



## ***Ethical Reflections on Fracking***

***KAIROS Paper for Discussion  
April 8, 2014***

The attached paper is offered to facilitate discussion among KAIROS members and their networks on the issue of hydraulic fracturing for shale gas and oil, popularly known as fracking. Comments and reflections are invited, including on the question of whether KAIROS should endorse a moratorium on fracking. Please send comments to Ed Bianchi, Program Manager, at [ebianchi@kairoscanada.org](mailto:ebianchi@kairoscanada.org), by September 1, 2014.

### ***Background to the paper:***

In October 2013, the KAIROS Sustainability Circle discussed the issue of hydraulic fracturing. Circle members raised concerns about the ecological and Indigenous rights consequences of fracking brought to light by recent developments, including a peaceful blockade against shale gas exploration in New Brunswick.

The Sustainability Circle asked KAIROS staff to prepare a draft discussion paper, using the ethical framework previously developed as a tool of reflection on emerging issues. Circle members discussed a first draft, suggesting changes, and leading to a second draft for the consideration of the KAIROS Board of Directors.

At their 26 February 2014 meeting, Board members suggested several changes and approved the paper for circulation with amendments discussed at the meeting. The Board further agreed to take the paper back to KAIROS members for further consideration of policy issues in preparation for the Board's October 2014 meeting.

For further information, please contact Ed Bianchi, Program Manager, at 1-613-235-9956 x221 or at [ebianchi@kairoscanada.org](mailto:ebianchi@kairoscanada.org).

*In KAIROS, eleven churches and religious organizations work together  
for ecological justice and human rights*

**KAIROS: Canadian Ecumenical Justice Initiatives  
200-310 Dupont Street, Toronto, Ontario M5R 1V9 [www.kairoscanada.org](http://www.kairoscanada.org)**

## Ethical Reflections on Fracking

### KAIROS Paper for Discussion (April 8, 2014)

#### 1. Naming the issue: What is the 'red flag' that raised this as an issue that needs to be addressed?

On 17 October 2013 the RCMP enforced an injunction to end a blockade by members of the Elsipogtog First Nation and their allies to prevent SWN Resources from conducting exploratory seismic testing in search of shale gas on their ancestral territory.

The practice of hydraulic fracturing (or fracking) for shale gas and oil raises significant justice issues. The ecological consequences of fracking and the rights of Indigenous peoples are intimately connected. Indigenous and non-Indigenous civil society groups in numerous jurisdictions have grave concerns about the consequences of fracking for air and water contamination, as well as the exacerbation of climate change. The Elsipogtog people, and other Indigenous peoples in other parts of Canada and the world, are demanding to be consulted and to have their right to give or withhold their free, prior and informed consent respected before fracking operations are allowed to take place on their territory. The right to free, prior and informed consent is affirmed in the UN *Declaration on the Rights of Indigenous Peoples*.

#### 2. What communities does the issue affect?

##### A. Indigenous Peoples are at the forefront of resistance to fracking:

Indigenous peoples in North and South America have raised concerns about the ecological dangers of fracking for shale gas and shale oil. Susan Levi-Peters, former Chief at Elsipogtog, says "It is our responsibility to protect Mother Earth, to protect the land for non-Natives too."<sup>1</sup> Non-Indigenous people from New Brunswick's Acadian and Anglophone communities continue to support the protest led by the Elsipogtog First Nation.

In British Columbia, hereditary Chief Na`moks of the Wet'suwet'en First Nation's Tsayu Clan leads his people "standing in the path of all proposed pipelines through their unceded traditional territory ... not just the Enbridge Northern Gateway pipeline for diluted bitumen, but, importantly, several gas pipelines proposed to supply BC LNG terminals – including Chevron and Apache's Pacific Trails Pipeline. ... Another clan of the Wet'suwet'en, the Unistòtèn, has been occupying a key pipeline corridor across the Morice River in their territory for a year and a half now and already [blocked some surveying work](#) for the Pacific Trails line."<sup>2</sup>

Also in B.C., "the Fort Nelson First Nation has been fighting applications for the withdrawal of three billion litres of water per year from the Fort Nelson River for fracking projects."<sup>3</sup> The Tahltan First Nation stopped Royal Dutch Shell from fracking for coal bed methane in the Sacred Headwaters, the birthplace of the Skeena, Nass and Stikine Rivers. In August 2013 the Tahltan issued an eviction notice to Fortune Minerals. Tahltan elders were arrested while keeping Fortune Minerals out of the Sacred Headwaters a decade ago.<sup>4</sup>

In July 2013, the Council of Yukon First Nations declared their traditional territories “frack-free” after a Chinese-owned company, Northern Cross, commenced 3D seismic testing.<sup>5</sup>

In Argentina, the Mapuche people continue to resist fracking to extract shale oil from the Vaca Muerta field despite attempts by police to break up their protests with tear gas and rubber bullets. Lefxaru Nahuel, a Mapuche leader in Argentina, explains why he will continue to lead protests: “We’ll continue to fight to defend the land, the water and the air. With fracking, there is no future for us here.”<sup>6</sup>

**B. Citizen mobilizations in many countries have demonstrated widespread concern for the ecological dangers posed by fracking. One measure of the extent and the depth of concern that these mobilizations reflect is the number of jurisdictions that have instituted bans or moratoria on fracking.**

Two countries have instituted outright bans on fracking:

- Bulgaria – In January 2012 the National Assembly voted 166 to 6 to rescind a contract with Chevron Corporation and banned exploration for shale gas as well as its exploitation.<sup>7</sup>
- France – In June 2011 the National Assembly banned fracking. Ex-President Sarkozy declared the ban would last until it could be proven that fracking did not damage the environment. The ban withstood a later court challenge and is being upheld by President Hollande.

In Canada, several municipalities and two provinces have declared moratoria on fracking. Quebec was the first province to declare a moratorium on fracking for shale gas in March 2011. Most recently, the government of Newfoundland and Labrador announced in November 2013 that the province will not allow onshore or onshore-to-offshore fracking while it reviews “regulations, rules and guidelines in other jurisdictions and undertakes public consultations.”<sup>8</sup>

Other jurisdictions that have declared moratoria include:

- Denmark
- Czech Republic
- North Rhine Westphalia state in Germany
- Ireland
- Burgos municipality and Cantabria region in Spain
- Canton of Fribourg in Switzerland
- New South Wales and Victoria states in Australia
- Christchurch in New Zealand

In the United States of America:

- New York, Maryland and Vermont have state-wide bans.
- Municipal resolutions have been passed in 20 states including California, Michigan, New Jersey, Ohio, Pennsylvania, Colorado, New Mexico and Virginia.<sup>9</sup>

In two instances moratoria were first declared and then later lifted under political pressure or after a change of government:

- Britain – moratorium imposed in 2011 was lifted in 2012 but opposition continues.
- South Africa – moratorium imposed in 2011 has been lifted despite community protests.

The significant number of jurisdictions that have instituted bans or moratoria is indicative of the importance governments attach to adhering to the precautionary principle, that is, the precept that an action should not be undertaken if its consequences are uncertain and potentially dangerous.

### **3. What are the facts and how are they narrated?**

Hydraulic fracturing (or fracking) involves the injection of millions of litres of water and thousands of litres of sand and chemicals into coal beds or shale rock formations to break open fissures to release natural gas or oil. Natural Resources Canada's contention that fracking has been safely carried out in North America for over 60 years is only partly true. As author Andrew Nikiforuk explains:

[T]he practice of pumping small volumes (1,000 to 10,000 gallons) of toxic fluid into vertical wells (2,400 feet) using about 600 horsepower of pressure is indeed 60 years old. But that's not what is happening in Pennsylvania, Texas or Northern British Columbia today. Now industry injects millions of gallons of water into wellbores two miles deep that then angle or deviate horizontally another kilometre underground. They then break up the rock with up to 40,000 units of horsepower onsite and at pressures so extreme that the practice triggers small earthquakes.<sup>10</sup>

Among the ecological concerns of populations who live on lands where fracking has occurred are its consequences for water use, water contamination, earthquakes and the release of methane, a greenhouse gas 25 times more potent than CO<sub>2</sub> over a century and 105 times more powerful over a 20-year time frame.

#### **A. Water Use**

The Canadian Association of Petroleum Producers (CAPP) says water use per well is moderate. An article on its web site states: "Shale gas resources currently developed in New Brunswick using multistage hydraulic fracturing require about 20,000 cubic metres of water per well, depending on geology. ... Most operators use water from rivers, their own freshwater storage pits or saline groundwater. They also use recycled water."<sup>11</sup> Similarly the CAPP data for water use in British Columbia appear modest when presented on a per well basis: "Shale gas resources currently developed in B.C. using horizontal wells with multi-stage fracturing use 5,000 to 100,000 cubic metres of water per well, depending on geology."<sup>12</sup>

However, when the fact that several wells are perforated from a single well-pad is taken into account, the actual water use data from British Columbia's Horn River Basin indicates that

water use has been much larger. Canadian Centre for Policy Alternatives analyst Ben Parfitt writes:

In B.C. industry records have been set for water usages at individual multi-well shale gas pads ... when 980,000 cubic metres of water was pumped underground at a single well pad operated by Apache Canada. ... The water was used in 274 successive hydraulic fracturing procedures performed at 16 wells at a remote site ... named Two Island Lake. The average horizontal wellbore length at Two Island Lake was 1600 metres, a factor that helps to explain the huge volume of water required and why the water level at Two Island Lake declined by 15 centimetres due to continuous drawdown over a nearly four-month period. Apache states that it will drill 1,218 wells in the Horn River Basin by just 2034. If the company matches the standard set at Two Island Lake the total water demand for this company alone ... will be in the neighbourhood of 130 million cubic metres.<sup>13</sup>

In response to a 12-fold increase in the past two years of water extraction from their territory in the past two years, the Fort Nelson First Nation is attempting to stop an application for another fracking operation at a B.C. environmental appeal board.<sup>14</sup> According to a report in the *Vancouver Sun*, in 2012 “more than 800 deficiencies were found during 4,223 inspections conducted in the oil and gas industry by the B.C. Oil and Gas Commission. Of these, 80 resulted in charges, mainly under the provincial Water Act for the non-reporting of water volumes. Other charges included violations under the provincial Environment Management Act.”<sup>15</sup>

Three environmental organizations, Ecojustice, the Wilderness Committee and Sierra Club B.C., have filed a lawsuit in the Supreme Court of B.C. alleging that the B.C. Oil and Gas Commission has violated the provincial Water Act. While the law allows water withdrawals to be granted for short-term, low-impact projects for 24 months with little review, the suit alleges that the Commission has been consistently renewing short-term contracts as many as six times and has granted some permits for more than 24 months at a time thus avoiding a more rigorous review and monitoring process.<sup>16</sup>

## **B. Water Contamination**

The CAPP also maintains that fracking does not contaminate drinking water: “More than 175,000 wells have been hydraulically fractured in British Columbia and Alberta over the past 60 years without a case of harm to drinking water, according to the BC Oil and Gas Commission and the Alberta Energy Regulator. In New Brunswick, there have been no reports of drinking water contamination related to the 49 hydraulic fracturing operations that have taken place since 1985. This strong safety record is the result of strict regulations and industry best operating practices.”<sup>17</sup>

Many citizens claim otherwise. In northern B.C., people are reporting that after fracking commenced they were no longer able to drink their tap water and that the water burned children’s skin.<sup>18</sup> The U.S. Environmental Protection Agency found that groundwater in Pavilion,

Wyoming had been contaminated with toxic fracking fluids and cautioned residents against drinking water from their wells.<sup>19</sup> Across the U.S., nearly 1,000 cases of water contamination due to shale gas fracking have been reported.<sup>20</sup>

A 2011 study by scientists at Duke University found that 85% of water wells close to shale gas sites in Pennsylvania and New York were contaminated with methane levels that were up to 17 times higher than normal.<sup>21</sup> A follow-up study released in 2013 examined 141 private water wells in Pennsylvania and New York.<sup>22</sup> It found methane in 82% of the wells with concentrations that were six times higher than in wells within one kilometer of fracking operations. High concentrations of hazardous ethane and propane were also found in wells near fracking sites. The lead author of the Duke study, Dr. Robert B. Jackson, said the cause of the contamination is likely poor well construction with older wells more likely to leak.

Jessica Ernst, a former consultant to the oil and gas industry, sued Encana Corporation in 2007 for allegedly contaminating her water supply due to its fracking of a shallow coal bed to extract methane near Rosebud, Alberta. While Alberta's chief justice ruled that Alberta's Energy Resources Conversation Board, which granted the fracking license, cannot be sued, the case against Encana is still before the courts. In its statement of defense the company claims that it did not frack any coal beds but merely "stimulated" them.<sup>23</sup> Ernst has compiled a 93 page document describing multiple cases of water contamination from fracking operations.<sup>24</sup> According to journalist Andrew Nikiforuk, ranchers are saying that "Alberta Environment now has so many complaints about hydraulic fracturing from landowners in southern Alberta's foothills that it is completely backlogged."<sup>25</sup>

Another contaminant associated with fracking is highly carcinogenic radium leached from shale rock. A *New York Times* investigation revealed that "fracturing wastewater containing worrying levels of naturally occurring radioactivity was being released into Pennsylvania rivers."<sup>26</sup> A study by scientists at Duke University found that treatment of wastewater from fracking does not remove all dangerous contaminants. The study found "elevated levels of radioactivity, salts and metals ... in river water and sediments at a site where treated water ... is discharged into a western Pennsylvania creek."<sup>27</sup> The study revealed radium levels around 200 times greater downstream from the treatment plant as compared to samples taken upstream. Professor Robert B. Jackson stated "The radioactivity levels we found in the sediments near the outflow are above management regulations in the U.S. and would only be accepted in a licensed radioactive disposal facility." His colleague, Professor Avner Vengosh, added that the potential environmental risks will last for "thousands of years to come."<sup>28</sup>

A report released by the British Department of Health cites a 2011 paper from the Massachusetts Institute of Technology that found that "nearly half of 43 [groundwater] pollution incidents were related to drilling operations - mainly because of faulty sealing of wells."<sup>29</sup>

The petroleum industry maintains that the steel tubes or casings it inserts into well bores and secures with cement prevent anything travelling through the wellbore from coming into contact with the drinking water aquifers.<sup>30</sup> However, James Northrup, a retired manager at Atlantic

Richfield, the seventh largest oil company in the U.S., cites an industry study indicating that 25% of frack wells leak after five years and 40% after eight years. Northrup says “Everybody in the industry knows that gas drilling pollutes groundwater ... It’s not ... whether they leak. It’s how much.”<sup>31</sup>

Water contamination can also occur when a fracking operation experiences what is known as a “frack hit” or a “downhole communication.” These occur when fracking fluids under high pressure migrate underground to an adjacent well and flow uncontrolled to the surface. The vice-president of an Alberta petroleum company who chairs a task force on frack hits admits that “a fluid spill on the surface or loss of well control underground ... could lead to contamination of a water aquifer.”<sup>32</sup> Frack hits have occurred throughout the U.S. and in Alberta and are expected to become more frequent as multiple wells are being drilled in close proximity from a single drill pad.

While the Canadian Association of Petroleum Producers maintains that a typical well is fracked only once, Karlis Muehlenbachs, a geochemist at the University of Alberta, explains “They’ll frack each well up to 20 times. Each time the pressure will shudder and bang the pipes in the wellbore. The cement is hard and the steel is soft. If you do that all the time you are going to break the bonds and cause leaks.”<sup>33</sup>

### **C. Air Contaminants**

A study by Public Health England, an agency of the Department of Health, concluded that “potential risks to public health from exposure to the emissions associated with shale gas extraction are low if the operations are properly run and regulated.”<sup>34</sup>

However, the British study recognizes a lack of research exists on the topic. It refers to one US study that found that 75% of the chemicals used in fracking could affect skin, eyes and breathing. Another 25% are carcinogenic. According to the BBC’s science editor “the only detailed peer reviewed study of the impact of air emissions was published last year by the Colorado School of Public Health. That work found that people living within half-a-mile of gas wells had an elevated risk of health conditions including neurological and respiratory effects.”<sup>35</sup>

People living downwind from shale gas fracking operations in Texas, Colorado and Pennsylvania typically complain of symptoms including rashes, headaches, intestinal illnesses and difficulty breathing.<sup>36</sup> Researchers studying communities in Colorado near fracking operations “found that babies whose mothers lived in close proximity to multiple oil and gas wells were 30% more likely to be born with defects in their heart than babies born to mothers who did not live close to oil and gas wells.”<sup>37</sup>

According to a report from Friends of the Earth Europe:

Fracking fluid can contain as many as 300 chemicals, out of which 40 per cent are endocrine disruptors, known to interfere with the hormone system in animals and

humans, and a third of which are suspected carcinogens. Over 60 per cent of the chemicals used can harm the brain and nervous system.<sup>38</sup>

The main sources of air pollution include:

- gas flaring from well heads;
- leakages from compressor stations where gas is compressed and made ready to transmit in pipelines; and
- evaporating fracking chemicals (whether before, during or after injection, including from waste water).<sup>39</sup>

#### **D. Greenhouse Gas Emissions**

The petroleum industry correctly maintains that using natural gas as a substitute for coal reduces greenhouse gas (GHG) emissions from power plants at the point of combustion. Burning gas to produce electricity emits only about half as much carbon dioxide as coal per unit of energy.

However, there is evidence that shale gas production is more GHG intensive than conventional natural gas due to what are called “fugitive emissions.” A study led by Robert Howarth of Cornell University concluded that there were “significant greenhouse gas emissions (notably methane) at gas wells as they were fracked and subsequently as they went into production. The Cornell study ... estimated the impact of the routine methane emissions after well development and concluded that there were numerous instances where the venting or leaking of methane at various points in the gas gathering and distribution system would add significantly to the industry’s GHG emissions.”<sup>40</sup>

The Cornell team found that during the life cycle of the average shale gas well, somewhere between 3.6% and 7.9% of the well’s methane escapes into the atmosphere. At this rate, methane emissions from fracked wells is between 1.3 and 2.1 times as great as those from conventional gas wells. They conclude that the GHG footprint of shale gas is 1.2 to 2.1 times greater than that of coal over a 20-year time frame when expressed per quantity of energy available during combustion.<sup>41</sup>

The petroleum industry has attempted to refute Howarth’s research by funding a study that purports to show a lower level of methane emissions. However, the study paid for by Shell, Exxon Mobil and Chevron among others, was based on the evaluation of sites chosen by the industry at times of their choosing.<sup>42</sup> Other studies cited in a paper commissioned by the UK Department of Energy and Climate Change find much lower GHG emissions from shale gas wells than the study by Howarth and colleagues. These studies characterize Howarth’s work as an “outlier” study based on a flawed methodology.<sup>43</sup>

The Friends of the Earth Europe report cites the US National Academy of Sciences as concluding that “it is likely that leakage at individual natural gas well sites is high enough, when combined with leakage from downstream operations, to make the total leakage exceed the 3.2 per cent



threshold beyond which gas becomes at least comparably worse for the climate than coal for at least some period of time.”<sup>44</sup>

### **E. Earth Tremors**

Earth tremors have occurred during actual fracking operations and during the injection of waste fluids underground. Seismic activity may contribute to water contamination when it opens new fissures in rock formations.

Small earthquakes have occurred near sites where fracking fluids are disposed in Ohio, Arkansas, Oklahoma and Texas.<sup>45</sup> In Britain a fracking operation in Lancashire was discontinued after a 1.5 magnitude tremor.<sup>46</sup>

The CAPP cites a 2012 report by the BC Oil and Gas Commission (OGC) concerning earthquakes in the Horn River Basin that “concluded hydraulic fracturing was the cause of 272 cases of what the OGC called ‘anomalous seismicity.’ But none of these seismic events, the report makes clear, caused any injury, property damage or posed any risk to public safety or the environment. In fact, only one of these seismic events was felt on the surface.”<sup>47</sup> The latter observation is not surprising given that the area is sparsely populated.

### **F. Low Economic and Net Energy Returns**

A report, *La ruina de la fractura hidráulica (The Blight of Hydraulic Fracturing)*, published by Ecologists in Action in Spain, shows how many shale gas fracking operations are neither viable economically nor in their return on the energy expended to extract the gas.<sup>48</sup> The report says initial estimates of shale gas reserves are often vastly overstated. In the U.S., “shale gas and shale oil reserves have been overestimated by a minimum of 100% and by as much as 400-500% by operators according to actual well production data.”<sup>49</sup> As production from shale wells declines quickly, new wells must be drilled constantly. Geoscientist David Hughes calculates that in order to maintain U.S. production, more than 7,000 shale gas wells must be drilled annually at a cost of US\$42 billion, while “the value of shale gas produced in 2012 was just US\$32.5 billion.”<sup>50</sup>

Andrew Nikiforuk observes how “shale gas and oil fields deplete so quickly that they resemble financial treadmills. In order to maintain constant flows from a play industry must replace 30 to 50 per cent of declining production with more wells.” Nikiforuk cites David Hughes’ analysis of the uneven geology of various shale gas fields that shows that “In every shale play there are sweet spots and unproductive areas and marginal ones. In fact 88 per cent of all shale gas production flows from six of 20 active plays in the United States while 81 per cent of shale oil comes from two of 21 plays.”<sup>51</sup>

In addition, Hughes has found that the amount of gas recovered from shale plays is much lower than what can be recovered from conventional wells. Whereas conventional drilling “often captured up to 70 per cent of the gas in the ground... shale barely averages 10 per cent despite

deploying more horsepower and water over greater landscapes.”<sup>52</sup> Given these low rates of recovery, there is ample room for skepticism concerning a joint federal-provincial report’s claim that the Montney basin, straddling the B.C.-Alberta border, containing 449 trillion cubic feet of natural gas, has enough gas to supply Canada’s needs for 145 years.<sup>53</sup> As David Hughes explains:

Pundits and politicians who wax on about “100 years of natural gas” are probably right that there is one hundred years’ worth of recoverable oil and gas at current production rates—it’s just that it may take 800 or more years to recover it. In other words, as our reliance on unconventional oil and gas grows, production rates are increasingly difficult to maintain because tomorrow’s resources are so much more technically challenging to produce than today’s. Falling rates of supply are a much more critical problem in the current economic growth paradigm than “running out”, which is unlikely to ever happen.<sup>54</sup>

Moreover the Ecologists in Action report states that fracking has a very low energy return on energy investment of between 2:1 and 3:1. This means that only two to three units of usable energy are derived from each unit of energy used to extract shale gas. In contrast a conventional gas well in Russia yields 20 units of energy for each one consumed in their extraction.

Due in large part to an abundance of shale gas on the market, natural gas prices in North America fell by 60% between 2008 and early 2013.<sup>55</sup> The Ecologists in Action report estimates that about 80% of U.S. wells are not now viable economically. With prices below the costs of extraction in some instances, many firms have reassessed their investment plans. Some Canadian firms, like Encana Corp, are cutting back on the number of wells drilled and giving priority to gas plays that also produce natural gas liquids, such as propane and butane, which fetch higher prices than dry gas alone.<sup>56</sup> But in mid-2012 Reuters reported that the surge of investment into natural gas liquid plays in the U.S. had caused a new glut leading to falling prices for these liquids.<sup>57</sup> Business writer David Olive estimates that some “three-quarters of a trillion dollars invested in shale oil and gas has either gone down the rat-hole or been re-directed away from smarter investments in ... alternative energy and fuel efficiency technologies.”<sup>58</sup>

If the return on investments in shale gas extraction is very low or negative in many instances, why has the industry continued to expand? Financial consultant Deborah Rogers offers a plausible explanation. She attributes the phenomenon to the involvement of investment banks with the shale gas industry. Producers were driven to meet financial analysts’ targets for production growth and a need for sales revenues to keep up on debt service payments to their bankers. The investment banks then profited by arranging merger and acquisition deals worth US\$46.5 billion in 2011 alone as the assets of troubled shale companies were sold off to larger corporations.<sup>59</sup>

But why would larger corporations buy up shale properties that are losing money? One reason is that corporations such as Exxon Mobil need to shore up their reserve-replacement ratios, or the quantity of reserves they hold relative to the quantity of gas they sell. Another factor may

be that the petroleum industry giants that have the financial resources to endure losses in the short-term hope to reap large profits in the future when more gas can be exported to higher-priced markets, particularly in Asia where prices are currently four-times higher than in North America. In early November 2013, natural gas sold for around US\$3.50 per million British thermal units (mmBtu) in North America compared to about US\$16 per mmBtu in Asia. However, Bloomberg news has projected the difference between U.S. and Asian gas is poised to drop by more than 60 per cent by 2020, leaving exporters facing a loss of as much as \$6 million per tanker.”<sup>60</sup>

Currently there are perhaps a dozen proposals for building Liquefied Natural Gas (LNG) export terminals on B.C.’s coast, with four industry groups in the lead.<sup>61</sup> However, one of these, BC LNG, also known as Douglas Channel LNG, in which the Haisla First Nation has an ownership stake, has applied for bankruptcy protection.<sup>62</sup>

An analysis by Friends of the Earth Europe suggests three reasons why gas production was not cut in the U.S. to raise prices. First, “shale gas operators were able to hedge against low prices through financial instruments, ensuring acceptable prices in future markets that left them relatively unscathed from plummeting spot prices. [Second] there was a backlog of uncompleted drills that kept up supply as they were progressively completed. [Third] land lease contracts often force operators to start drilling within five years or lose their leases.”<sup>63</sup>

#### **G. Threat to Action on Climate Change**

A document prepared for B.C.’s Environment Minister warns that the pursuit of a liquefied natural gas (LNG) industry could double the province’s greenhouse gas emissions imperiling its legislated targets for GHG reductions. The document, obtained under a freedom of information request, says that emissions would rise by a minimum of 16% or as much as 100%. It says “At the high end of that range B.C.’s natural gas sector emissions would be comparable to those from Alberta’s oil sands.”<sup>64</sup>

A report from the Pembina Institute says that if B.C. achieves its revenue target by exporting four to six trillion cubic feet of shale gas per year by 2020, it would result in the release of an additional 73 million tonnes of greenhouse gases each year. This would be equivalent to 72% of the 101 million tonnes of GHGs expected from the tar sands by 2020. The added emissions would come from the extraction, processing, transportation, liquefying and storage of Liquefied Natural Gas for export, not counting the additional GHGs that would be emitted from burning the gas in Asia. As a result, B.C. would fail to meet its legislated target of reducing emissions to below 43 million tonnes by 2020.<sup>65</sup>

While cheap shale gas is replacing coal in some jurisdictions, it is also crowding out wind and solar alternatives.<sup>66</sup> In a worrisome development *The Guardian* revealed the contents of a secret European Union document indicating that subsidies from an €80 billion program intended to promote renewable sources of energy would be made available for natural gas power stations using shale gas. The International Energy Agency’s chief economist, Fatih Birol, warns that “Renewable energy may be the victim of cheap gas prices if governments do not stick to their renewable support schemes. A golden age for gas is not necessarily a golden age

for the climate.”<sup>67</sup> Dr. Birol says the shale gas boom in the U.S. led to a 50% drop in investment in renewable energy.

Since North American gas prices have fallen due to an abundance of shale gas, companies have taken to flaring, or burning off, unwanted gas associated with oil production. Flaring not only wastes gas but also has detrimental effects on air quality and climate change. In response, Mercy Investment Services, a fund that manages investments for the Sisters of Mercy, “filed a shareholder resolution calling on Continental Resources, the leading oil producer in the Bakken [field in North Dakota], to adopt clear goals for cutting or eliminating flaring.”<sup>68</sup>

#### **4. Why does this issue matter? What key theological assumptions and ethical values are in play?**

KAIROS’ 2007 paper *Reenergizing the Future: Faith and Justice in a Post-Petroleum World*<sup>69</sup> affirms five core Christian beliefs:

**a) We believe that the world as God’s handiwork has its own inherent worth and value.**

After each act in the first Creation story (Genesis 1), God “saw that it was good.” Following God’s lead, we value Creation in its own right, caring for it as would God, its Creator. This teaching calls for a change of worldview from one of unrelenting exploitation.

**b) We believe that we share in God’s covenanted relationship with all of Creation.**

In Genesis 2: 15 we learn that when God created the Garden of Eden, God also charged humans to “till it and keep it.” The story of the Garden of Eden reminds us of our human responsibility to do our part in caring for Creation.

Indigenous peoples constantly remind us of the need to live in harmony with the Creators’ works and to treat all Creation with respect. Hydraulic fracturing is a recent example of a reckless attitude towards the natural world. At KAIROS’ 2013 intergenerational gathering *Elements of Justice*, Caleb Behn, an Eh Cho Dene and Dunne-Za and Cree from the Treaty 8 Territory of Northeastern B.C. where extensive fracking is taking place, characterized fracking as a violent act, tantamount to “breaking the bones of Mother Earth.”

As a spokesperson for the Indigenous people of the Wabanaki-Mi’gmaq District of Signitog stated “Creator made us caretakers of Mother Earth. Our goal as the Collective Community of Concerned Members of Signitog is to protect Mother Earth because we’re killing her. She’s already endured too much. We will lose our clean water if we sit back and allow what the shale gas companies are planning on doing in Signitog. What they are planning is unacceptable. We do not accept the unacceptable.”<sup>70</sup>

**c) We believe that the way we treat the poor and the vulnerable and all Creation is a reflection of our faithfulness to God.**

The Hebrew Scriptures assert that care of those living on the margins – the widow, the orphan, the stranger – is a requirement of holiness (Exodus 22: 21-27, Deut. 10: 17, Deut. 24: 20-21, Prov. 19: 17). In the Gospels, care of the poor, the sick, or stranger is made analogous to dedication to God (Matt. 25: 31-46).

The Elsipotog First Nation, like so many other Indigenous communities in Canada, is very poor in relation to the social norms of Canadian society. It has an 80% unemployment rate. As many as 20 people dwell in a single house. The premier of New Brunswick holds out the promise of jobs and prosperity through the development of natural gas. Yet the price they would pay in destruction of their land is too high. Instead of grasping at the promise of jobs or perhaps a share in royalties, the Elsipogtog have responded in a spirit of generosity towards all Creation.

**d) We believe that God wants people to live in mercy, compassion and mutual respect of other humans and all Creation and that this will be the basis for peace and justice.**

The basic Biblical call to love our neighbours as ourselves (Lev. 19: 18, Mark 12: 31) along with the Golden Rule, where we are urged to do unto others as we would have them do unto us (Mt 7: 12), counsel us against seeking our own well-being at the expense of other parts of Creation.

**e) We believe that God intends restoration through Christ, inviting our collaboration in acts of healing and transformation.**

Visions of the restoration of Creation are abundant in the Scriptures, including a renewal of the covenant (Ezek. 47: 1-12, Isaiah 58: 1-12, Isaiah 61: 1-4, Isaiah 65: 11-25, Rev. 21: 1-4).

## **5. What can guide our decision-making? What principles can be applied?**

In 2007, the Canadian churches reaffirmed ***A New Covenant Towards the Constitutional Recognition and Protection of Aboriginal Self-Government in Canada***. This pastoral statement by KAIROS member churches calls for a new covenant with Indigenous peoples to uphold their rights to self-determination as distinct peoples with an adequate land base.

One guideline is KAIROS` commitment to promote Indigenous peoples rights as affirmed in the 2007 UN *Declaration on the Rights of Indigenous Peoples*, including their right to grant or withhold free, prior and informed consent before resource extraction projects are allowed to proceed on their territories.

Article 32 of the UN *Declaration* states:

1. Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources.
2. States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or

territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.

In order to achieve genuine reconciliation with Indigenous peoples in a spirit of truth that acknowledges past wrongs, there is an urgent need for Canadians to honour treaties signed with First Nations. When the Mi'kmaq nation, to which the people of Elsipogtog belong, signed a treaty of peace and friendship with the English in 1761, they agreed to allow settlers onto their lands on the condition that the Indigenous people be able to continue to live on their land and derive their livelihood from their lands and waters. While this treaty has not been honoured in practice, the historic 1999 decision by the Supreme Court of Canada in the Marshall case confirmed that the Mi'kmaq had never surrendered their lands. Recognition of the Mi'kmaq peoples' right to grant or withhold their free, prior and informed consent to exploration for shale gas would represent the actualization of the peace and friendship treaty.

In November 2009, KAIROS adopted policy positions in relation to the Alberta tar sands. The principles articulated at that time can be applied to the issues raised by hydraulic fracturing with only minor wording changes. The 2009 policy document calls for:

- 1) No further approvals for tar sands projects;
- 2) Support Indigenous communities' and environmental groups' longstanding calls for independent studies, funded by the Alberta and federal governments, on the cumulative impacts of the tar sands development, especially on health, water and ecosystems. These studies must involve Indigenous people and be accessible to them and the public.
- 3) The federal government must develop a clean and sustainable energy strategy, based on conservation and the development of renewable energy as well as a funded transition plan for sustainable jobs in a renewable energy sector. The principles of ecological sustainability and Indigenous Rights must be applied to the development of a renewable energy projects.<sup>71</sup>

The precautionary principle, or the precept that an action should not be undertaken if its consequences are uncertain and potentially dangerous, is a fundamental tenet of ecological justice. The number of jurisdictions that have adopted moratoria on shale gas fracking reflects a widespread recognition of the need to apply the precautionary principle.

New Brunswick's Chief Medical Officer, Doctor Eilish Cleary, has cautioned against proceeding with shale gas fracking until further study can be done on its health effects. Her report notes that while media have focused on the impact of fracking chemicals on drinking water and to a lesser extent on air quality, there are other important determinants of health that must also be considered. In particular, she points to the negative social impacts of the "Boomtown Effect" involving "increases in crime, drug and alcohol abuse, sexually-transmitted infections (STIs), and domestic violence. An inadequate supply and poor quality of housing along with increased cost of living resulting from the boom can lead to increased community dissatisfaction. These problems can be further compounded due to inadequate infrastructure and public services

capacity (including policing, local government, mental health services, social services, and health care)...”<sup>72</sup>

Dr. Cleary’s report notes how these boomtown effects have been documented at Fort McMurray, Alberta at the centre of the tar sands boom and at the B.C. communities of Fort Nelson, Fort St. John and Dawson Creek where a shale gas boom is underway. She also notes how the inequitable distribution of risks and rewards from a shale gas boom can benefit some outsiders, such as transient workers and non-residents, while vulnerable and disadvantaged local populations are at greater risk of suffering harm from environmental contaminations.<sup>73</sup>

Researchers at the University of New Brunswick have cautioned that “Hydraulic fracturing should not proceed unless there is an environmentally responsible option for waste water disposal.”<sup>74</sup> They cautioned against sending saline wastewater to public water treatment plants as has been done in some jurisdictions.

## **6. What is new in this issue? How is this issue different from other-related issues?**

At first glance the issues explored above do not appear to be novel. In the recent past armed force has been used to break up other Indigenous peoples’ protests against development projects that infringe on their rights. In 1989, on the Kanehsatake Mohawk Reserve near Oka, Quebec, the Canadian military was deployed against a community protecting their sacred lands against a proposal to expand a golf course. In 1995, a peaceful encampment set up by the Anishinaabeg people from the Stoney Point Reserve calling for the return of Ipperwash Provincial Park was attacked by the Ontario Provincial Police, and community member Dudley George was killed. In 1995, at Gustafsen Lake, B.C., more than 400 RCMP marched against Shuswap First Nation members who were defending a sacred site.<sup>75</sup>

The 1999, confrontations between members of the Mi’kmaq Nation and fisheries officers at Burnt Church, New Brunswick led to several groundbreaking Supreme Court decisions. These decisions, marking a new era of Indigenous rights, emerged after a disagreement over fishing rights that involved the smashing of Mi’kmaq fishing boats.

In the Marshall case concerning Mi’kmaq fishing rights, the Supreme Court found that Canada must give Indigenous peoples priority use of resources, such as fisheries, look beyond the literal wording of treaties, and take into account other evidence such as historical documents when determining rights and jurisdiction. The *Delgamuukw* decision, another Supreme Court of Canada ruling, “also makes it clear that the Court will consider oral history as well as historical documentation in such a treaty reconstruction process.”<sup>76</sup>

This recognition of Indigenous peoples’ rights to resources found on their territories leads to a requirement to consult them before decisions are made on resource extraction projects. In the *Delgamuukw* case the Supreme Court wrote:

...aboriginal title encompasses within it a right to choose to what ends a piece of land can be put. ... There is always a duty of consultation. ... The nature and scope of the duty

of consultation will vary with the circumstances. ... In most cases, it will be significantly deeper than mere consultation. Some cases may even require the full consent of an aboriginal nation.<sup>77</sup>

These and other court decisions mark a new era of legal rights for Indigenous Peoples in Canada. While the courts have yet to define which cases require the full consent of a First Nation, Indigenous peoples can clearly invoke these legal precedents when faced with dangerous resource extraction projects.

Unfortunately, too often Canadian courts do not always act in accordance with the spirit of the Supreme Court decisions cited above. For example, in December of 2013, a Calgary court granted Penn West Petroleum corporation an injunction against the Lubicon Lake Nation Land Protectors who had sought to prevent Penn West from fracking on their land. This is an example of the failure of Canadian courts to respect Indigenous peoples' right to free, prior and informed consent. Sylvia McAdam, a co-founder of Idle No More who was a keynote speaker at KAIROS' *Elements of Justice* gathering, says "We are deeply disappointed with the decisions .... We strongly condemn the actions of companies and the extractive industry that deny and disregard the rights of Indigenous Peoples, like the Lubicon Lake Nation who are defending their lands for their children and grandchildren."<sup>78</sup>

A second new element that sets current struggles over fossil fuel extraction projects apart from earlier struggles is the realization of the extent of the threat to life on Earth from climate change. KAIROS' October 2013 Briefing Paper *IPCC Confirms We Must Act Now on Climate Change*, cites a recent study by renowned climate scientist James Hansen and colleagues from the Earth Institute at Columbia University and the NASA Goddard Institute for Space Studies. Their study *Climate Sensitivity, sea level and atmospheric carbon dioxide* warns that continuing to burn fossil fuels at the same rate as at present will render most of our planet uninhabitable.<sup>79</sup>

Hansen's study points to the particular danger of exploiting unconventional fossil fuels such as tar sands and shale oil and shale gas. The study concludes with a rhetorical question: "Humanity stands at a fork in the road. As conventional oil and gas are depleted, will we move to carbon-free energy and efficiency—or to unconventional fossil fuels and coal?"<sup>80</sup>

Another study by climatologist Andrew Weaver and graduate student Neil Swart at the University of Victoria reveals that unconventional natural gas resources globally are almost nine times as large as those of conventional gas. According to a table in their commentary, the carbon contained in unconventional gas resources is eight times greater than the amount of carbon contained in the Alberta tar sands.<sup>81</sup>

If burning unconventional fossil fuels literally threatens life on Earth as we know it, then we owe a great deal to the courageous Indigenous peoples who are standing up against their exploitation. As Ryerson University Professor Pamela Palmater, a member of the Mi'kmaq Nation, has written:



First Nations, with our constitutionally protected aboriginal and treaty rights, are Canadians' last best hope to protect the lands, plants and animals from complete destruction — which doesn't just benefit our children, but the children of all Canadians.<sup>82</sup>

## **7. What are the best options for response in this situation?**

### **To engage in ethical reflection on fracking with a particular focus on considering endorsing a moratorium on fracking.**

One faith community, the West District Presbytery of the Newfoundland and Labrador Conference of the United Church of Canada, has already declared its support for a moratorium on fracking.

KAIROS has signed a joint open letter to New Brunswick Premier Alward, together with Amnesty International and the Canadian Friends Service Committee, declaring:

First, it is critical to acknowledge that Indigenous Peoples have rights to their lands, territories and resources that predate the creation of the Canadian state. These pre-existing rights are affirmed in the Peace and Friendship Treaties, in the Royal Proclamation of 1763, and in section 35 of the *Constitution Act, 1982*, as well as in authoritative international human rights instruments including the *United Nations Declaration on the Rights of Indigenous Peoples*. ...

Second, the inherent land rights of Aboriginal peoples cannot be ignored in the day-to-day operations of the government. Doing so is both discriminatory and contrary to the rule of law....

Third, whenever a proposed project has the potential for impacts on the cultures, livelihoods, health and well-being of Indigenous peoples, or where questions remain about the extent of the possible impacts, a very high standard of precaution is required to ensure that no further harm is inflicted... Our organizations call on New Brunswick to acknowledge that shale gas exploration and development on or near the traditional lands of Indigenous peoples is clearly an example where the safeguard of free, prior and informed consent is appropriate and necessary.

Finally, our organizations highlight the need to ensure appropriate police response in the unresolved conflicts over Indigenous lands rights. In all instances, police have a clear responsibility to respect and protect human rights.<sup>83</sup>

#### **Options for further response by KAIROS include:**

- A. Making the four calls contained in the letter to the New Brunswick premier widely known among our member churches and civil society partners, and seeking their widespread endorsement.

- B. Maintaining a close and ongoing dialogue with Indigenous and non-Indigenous communities affected by fracking. KAIROS and allied groups, such as the Christian Peacemakers Teams<sup>84</sup>, may continue to accompany the Elsipogtog and other Indigenous peoples in peaceful protest actions resisting fracking operations.
- C. Closely monitoring independent inquiries into the safety of fracking operations and studying their results, in particular the results of the 78 studies by scientists and university researchers commissioned by the government of Quebec.
- D. Monitoring the suit initiated by U.S.-based Lone Pine Resources under the investor-state provisions of the North American Free Trade Agreement challenging Quebec's moratorium on hydraulic fracturing. Lone Pine is seeking US\$250 million in compensation for the "expropriation" of its permit to explore for shale gas under the St. Lawrence River.<sup>85</sup> If Lone Pine wins this arbitration it will be a setback not only for the people of Quebec but also for Indigenous Peoples across the country seeking to protect their rights against corporations seeking to take advantage of Foreign Investment Protection Agreements as explained in *KAIROS Briefing Paper* No. 36, September 2013.<sup>86</sup>

## Endnotes

---

- <sup>1</sup> Cited in Martin Lukacs, “New Brunswick fracking protests are the frontline of a democratic fight.” *The Guardian*. October 21, 2013.
- <sup>2</sup> “First Nation bans pipelines for BC LNG.” October 3, 2013 at <http://commonsensecanadian.ca/VIDEO-detail/first-nations-ban-pipelines-bc-lng/>
- <sup>3</sup> Emma Lui. *NAFTA challenge to Quebec fracking law puts profits ahead of water*. Post on Common Sense Canadian. October 11, 2013.
- <sup>4</sup> David Suzuki. “Tahltan’s Sacred headwaters defence has deep roots.” *Rabble.ca* September 17, 2013.
- <sup>5</sup> The Council of Canadians. “Fracking Across Canada.” *Canadian Perspectives*. Autumn 2013. P.8.
- <sup>6</sup> Cited in Simon Romero and Clifford Krauss. “Fracking Deal in Patagonia Is Angering Argentines.” *The New York Times International Weekly*, Nov. 3, 2013. P.8.
- <sup>7</sup> *Lista de países que prohibieron el fracking*. Ecoportal.net. Accessed November 4, 2013.
- <sup>8</sup> “Moratorium on fracking announced by Newfoundland government.” *The Telegram*. November 4, 2013.
- <sup>9</sup> For a list of jurisdictions with bans or moratoria on fracking see *Keep Tap Water Safe* at <http://keaptapwatersafe.org/global-bans-on-fracking/>
- <sup>10</sup> Andrew Nikiforuk. “Shale Gas: Myths and Realities.” *The Tyee*. January 7, 2013.
- <sup>11</sup> Sheri Somerville. “Fracking: not new, not risky.” Op ed published in the *St. John Telegraph-Journal*, Oct. 21, 2013 reproduced on the web site of the Canadian Association of Petroleum Producers at <http://www.capp.ca/aboutUs/mediaCentre/CAPPCommentary/Pages/OpinioneditorialforTelegraph-Journal.aspx>
- <sup>12</sup> Canadian Association of Petroleum Producers. “CBC’s Shattered Ground ignores the facts.” CAPP web post February 12, 2013 at <http://www.capp.ca/aboutUs/mediaCentre/CAPPCommentary/Pages/ShatteredGroundignoresthefacts.aspx>
- <sup>13</sup> Ben Parfitt. *Fracking Up Our Water, Hydro Power and Climate: BC’s Reckless Pursuit of Shale Gas*. Vancouver: Canadian Centre for Policy Alternatives and Wilderness Committee. November 2011. p. 13- 14.
- <sup>14</sup> Justine Hunter. “Is LNG fracturing worth its weight in water?” *The Globe and Mail*. December 29, 2013.
- <sup>15</sup> Griffin, Kevin. “Chemical soup used in fracking includes hydrochloric acid, antifreeze.” *Vancouver Sun*. May 3, 2013.
- <sup>16</sup> Tim McSorley. “BC Regulator Sued for Water Act Violations related to Fracking Industry.” *Desmog Canada* at <http://desmog.ca> November 30, 2013.
- <sup>17</sup> Sheri Somerville. Op. cit.
- <sup>18</sup> Cameron Fenton, Canadian Youth Climate Coalition, blog post, Nov. 3, 2013.
- <sup>19</sup> Cited in Bill McKibben. “Why Not Frack?” *The New York Review of Books*. March 8, 2012.
- <sup>20</sup> Nikiforuk, Andrew. “US Study Casts Pall over BC’s Shale Gas Biz.” *The Tyee*. December 9, 2011.
- <sup>21</sup> Goldenberg, Suzanne. “Methane contamination of water rises near to shale gas sites, study shows.” *The Guardian*. May 9, 2011.
- <sup>22</sup> Robert B. Jackson et al. Increased stray gas abundance in a subset of drinking water wells near Marcellus shale gas extraction. *Proceedings of the National Academy of Sciences*. June 24, 2013 at <http://www.pnas.org/content/early/2013/06/19/1221635110.full.pdf+html>
- <sup>23</sup> Andrew Nikiforuk. “Alberta Energy Regulator Given Immunity in Landmark Fracking Suit.” *The Tyee*. October 9, 2013.
- <sup>24</sup> See *Brief Review of Threats to Canada’s Groundwater from the Oil and Gas Industry’s Methane Migration and Hydraulic Fracturing*. Rosebud, Alberta: Ernst Environmental Services. June 2013 at <http://www.ernstversusencana.ca/wp-content/uploads/2013/06/Brief-review-of-threats-to-Canadas-groundwater-from-oil-gas-industrys-methane-migration-and-hydraulic-fracturing-v4.pdf>
- <sup>25</sup> Andrew Nikiforuk. “Alberta Energy Regulator Given Immunity in Landmark Fracking Suit.” *The Tyee*. October 9, 2013.
- <sup>26</sup> “Fracking Under Pressure.” *Sustainalytics*. August 2011. Page 8.
- <sup>27</sup> “Streams Below Fracking Wastewater Treatment Show Elevated Salts, Metals, Radioactivity.” *Science Daily*. October 2, 2013. at <http://www.sciencedaily.com/releases/2013/10/131002092621.htm>
- <sup>28</sup> *Ibid*.
- <sup>29</sup> David Shukman. “‘Low health risk’ from fracking, says UK agency.” *BBC World*. October 31, 2013 at <http://www.bbc.co.uk/news/science-environment-24761980>

- 
- <sup>30</sup> Sheri Somerville. "Fracking: not new, not risky." Op ed published in the St. John Telegraph-Journal, Oct. 21, 2013 reproduced on the web site of the Canadian Association of Petroleum Producers at <http://www.capp.ca/aboutUs/mediaCentre/CAPPCommentary/Pages/OpinioneditorialforTelegraph-Journal.aspx>
- <sup>31</sup> Cited in Ellen Cantarow. "Shale-shocked: Fracking gets its own Occupy movement" Aljazeera.net. January 27, 2012.
- <sup>32</sup> Cited in Gayathri Vaidyanathan, "Hydraulic Fracturing: When 2 wells meet, spills can often follow." *A&E Special Report*. August 5, 2013.
- <sup>33</sup> Cited in Andrew Nikiforuk. "Fracking Contamination 'Will Get Worse': Alberta Expert." *The Tyee*. December 19, 2011.
- <sup>34</sup> Cited in David Shukman. "'Low health risk' from fracking, says UK agency." BBC World. October 31, 2013 at <http://www.bbc.co.uk/news/science-environment-24761980>
- <sup>35</sup> Ibid.
- <sup>36</sup> Ellemn Cantarow. *The Downwinders*. Tom Dispatch. Undated.
- <sup>37</sup> Miriam Rotkin-Ellman. « New Study Finds Worrisome Pattern of Birth Defects in Fracking Communities.» San Diego Free Press. February 6, 2014. at <http://sandiegofreepress.org/2014/02/new-study-finds-worrisome-pattern-of-birth-defects-in-fracking-communities/>
- <sup>38</sup> Greig Aitken et al. *Unconventional and Unwanted : The Case Against Shale Gas*. Friends of the Earth Europe. Brussels. September 2012. P.12.
- <sup>39</sup> Ibid. P.14.
- <sup>40</sup> Ben Parfitt. *Fracking Up Our Water, Hydro Power and Climate: BC's Reckless Pursuit of Shale Gas*, Vancouver: Wilderness Committee and Canadian Centre for Policy Alternatives BC office. November 2011. p. 20-21.
- <sup>41</sup> Howarth, Robert. Santor, Renee. Ingraffea, Anthony. "Methane and the greenhouse gas footprint of natural gas from shale formations." *Climate Change Letters*. March 13, 2011.
- <sup>42</sup> Jim Naureckas. "Is Oil Industry Funding of a Fracking Study a Problem?" September 19, 2013.
- <sup>43</sup> David J.C. MacKay and Timothy J. Stone. *Potential Greenhouse Gas Emissions Associated with Shale Gas Extraction and Use*. London: UK Department of Energy and Climate Change. September 9, 2013 at [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/237330/MacKay\\_Stone\\_shale\\_study\\_report\\_09092013.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/237330/MacKay_Stone_shale_study_report_09092013.pdf)
- <sup>44</sup> Greig Aitken et al. op. cit. p.10.
- <sup>45</sup> Matt Daily and Anna Driver. "Foreign firms start to dig in to U.S. shale gas deposits." *The Globe and Mail*. January 4, 2012 B8.
- <sup>46</sup> McCarthy, Shawn. "British authorities see link between fracking and quakes." *The Globe and Mail*. June 2, 2011. Page B1.
- <sup>47</sup> Canadian Association of Petroleum Producers. "CBC's Shattered Ground ignores the facts." CAPP web post February 12, 2013 at <http://www.capp.ca/aboutUs/mediaCentre/CAPPCommentary/Pages/ShatteredGroundignoresthefacts.aspx>
- <sup>48</sup> Ecologistas en Acción. *La ruina de la fractura hidráulica*. Madrid. May 2013 at <http://www.ecologistasenaccion.org/article25805.html?lang=en>
- <sup>49</sup> Deborah Rogers. "Shale and Wall Street: Was the Decline in Natural Gas Prices Orchestrated?" *Energy Policy Forum*. February 2013 at <http://shalebubble.org/wp-content/uploads/2013/02/SWS-report-FINAL.pdf>
- <sup>50</sup> J. David Hughes. *Drill, Baby, Drill: Can Unconventional Fuels Usher in a New Era of Energy Abundance?* Santa Rosa, California: Post Carbon Institute. February. 2013 P.ii. at <http://www.postcarbon.org/reports/DBD-report-FINAL.pdf>
- <sup>51</sup> Andrew Nikiforuk. "Fracked Gas Won't Solve Energy Crunch: Report." *The Tyee*. February 23, 2013.
- <sup>52</sup> Ibid.
- <sup>53</sup> Gordon Hoekstra. "B.C.'s Montney natural gas basin estimated to be world-class." *Vancouver Sun*. November 6, 2013.
- <sup>54</sup> J. David Hughes. Op. cit. p.46.
- <sup>55</sup> David Olive, "Fracking's future an illusion at best: Olive." *Toronto Star*. February 22, 2013.
- <sup>56</sup> Carrie Tait. "Encana cuts deep in massive shakeup." *The Globe and Mail*. November 6, 2013.
- <sup>57</sup> Cited in Deborah Rogers. Op. cit. p.14.
- <sup>58</sup> David Olive op. cit.
- <sup>59</sup> Deborah Rogers. Op. cit. p.13.
- <sup>60</sup> Cited in Geoff Olson. "Pipeline dreams face a Catch-22" *Vancouver Courier*. February 20, 2014.
- <sup>61</sup> Brenda Bouw, "The race to ship liquefied natural gas to Asia." *The Globe and Mail*. July 17, 2013.

- <sup>62</sup> Chester Dawson. “Gas developers seek reshuffle.” *Wall Street Journal* reprinted in *The Globe and Mail*. November 5, 2013 B11.
- <sup>63</sup> Fabian Flues and Antoine Simon. *Unconventional, and Unfounded: The myth of cheap and abundant shale gas in the US*. Friends of the Earth Europe at [http://www.foeeurope.org/sites/default/files/publications/foee\\_unconventional\\_unfounded\\_may2013\\_1.pdf](http://www.foeeurope.org/sites/default/files/publications/foee_unconventional_unfounded_may2013_1.pdf)
- <sup>64</sup> Cited in Justine Hunter. “LNG threatens greenhouse-gas goals.” *The Globe and Mail*. November 13, 2013. A3.
- <sup>65</sup> Aloson Bailie. “Carbon footprint of B.C. LNG boom could rival Alberta’s oilsands.” *The Tyee*. January 13, 2014.
- <sup>66</sup> Pilita Clark “Fightback against the frack attack.” *Financial Times*. April 24, 2012.
- <sup>67</sup> Cited in Fiona Harvey. “Gas rebranded as green by EU.” *The Guardian*. May 29, 2010.
- <sup>68</sup> Ajay Makan and Ed Crooks. “Shale gas boom now visible from space.” *Financial Times*. January 27, 2013.
- <sup>69</sup> See *Re-energize the Future: Faith and Justice in a Post-Petroleum World* at <http://www.kairoscanada.org/sustainability/climate-justice/re-energizing-the-future-faith-and-justice-in-a-post-petroleum-world-developing-an-ecumenical-response-to-the-fossil-fuel-crisis/>
- <sup>70</sup> Elsipogtog First Nation media release “We do not accept the unacceptable.” September 6, 2013.
- <sup>71</sup> See *Drawing a Line in the Sand: Why Canada needs to limit tar sands expansion and invest in a green economy*. A KAIROS Position Paper. July 2010. at <http://www.kairoscanada.org/wp-content/uploads/2010/12/Sust-Tar-DrawingLine.pdf>
- <sup>72</sup> Dr. Eilish Cleary. Chief Medical Officer of Health’s Recommendations Concerning Shale Gas Development in New Brunswick. Office of the Chief Medical Officer of Health, New Brunswick Department of health. September 2012 p. 22 at [http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/HealthyEnvironments/Recommendations\\_ShaleGasDevelopment.pdf](http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/HealthyEnvironments/Recommendations_ShaleGasDevelopment.pdf)
- <sup>73</sup> Ibid. p. 51.
- <sup>74</sup> Dr. Tom Al, Dr. Karl Butler, Dr. Rick Cunjak and Dr. Kerry MacQuarrie. “Opinion: Potential Impact of Shale Gas Exploitation on Water resources.” University of New Brunswick. April 2011.
- <sup>75</sup> See Kent Blansett. *The New Manifest Destiny: A Brief Political History of the Idle No More Movement*.
- <sup>76</sup> Maria Mortellato. *The Crown’s Constitutional Duty to Consult and Accommodate Aboriginal and Treaty Rights* a research paper written for the National Centre for First Nations Governance. February, 2008. Page 17.
- <sup>77</sup> Ibid. Page 20.
- <sup>78</sup> Idle No More and Defenders of the Land. Media Release. “Idle No More and Defenders of the Land Condemn the Alberta Court Judgement Issued Against the Lubicon Lake Nation Land Protectors.” Turtle Island: December 23, 2013.
- <sup>79</sup> Hansen J, Sato M, Russell G, Kharecha P. *Climate sensitivity, sea level and atmospheric carbon dioxide*. Philosophical Transactions of the Royal Society. September. 2013. at <http://rsta.royalsocietypublishing.org/content/371/2001/20120294.full.pdf+htm>
- <sup>80</sup> Ibid. P.25.
- <sup>81</sup> Neil C. Swart and Andrew J. Weaver. “The Alberta oil sands and climate.” *Nature Climate Change*. February 19, 2012.
- <sup>82</sup> Pamela Palmater. op. ed in the *Ottawa Citizen*. December 28, 2012.
- <sup>83</sup> For the full text of the letter see <http://www.kairoscanada.org/sustainability/kairos-joins-in-letter-to-nb-premier-re-elsipogtog/>
- <sup>84</sup> For a description of how Christian Peacemakers Teams have accompanied the Elsipogtog First nation protests see <http://www.cptnet.org/category/cptnet-categories/canada>
- <sup>85</sup> Luke Eric Peterson. “Canada threatened with quarter billion dollar NAFTA claim over cancelled permits for gas fracking ventures.” *Investment Arbitration Reporter*. Nov. 14, 2012.
- <sup>86</sup> See John Dillon. “First Nations Challenge Foreign Investment Protection Agreements.” KAIROS Policy Briefing Paper No. 36, September 2013. At <http://www.kairoscanada.org/sustainability/global-finance/first-nations-challenge-foreign-investment-protection-agreements/>