "stand at 10 and 12 years of production respectively."<sup>15</sup> The jobs that are created and the communities that are sustained on the basis of exploitation of these non-renewable resources are subject to collapse.

## **(2) Non-renewable resources, such as fossil fuels, contribute to climate change.**

In addition to the exhaustibility of fossil fuel supplies, investment in renewable energy is also desirable to help mitigate the effects of climate change. Almost all forms of renewable energy contribute little by way of greenhouse gases. In fact, renewable biomass fuels such as biodiesel, simply release the CO<sub>2</sub> they absorb when their feedstock is growing - the net effect on the atmosphere is zero.<sup>16</sup> In contrast, the combustion of fossil fuels releases greenhouse gases that have been stored for millions of years and contributes to climate change by affecting the composition of our atmosphere. The Intergovernmental Panel on Climate Change notes that the "balance of evidence suggests that there is a discernible human influence on global climate."<sup>17</sup> The National Center for Atmospheric Research goes further and concludes, "there is no doubt that the composition of the atmosphere is changing because of human activities, and today

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<sup>13</sup> Herman Daly, *Steady State Economics*, 2nd ed. (Washington DC: Island Press, 1991) at 15-17

<sup>14</sup> Dale Marshall with Jodi-Lyn Newnham, *Running on Empty: Shifting to a Sustainable Energy Plan for BC*, David Suzuki Foundation and Canadian Centre for Policy Alternatives (August 2004) [*"Running on Empty"*] <[http://www.davidsuzuki.org/files/Climate/BC/Running\\_on\\_empty.pdf](http://www.davidsuzuki.org/files/Climate/BC/Running_on_empty.pdf)>

<sup>15</sup> *Ibid.* at 7.

<sup>16</sup> Consumer Energy Council of America "Bio-fuels facts" <<http://www.cecac.org/Programs/Fuels/Fuelfacts/Bio-Fuels%20Facts.html>>

<sup>17</sup> IPCC Working Group I, *Summary for Policymakers: The Science of Climate Change* <<http://www.ipcc.ch/pub/sarsum1.htm>>

greenhouse gases are the largest human influence on global climate.”<sup>18</sup> Lest there be any doubt as to the collective human capacity to affect the atmosphere, we would be wise to remember that we put holes in the ozone layer.

The effects of climate change vary by region and can be quite severe. A Government of Canada study on the effects of climate change in BC reveals “increased flood dangers in some areas, drought in others, and widespread disruption to forests, fisheries and wildlife.”<sup>19</sup> The study also notes the risk of permanent inundation, landslides, permafrost degradation, glacier retreat, and reduced water supplies affecting irrigation and domestic water use.<sup>20</sup> Ironically, the study predicts that glacier reduction could affect the flows of waterways and have a negative impact on hydroelectric generation.<sup>21</sup> BC’s hydrological facilities have provided the province with low cost, very reliable and secure electricity that can power the grid on short notice.<sup>22</sup> Excessive use of fossil fuels undermines this legacy.

Of course, the effects of climate change are not limited to the borders of the province. University of Victoria geographer, Dr. Terry Prowse, is a member of a research group that concluded the Arctic climate is rapidly warming.<sup>23</sup> Much larger changes are expected and will have worldwide implications that push some species towards extinction.<sup>24</sup> In considering the security risks of climate change, Jon Barnett notes that rising sea levels will affect the ability of some people to live on their land. For example, only a 45 cm rise in sea level will result in a loss of territory to Bangladesh and force the relocation of approximately 5.5 million people.<sup>25</sup> Other states risk being completely

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<sup>18</sup> National Center for Atmospheric Research “No Doubt” Human Activity is Affecting Global Climate, Top Scientists Conclude” (2 December 2003)

<<http://www.ucar.edu/communications/newsreleases/2003/trenberth.html>>

<sup>19</sup> Government of Canada, *Canada Country Study: Climate Impacts and Adaptation*, (2 June 2004)

<<http://www.climatechange.gc.ca/english/publications/ccs/#bc>>

<sup>20</sup> *Ibid.*

<sup>21</sup> *Ibid.*

<sup>22</sup> *Running on Empty*, *supra* note 14 at 26.

<sup>23</sup> Shannon McCallum “Global Warning” *The Ring* Vol. 31 No. 4 (April 2005) at 12 (note: for more information visit the Arctic Climate Impact Assessment website online: <<http://www.amap.no/acia/>>)

<sup>24</sup> *Ibid.*

<sup>25</sup> Jon Barnett “Security and climate change” *Tyndall Centre for Climate Change Research*, Working Paper No. 7. (2001) <[http://www.tyndall.ac.uk/publications/working\\_papers/wp7.pdf](http://www.tyndall.ac.uk/publications/working_papers/wp7.pdf)> at 2

inundated and losing their entire sovereign territory. Some suggest that the small island state of Tuvalu will totally disappear beneath rising sea levels.<sup>26</sup> There is no shortage of examples of the devastating effects of climate change.

Some even compare the effects of climate change to warfare. World renowned climatologist, Sir John Houghton, has “no hesitation in describing [climate change] as a ‘weapon of mass destruction.’”<sup>27</sup> In an article published in the Guardian, Houghton notes, “long-term security is threatened by a problem at least as dangerous as chemical, nuclear or biological weapons, or indeed international terrorism: human-induced climate change.”<sup>28</sup> British Prime Minister, Tony Blair, shared Houghton’s sentiments when he stated, “there can be no genuine security if the planet is ravaged by climate change.”<sup>29</sup>

Unlike traditional threats, climate change is unique in that its source is diffuse - we all bear some responsibility. BC has an obligation to protect its citizens and its territory by mitigating the impacts of climate change. Further, to the extent that BC is responsible for effects outside of its borders; we have an obligation to decrease our output of greenhouse gases from fossil fuels.

The writing is on the wall: fossil fuels are both finite and contribute to climate change. As mentioned earlier, conservation is a necessary and important element to a successful energy policy; however, there are limits to conservation, as human activity will always consume energy. Thus, the need for greater use of renewable energy in BC and Canada is clear.

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<sup>26</sup> Leslie Allen “Will Tuvalu Disappear Beneath the Sea? Global warming threatens to swamp a small island nation” *Smithsonian Magazine* (August, 2004)  
<<http://www.smithsonianmag.si.edu/smithsonian/issues04/aug04/pdf/tuvalu.pdf>>

<sup>27</sup> John Houghton “Global Warming is now a Weapon of Mass Destruction: It kills more people than terrorism, yet Blair and Bush do nothing” *The Guardian* (July 28, 2003)  
<[http://www.mng.org.uk/green\\_house/threat/houghton.htm](http://www.mng.org.uk/green_house/threat/houghton.htm)>

<sup>28</sup> *Ibid.*

<sup>29</sup> *Ibid.*

## Why state intervention?

States create, regulate, and enforce our markets. Indeed, “the market” cannot exist without the support of the state; governments are completely implicated in our economy. Unfortunately, our markets are flawed. We undervalue our natural capital services and fail to take into account externalities.<sup>30</sup> The result is excessive use. David Boyd notes, “Low prices are a major reason why Canadians are among the world’s leaders in water, energy, gasoline, and electricity consumption as well as greenhouse gas emissions.”<sup>31</sup>

Governments are involved in the pricing of various sources of energy. In BC, the British Columbia Utilities Commission sets a rate of return for individual utilities, which then determines the price for customers. Comparing the price of electricity in Vancouver with other prices in national and international cities reveals a truly low rate for electricity. Though the figures in the table below are dated, the relative amounts are still relevant.

**International Comparison of Electricity Prices<sup>32</sup>**

Price (U.S. cents/ kWh*)				
City	Country	Residential	Commercial	Industrial
Sao Paulo	Brazil	15.4	9.82	4.72
Brussels	Belgium	14.52	13.61	12.4
New York	U.S.	13.36	13.9	10.75
Detroit	U.S.	9.32	9.16	6.9
Taipei	Taiwan	9.12	7.95	6.61
Houston	U.S.	8.41	7.09	5.83
Toronto	Canada	7.42	8.38	6.27
Montréal	Canada	5.19	7.09	4.17
Vancouver	Canada	4.97	4.99	3.7

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<sup>30</sup> David Boyd, *Unnatural Law: Rethinking Canadian Environmental Law and Policy*, (Vancouver: UBC Press, 2003) at 314.

<sup>31</sup> *Ibid.*

<sup>32</sup> Natural Resources Canada, *Canada’s Energy Markets* (1997) (note: Canadian data were obtained from the Energy Resource Branch, Natural Resources Canada. Data for other countries were obtained from a survey undertaken by the Energy Resource Branch, Natural Resources Canada, March 1997.) <[http://www2.nrcan.gc.ca/es/ener2000/online/html/chap3g\\_e.cfm](http://www2.nrcan.gc.ca/es/ener2000/online/html/chap3g_e.cfm)>

On a per capita basis, Canadians are among the heaviest users of energy in the world.<sup>33</sup> As Boyd explains, cheap electricity encourages excessive use.<sup>34</sup> To the extent that low prices encourage excessive consumption of energy, the government plays a role promoting wastefulness.

Governments have an obligation to correct market failures. In fact, there is presently a movement in Europe to fully account for the aforementioned externalities. An EU funded study that computes the socio-environmental costs of externalities in the generation of electricity has “proven that the cost of producing electricity from coal or oil would double and the cost of electricity production from gas would increase by 30% if external costs” were taken into account.<sup>35</sup> A table from the study, reproduced on the following page, shows the relative external costs of various sources of electricity for 15 European countries. The figures are in Euros, so the costs are roughly 50 percent higher given an exchange rate of 1.58.<sup>36</sup>

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<sup>33</sup> EarthTrends Data Tables: Energy and Resources “Energy Consumption by Source” <[http://earthtrends.wri.org/pdf\\_library/data\\_tables/ene3\\_2003.pdf](http://earthtrends.wri.org/pdf_library/data_tables/ene3_2003.pdf)>

<sup>34</sup> The BC Hydro website notes “British Columbians pay less for electricity than most areas in Canada *and yet* we use more energy on average” [Emphasis added]. BC Hydro’s use of the words “and yet” indicates a difference in understanding of the relationship between low price and high consumption than that of David Boyd. While greater demand on a constant supply will tend to increase prices, such is not the case in BC as price is regulated. Thus, there is no need for the term “and yet” since there is no incongruity between the two propositions (i.e. low price and high consumption). The website would be more accurate if it read something like: “British Columbians use more energy on average (partly) *because* we pay less for electricity than most areas in Canada.” <<http://www.bchydro.com/policies/demandgrowth/demandgrowth771.html>>

<sup>35</sup> Research Directorate-General, European Commission “New research reveals the real costs of electricity in Europe” Brussels (25 July 2001) <<http://www.externe.info/externen.pdf>>

<sup>36</sup> Bank of Canada Currency Converter (8 April 2005) <<http://www.bankofcanada.ca/en/exchform.htm>>

**External costs for electricity production in the EU (in cent/kWh<sup>\*\*</sup>)<sup>37</sup>**

Country	Coal & lignite	Peat	Oil	Gas	Nuclear	Biomass	Hydro	PV	Wind
AUT				1-3		2-3	0.1		
BE	4-15			1-2	0.5				
DE	3-6		5-8	1-2	0.2	3		0.6	0.05
DK	4-7			2-3		1			0.1
ES	5-8			1-2		3-5*			0.2
FI	2-4	2-5				1			
FR	7-10		8-11	2-4	0.3	1	1		
GR	5-8		3-5	1		0-0.8	1		0.25
IE	6-8	3-4							
IT			3-6	2-3			0.3		
NL	3-4			1-2	0.7	0.5			
NO				1-2		0.2	0.2		0-0.25
PT	4-7			1-2		1-2	0.03		
SE	2-4					0.3	0-0.7		
UK	4-7		3-5	1-2	0.25	1			0.15

\* : biomass co-fired with lignites  
 \*\* : sub-total of quantifiable externalities  
 (such as global warming, public health, occupational health, material damage)

The table undermines the common charge that renewables are more expensive than non-renewables. Such beliefs show a lack of an appreciation for flawed pricing mechanisms. Many renewables are actually cost competitive - even under current distorted market conditions. Nonetheless, it is evident that appropriate consumer behaviour requires accurate price signals and it is the state's duty to fix such flaws. The implication of an imperfectly priced good is that the market fails to produce it at optimal quantities.<sup>38</sup> Governments that choose to ignore externalities permit markets to send inaccurate price signals and are essentially participating in a lie. Methods of internalizing costs are discussed in the following section.

The provincial government adds to these market deficiencies (that already favour non-renewable resources) by further subsidizing these industries. Royalties can potentially be

<sup>37</sup> European Commission, *External Costs: Research results on socio-environmental damages due to electricity and transport*, European Communities (2003) <<http://www.externe.info/externpr.pdf>>

<sup>38</sup> J. Owen Saunders "The Economic Approach" in Hughes et. al, *Environmental Law and Policy* 3rd ed. (Toronto: Emond Montgomery Publications, 2003) at 392. ["*Environmental Law*"]

used to internalize costs for oil and gas; however, since the previous election, royalties have actually declined.<sup>39</sup> As Dale Marshall, author of *Running on Empty*, observes:

The intent is clear: no matter how inaccessible the oil or gas (geographically or geologically), no matter how marginal the operation, the BC government will try as hard as possible to make it economical for industry to access it. The increase in current production has meant a steep increase in revenue to the provincial treasury . Nevertheless, if extraction of a non-renewable resource is encouraged through reduced royalties (as is the case), it represents a loss of income for current and future British Columbians.<sup>40</sup>

Recent BC aid to non-renewable energy includes a \$30 million dollar subsidy towards the construction of roads to enhance oil and gas exploration, subsidies for coal bed methane exploration, and approval of fossil fuel power plants that provide a market for the output of such exploratory activities.<sup>41</sup> Also, non-renewables have historically received tremendous subsidies. The data in the chart (on the next page) represents federal spending on various forms of energy from 1970 to 1999.

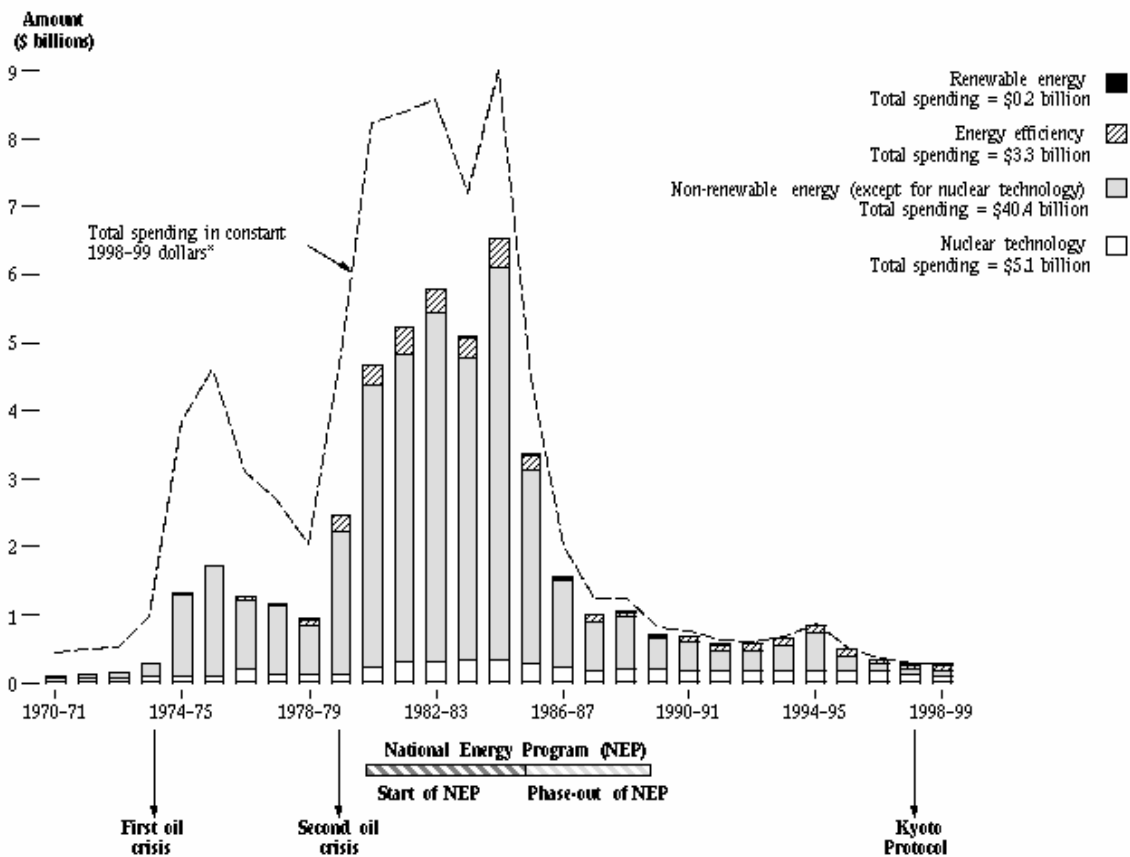
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<sup>39</sup> *Running on Empty*, *supra* note 14 at 18.

<sup>40</sup> *Ibid.*

<sup>41</sup> BCFacts.org “Energy and Climate Change” <<http://www.bcfacts.org/facts?cat=energy>>

## Direct Federal Spending on Energy, 1970-71 to 1998-99<sup>42</sup>



The graph shows that our federal government reacted to two *energy* crises by myopically spending more money on non-renewable energy.<sup>43</sup> In total, it spent \$40.4 billion dollars on non-renewable energy and only \$0.2 billion on renewable energy.<sup>44</sup> Though direct federal spending has since decreased, these numbers demonstrate a significant historical asymmetry in subsidies to renewable and non-renewable energy. Subsidies to non-renewable energy are still granted today via various provisions in our income tax regime.

<sup>42</sup> Office of the Auditor General of Canada “Government Support for Energy Investments” *2000 Report of the Commissioner of Environment and Sustainable Development* (2000) <<http://www.oag-bvg.gc.ca/domino/reports.nsf/html/c003xe03.html>>

<sup>43</sup> A similar response is particularly noticeable in the United States today. Indeed, our mental link between fossil fuels and energy is strong. Of course, fossil fuels are nothing but stored, low-entropy energy from the sun - the actual source of the energy. The very fact that the ministry that is responsible for energy policy is also responsible for mining (i.e. the “BC Ministry of Energy and Mines”) is problematic as it suggests a narrow understanding of energy as being “dug out of the ground.”

<sup>44</sup> *Ibid.*

The BC government has also indicated its desire to develop offshore oil and gas resources.<sup>45</sup> This position was recently confirmed by Richard Neufeld, the Minister of Energy and Mines, in a recent budget debate.<sup>46</sup> In examining similar developments on the east coast of Canada, Marshall concludes that offshore oil and gas in BC may be economically problematic. He cites Wade Locke, a Newfoundland economist, who predicted that the offshore projects would be “unviable without government subsidy.”<sup>47</sup> Locke’s prediction was borne out as federal and provincial subsidies included “at least \$1.04 billion in grants, \$2.36 billion in loans and loan guarantees, an almost \$1 billion equity position, and \$200 million in tax exemptions.”<sup>48</sup>

The foregoing analysis illustrates how the provincial and federal government is heavily implicated in the manipulation of the energy sector. Market failures such as externalities tend to favour non-renewables and result in a skewed energy portfolio. As Boyd notes, “when the market fails, it is the government’s job to protect the public interest by implementing laws and policies to correct these failures.”<sup>49</sup> While states have a duty to account for externalities, our federal and provincial governments actually compound such flaws by providing favourable treatment to producers of non-renewable energy. The duty to adopt incentives that promote renewable energy is even more pressing in light of the earth’s limited assimilative capacities and the fact that the non-renewable sources are exhaustible.

### **Incentives for Renewable Energy.**

It is obvious from the preceding analysis that internalizing costs would lead to more accurate pricing. As long as the market does not account for externalities, producers and consumers will not receive price signals to guide behaviour.

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<sup>45</sup> *BC Energy Plan*, *supra* note 11 at 8.

<sup>46</sup> British Columbia, Legislative Assembly, *Hansard*, Volume 27, Number 18 (February 24, 2005) at 12123 Sitting (Hon. R. Neufeld).

<sup>47</sup> *Running on Empty*, *supra* note 14 at 24.

<sup>48</sup> *Ibid.*

<sup>49</sup> *Boyd*, *supra* note 31 at 314.

The three main methods to control externalities are: regulation, taxation, and subsidization.<sup>50</sup> Regulation can be used to change our skewed energy portfolio by legislating that utilities sell a minimum amount of renewable energy. To its credit, BC Hydro has adopted a voluntary objective of acquiring 50 per cent of new load growth from clean sources of energy.<sup>51</sup> However, this goal has been criticised for being voluntary, too low, and encompassing dirty power sources in its definition.<sup>52</sup> Marshall proposes adopting a renewable portfolio standard (“RPS”), which has been used successfully in various European, American, and Australia jurisdictions, to mandate the production of a greater proportion of renewable energy.<sup>53</sup> While regulatory measures are often perceived as being overly interventionist, they do have their place in a balanced energy policy.

If taxes are appropriately calculated, they can help raise the marginal costs of producers of non-renewable energy to equal the social and environmental costs that their activities create.<sup>54</sup> A broad tax that would raise the costs of non-renewable energy is a carbon tax. Countries such as Norway, Sweden, Denmark, the United Kingdom, Finland, Switzerland, and the Netherlands have already adopted carbon taxes.<sup>55</sup> Sweden, for example, raises US\$1 billion per year from its carbon tax and approximately US\$10 billion per year in energy taxes, some of which is part of a “tax shift” that goes to help develop renewable energy.<sup>56</sup>

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<sup>50</sup> R.L. Heilbroner, *Understanding Microeconomics*, 2nd ed. (Englewood Cliffs, NJ: Prentice-Hall, 1972) as reproduced in *Environmental Law*, *supra* note 38 at 397 [“*Understanding Microeconomics*”]

<sup>51</sup> BC Hydro, *BC Hydro Annual Report* (2004) at 9 <[http://www.bchydro.com/rx\\_files/info/info12355.pdf](http://www.bchydro.com/rx_files/info/info12355.pdf)> (note: on page 33 of the report, “clean” is defined as: “electricity produced by alternative technologies that result in a net environmental improvement relative to existing energy production... examples that may include hydro, wind, solar, photovoltaic, geothermal, tidal, wave and biomass energy, as well as cogeneration from heat and power, energy from landfill gas and municipal solid waste, fuel cells, and efficiency improvements at existing facilities.”)

<sup>52</sup> *Running on Empty*, *supra* note 14 at 34.

<sup>53</sup> *Ibid.* at 38.

<sup>54</sup> *Understanding Microeconomics*, *supra* note 51 at 398.

<sup>55</sup> *Boyd*, *supra* note 31 at 322.

<sup>56</sup> *Ibid.*

Even some in the coal business in North America support a carbon tax.<sup>57</sup> Paul Anderson, the CEO of a major carbon-dioxide emitting power company in the US, recently advocated the adoption of a national carbon tax. He said “reducing greenhouse gases has become a worldwide political and social imperative... It is an imperative where American leadership is not just needed; American leadership is required.”<sup>58</sup> Carbon taxes will eventually come to North America. BC would be wise to implement such a tax early to help stimulate investment in alternatives, which will pay dividends in the future. If BC took a leadership role, its businesses would have added impetus to develop technologies that could later be exported to laggards.

Taxes can also be used to grant breaks to renewable energy. Marshall suggests that the installation costs of ground source heat pumps and solar hot water heaters be fully deductible to lower their upfront cost and encourage their use.<sup>59</sup> Similar tax exemptions have been successfully employed in numerous European countries.<sup>60</sup>

Another type of incentive is subsidies. While Canada was responding to oil crises with direct payments to non-renewables (see chart on page 11 herein), Denmark responded by subsidizing renewable energy, particularly wind.<sup>61</sup> From 1979 to 1989, Denmark subsidized 30% of the capital cost of each wind turbine, which led to tremendous growth.<sup>62</sup> Thanks in part to the subsidy, the industry gained its footing and it now accounts for approximately 20% of Danish power consumption, has created 20,000 jobs in Denmark, and is the world’s largest wind industry.<sup>63</sup>

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<sup>57</sup> Reuters, “Duke Energy CEO backs carbon dioxide emission tax” New York (April 7, 2005) <[http://money.netscape.cnn.com/news\\_story.jsp?id=2005040722090002124368&dt=20050407220900&w=RTR&coview=&TickerSymbols=DUK](http://money.netscape.cnn.com/news_story.jsp?id=2005040722090002124368&dt=20050407220900&w=RTR&coview=&TickerSymbols=DUK)>

<sup>58</sup> *Ibid.*

<sup>59</sup> *Running on Empty*, *supra* note 14 at 37

<sup>60</sup> Active Solar Thermal Industry Group “Solar thermal markets and incentives in Europe” Belgium (January 2001) <<http://www.teriin.org/opet/articles/art8.htm>>

<sup>61</sup> Renewable Energy Policy Project, “Renewable Energy Policy Outside the United States, Part 2: Denmark's Wind Energy Program” (1999) <[http://www.crest.org/repp\\_pubs/articles/issuebr14/02Denmrk.htm](http://www.crest.org/repp_pubs/articles/issuebr14/02Denmrk.htm)>

<sup>62</sup> *Ibid.* (note: while the subsidy for wind was discontinued, it is still in effect for other renewables, which are also growing.)

<sup>63</sup> Danish Wind Industry Association “Did you know?” <<http://www.windpower.org/en/didyouknow.htm>>

The federal government has allocated \$920 million over 15 years to encourage the use of wind power and \$886 million over 15 years to stimulate the growth of renewables other than wind, such as small hydro, biomass and landfill gas.<sup>64</sup> However, these figures pale relative to Canada's historic \$40.4 billion direct payment to non-renewables. Equitable treatment necessitates similar expenditures for renewables. Provincially, other than a \$2 million contribution to fuel cell research (which is not actually a source of energy), BC's budget makes no explicit financial commitments to renewable energy.<sup>65</sup> Comparing the Ministry of Energy and Mines operating expenses and number of employees in its Electricity and Alternative Energy division with its Oil and Gas division reveals BC's commitment to renewables is mostly rhetoric.<sup>66</sup>

Vestas, the largest wind turbine manufacturer in the world (which is incidentally Danish), has recently offered to invest \$30 million towards a wind turbine plant in Squamish. In return, Vestas wants the provincial government to commit to purchasing 1,000 MW of wind power.<sup>67</sup> The investment would generate local jobs and help BC Hydro fulfill its commitment to purchase clean energy. The production of 1,000 MW of wind power would also qualify BC to receive a federal subsidy of \$87 million per year.<sup>68</sup> Unfortunately, Vestas is considering other investment opportunities, as BC has been stalling since December.<sup>69</sup>

A successful example of subsidies for small-scale projects can be found in Canada. The Renewable Energy Technology Conversion Assistance Program in the NWT provides funding for half the cost of solar, wind, small-scale hydro, ground source heat pumps and electricity storage equipment to a maximum of \$7,500 per person.<sup>70</sup> In its first year 22

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<sup>64</sup> Department of Finance Canada "The Budget Plan 2005" Ottawa (2005) at 170  
<<http://www.fin.gc.ca/budget05/pdf/bp2005e.pdf>>

<sup>65</sup> Ministry of Finance "Balanced Budget 2005" Ministry of Energy and Mines Service Plan 2005/06 - 2007/08 at 19 <<http://www.bcbudget.gov.bc.ca/sp/em/em.pdf>>

<sup>66</sup> *Ibid.* at 8.

<sup>67</sup> Arne Hansen "BC Liberals stalling on wind power" *Common Ground* (March 2005)  
<[http://www.commonground.ca/iss/0503164/cg164\\_wind.shtml](http://www.commonground.ca/iss/0503164/cg164_wind.shtml)>

<sup>68</sup> *Ibid.*

<sup>69</sup> *Ibid.*

<sup>70</sup> Arctic Energy Alliance "Energy News" *Energy Speak* Issue # 7 (June 2002) at 7  
<[http://www.aea.nt.ca/pdf/AEA\\_EnergySpeak\\_Jun2002.pdf](http://www.aea.nt.ca/pdf/AEA_EnergySpeak_Jun2002.pdf)>

off-grid projects were completed and \$250,000 was spent on local suppliers of hardware.<sup>71</sup> Such a subsidy might be workable for remote communities in BC. UVic's Institute for Integrated Energy Systems is examining the potential for solar, wind, micro-hydro, biomass energy and electrical storage at a HUU-ay-aht First Nations community near Bamfield.<sup>72</sup> The village currently receives power via a line from Port Alberni but experiences as many as 30 outages per year that last nine hours on average.<sup>73</sup> A similar subsidy might promote investment in renewables and help the HUU-ay-aht.

Long-term, low-interest financing is also an effective incentive for many types of renewable energies. Many renewable energy technologies have a high upfront cost but have little or no maintenance costs. Also, unlike non-renewables, the 'inputs' of renewable energy, such as the sun, wind, water, etc. are free. Financing that is arranged to help spread costs over the life of the technology helps to reduce the deterring effect of high upfront costs. Germany and India have each created funding agencies that provide low interest loans for renewable energy projects.<sup>74</sup> If BC were to create a long-term, low-interest financing agency, it would promote the installation of renewable technologies and even earn a small return on its investment.

There are private companies that recognize the opportunity and are already offering long-term, low-interest loans. Homeworks, an energy-saving home improvement company that also provides financing, offers monthly payment programs on amounts from \$2,000 to \$35,000 and amortize loans for up to 10 years.<sup>75</sup> Greg White, a director of Solarcrest Innovations in Victoria, which does its financing through Homeworks, describes how such loans essentially make the purchase and installation of a solar water heating system free:

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<sup>71</sup> *Ibid.*

<sup>72</sup> Maria Lironi "Institute investigates energy options for remote community" *The Ring* Vol. 31 No. 4 (April 2005) at 8 (note: for more information visit <[www.iesvic.uvic.ca](http://www.iesvic.uvic.ca)>)

<sup>73</sup> *Ibid.*

<sup>74</sup> Norbert Wohlgemuth and Reinhard Madlener "Financial Support of Renewable Energy Systems: Investment vs Operating Cost of Subsidies" (Paper presented to the Norwegian Association for Energy Economics Conference Bergen/Norway, 31 Aug – 2 Sep 2000) <[http://www.cepe.ethz.ch/download/staff/reinhard/madwoh\\_bergen2000\\_header.pdf](http://www.cepe.ethz.ch/download/staff/reinhard/madwoh_bergen2000_header.pdf)>

<sup>75</sup> Homeworks "Homeworks Financing" <<http://www.homeworks.ca/services/index.php?action=financing>>

In many cases solar water heating systems displace enough energy to reduce a utility bill by a margin great enough to make the monthly loan payment (for the capital cost of the solar system). Essentially, your monthly payments don't change for the loan period but when the loan is paid off (3-8 years) your energy is free for the life of the system. (20-35 years depending on the type of system)<sup>76</sup>

There is a plethora of easily accessible examples of incentives that promote the use of renewable energy. The policy report, *Running on Empty*, noted in this paper, provides a comprehensive analysis and makes numerous recommendations for a more sustainable future of energy in BC.<sup>77</sup> The internet is a tremendous source for information on renewable energy incentives. The United States Department of Energy has funded the creation of a database that catalogues incentives that promote renewable energy for various levels of US government. The “Database of State Incentives for Renewable Energy” can be accessed at [www.dsireusa.org](http://www.dsireusa.org). Entering “renewable energy incentives” into Google returns 721,000 results. Clearly, there is no shortage of creative strategies to promote renewable energy. The greatest challenge is in incentivizing policy makers to adopt such incentives.<sup>78</sup>

## Conclusion

This paper has attempted to show that renewable energy is needed and governments have a responsibility to adopt incentives to promote its proliferation. It also gave a snapshot of various incentives that promote investment in renewable energy and demonstrated that the problem is not a want of incentives but a lack of political leadership. Indeed, the writing is on the wall but our policy-makers are choosing to be illiterate. The real challenge is in convincing policy-makers to adopt such measures. If only Richard

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<sup>76</sup> Greg White “Renewable Energy Self Financing” *Friends of Renewable Energy B.C. Yahoo Message Group* (April 7, 2005) <<http://groups.yahoo.com/group/forebc/message/1665>> (note: for more information on Solarcrest, a company that installs a variety of renewable energy equipment, please visit [www.solarcrest.ca](http://www.solarcrest.ca))

<sup>77</sup> *Running on Empty*, *supra* note 14.

<sup>78</sup> This may be a good topic for future research by a student for FOREBC – how to get policy-makers to adopt incentives for renewable energy.

Neufeld googled “renewable energy incentives” and copied and pasted the results into his Energy Plan.<sup>79</sup> Neufeld, who has four children of his own, would be wise to consider Saint Exupéry’s words used in the opening of this paper:

*We do not inherit the earth from our parents, we borrow it from our children.*

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<sup>79</sup> Alternatively, he could remove the cover page of the *BC Energy Plan* and paste it on Dale Marshall’s *Running on Empty* report. I’m sure Dale wouldn’t mind.