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www.new-management-network.com E-mail: fowke@vianet.ca

Climate Change

The Strategic Challenge for Businesses

Don Fowke FCMC and Julian Fairfield FCA

Business strategy needs to recognize the growing public pressure for action on global warming in both Canada and the United States, and the American need for greater energy security.

In 2007 the Intergovernmental Panel on Climate Change (IPCC) was awarded the Nobel Peace Prize for its comprehensive evaluation of the effects of carbon dioxide emissions on the planet. IPCC calculate that, in order to hold the rise of temperatures to below 2 degrees C by the year 2050, we need to reduce carbon dioxide equivalent (CO2e) to 30% of the levels that were emitted across the planet in the year 2000.

Exhibit 1 suggests how dramatic these conclusions are for the typical developed country. Using an assumed GDP growth rate of 2.5% per annum, and an energy intensiveness of 60% (where each 1% growth in GDP implies a 0.6% growth in energy consumption) the IPCC targets imply a reduction of CO2e emissions by 13% in 2010, 40% in 2020, 55% in 2030 and 86% by 2050 from the emissions implied in a "Business as Usual" projection. That these reductions are much larger than those from 2000 levels reflects the impact of economic growth.

Meeting these targets in the developed world would imply revolutionary changes in the way energy is deployed in economic activity.

For CEOs in major companies, with planning horizons 10 to 20 years and beyond, and especially those who must contemplate capital investments with useful lives beyond 20 years, getting a clear sense of what all of this means is both important and difficult.

"we must plan for a transport and electricity system that is close to zero carbon"

In Canada in 2005 about 610 megatons of CO2e were emitted into the atmosphere. Some 120 megatons were emitted by electric power plants, mostly burning coal. Another 200 megatons were emitted by transport, about 2/3 of this by road vehicles. Some 80 megatons were emitted by buildings, 80 megatons by extraction and processing, and 45 megatons by manufacturing.

Candu?

Other fugitive emissions make up the 65 megaton balance.

Reduced usage and energy efficiencies might reduce "Business as Usual" emissions by 40% by 2050. The additional reduction of about 45% would need to come partly from de-commissioning coal power plants and replacing them with nuclear stations. This is the direction of policy in Ontario. Much of the remainder would need to come from conversion of automobiles, trucks and trains from hydrocarbons to electric or hydrogen propellants.

In short, we must plan for a transport and electricity energy system that is close to zero carbon.

All of these shifts and conversions are feasible in a 40 year time frame, as the useful life of a coal fired generating plant is roughly 30 years and of an automobile roughly 15 years. Indeed, shifting vehicles from internal combustion engines to electrical propulsion promises greater efficiencies in energy conversion, and substantially lower costs. Businesses considering investments in these changes face the uncertainty of if, how, and when these changes might unfold.

Canada and the United States have not been leaders in addressing the climate change challenge. Canada paid lip service to the Kyoto Accord, but did nothing. The United States repudiated Kyoto. In both countries

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there is a general grass roots political sense that climate change is a problem that needs to be addressed, but beyond good intentions political will has not materialized. Businesses work to reduce their carbon footprint, as do many individuals and public organizations. There remains enough skepticism about whether climate change is real, and if it is, whether human emissions are the cause, to dilute focus on the challenge.

Without a major political shift, we are likely to see a three phase process that unfolds over the next 10 – 20 years. The first phase is a period of hiatus where things are too uncertain to make large rational investments. This is roughly where we are today with some moderate focus on efficiency and with most investments being small, reduced carbon and moderate time frames. In the second phase a range of initiatives will come into play to substantially improve our use of energy by around 20 – 30%, both by reducing consumption and by making more efficient the use of the energy we consume. This will create a breathing space where legacy assets can be run to economic life. New growth and replacement assets will be required to be green and clean and operate at close to zero CO2e emissions. At the end of this step most dirty legacy assets will be retired or at the end of their useful life. In the third phase, the remaining dirty assets may well be subsidized into retirement.

The core issue is "how long is the first phase?"

There are, however, other forces which are moving both the United States and Canada in a direction consistent with that indicated by the climate change challenge. These have to do with energy security and flow from US dependence on offshore oil, especially that from politically unstable regions. President Nixon first pointed to this issue in the 1970's, and both presidential candidates in the 2008 election have highlighted it and expressed support for expansion of nuclear power in the United States. It

The Oil Sands Paradox

Will do!

seems clear that energy security will become a cornerstone of US policy in the decades ahead.

Canada is an importer of oil for Eastern Canadian needs, but overall a net exporter of both oil and natural gas from the the three Western provinces to the United States. Like the US, Canada's conventional oil pools are either peaked, dwindling or expensive offshore production fields. The big and growing capacity is in the Athabaska Oil Sands in Alberta, and to a lesser degree, Saskatchewan

In Canada some 80 megatons of CO2e were emitted by extraction and processing operations in 2005. A significant portion of this was related to the Oil Sands in Alberta.

"energy security will become a cornerstone of US policy"

This deposit rivals Saudia Arabia in petroleum reserves, and its development is both the current engine of economic growth in Canada and a substantial source of friendly petroleum for the United States. The Oil Sands remain an environmentally controversial program, but it seems clear that any transition to a low carbon future consistent with energy security will require sustained exploitation of this resource. A reduction in greenhouse gas emissions in Alberta is very difficult to reconcile with continued development of the Oil Sands.

This difficulty plays itself out in Canadian politics, and a resulting lack of coherence on policy. In the recent federal election the Liberal party's green shift, or "green shaft" as it is known in the West, was seen as a plan to tax Alberta resource extraction to pay for lower income taxes in Ontario and Quebec.

The very large capital investments in the Oil Sands have a useful life of 30 – 50 years, and seem inconsistent with the need to avoid hydrocarbon investments of that time horizon. However, this is does not need to be the case. Paradoxically, the Oil Sands are on the path to a lower carbon economy.

Exhibit 1: CO2e Reductions for a Typical Developed Country

A return to 2000 levels by 2010, reducing 2000 levels by 20% by 2020, 30% by 2030 and 70% by 2050

Illustrative: using 100 as a base

Ratio scale 2000 = 100	2000	2007	2010	2020	2030	2050
2.5% GDP growth =1.5 CO2e growth 0.6 carbon intensity	100	110	115	133	154	207
IPCC Targets			100	80	70	30
Difference between Target and Business as Usual			(15) -13%	(53) -40%	(84) -55%	(177) -86%

Source: Bach analysis

While estimates vary about when the world will hit "peak oil", and therefore have supplies dwindle, the US demand for secure continental oil supplies will grow dramatically for at least the next 30 years. It is clear that oil from the Oil Sands will be needed in the transition to a lower carbon economy in Canada and especially the United States, and beyond that for petrochemical and other industrial products.

The challenge is to make the oil sands production processes cleaner and consistent with a longer-term transition. Cosmos Voutsinos argues for replacement of natural gas as a source of heat in the Oil Sands with a nuclear reactor in the next decade. As a source of electricity for production processes and to produce hydrogen for upgrading bitumen, and as a source of steam to cause deep oil to flow, nuclear power is a logical technology. And in the longer term, he foresees the Oil Sands, the associated extraction, upgrading and pipeline distribution capacity, as a potential source of reliable, long-term hydrogen for a retooled transport economy in North America.

Nuclear power and the Athabaska Oil Sands, the bete noir of the environmental movement, are key components of a successful climate change strategy in North America.

"the Oil Sands are on the path to a lower carbon economy"

There are technical questions that need to be resolved in a 10 - 20 year time frame. These have to do with changes in the way bitument is hydrated to convert it to crude oil, and with the development of generation IV nuclear reactors that are designed to support the electric, hydrogen and heat needs of the oil sands. These are more important questions to address than carbon capture and sequestration, which will likely prove to be uneconomic and ineffective as method for mitigating the carbon footprint of the oil sands. For all of this to come into alignment, there needs to be a coherence of strategies between the nuclear and oil sands industries and a government policy and incentive framework that operates in a much longer time frame than at present.

The thread in all of this is that there is a consistent and coherent pattern in the scattered tea leaves of climate change and energy security that can guide public policy, as well as strategic positioning and long term planning for CEOs looking out over a 10 – 20 year time horizon for their businesses.

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i. http://www.ipcc.ch/ipccreports/index.htm

ii. Cosmos M. Voutsinos, *Getting the Most out of Alberta's Tar Sands: A White Paper for Discussion*, Lethbridge, 2007, www.computare.org

Julian Fairfield

is an international management consultant in business strategy and Global Organization Design. He was with Mckinsey and Company in the United States, Europe and the Far East and the Boston Consulting Group in Australia. His firm, Bach Consulting advises clients on strategies to position investments for profitability as the world adjusts to a low carbon future. He is a Fellow of the Institute of Chartered Accountants of Australia

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BEIJING CHINA
Sunny Sun sunny.sun@raise-win.com
Edwin Wang
edwin.wang@raise-win.com
(86) 010 84608511

BOULDER CO USA
Mark Bodnarczuk
mark@breckenridgeinstitute.com
(800) 303 2554

CAPE TOWN South Africa
Kerrin Begg
Kerrin@BusinessSculptors.com
Arthur Case
Arthur@BusinessSculptors.com
Eurico De Freitas
Eurico@BusinessSculptors.com
Roger Stewart
Roger@BusinessSculptors.com
+27 21 701 0610

CLEVELAND OH USA
Dorothy E. Siminovitch, PhD
awareworks@aol.com
(216) 464-5039

COSTA RICA
T. Gerald Hillis, FCMC
tghillis@webspawner.com
(506) 441-8796

HELSINKI FINLAND
Ben Laurent
ben.laurent@blmanagement.fi
Ari Lindeman, M.Sc.
ari.lindeman@kyamk.fi
(813) 975 9794

OTTAWA ON Canada
Claudia Chowaniec, PhD
precept@sympatico.ca
(613) 233-9378
George Reilly georeilly@rogers.com
(613) 357 2905

PENTICTON BC Canada
Graham Punnett gpunnett@shaw.ca
(250) 492-5106

ST. JOHN'S NL Canada
Jane Helleur jhelleur@nfld.com
(709) 722 8196

SOURIS MB Canada
Jim Collinson acrc@mts.net
(204) 483 3139

SYDNEY NSW Australia
David Eldridge
David.Eldridge@cdev.com.au
Julian Fairfield
julian@abacusimports.com.au
+61-29-700-1813

TORONTO ON Canada
Marcelene Anderson
manderson@ravenstrategic.com
(416) 487 5300
Maurice Dutrisac
maurice@mastermindsolutions.ca
(416) 527 3536
Bonnie Fowke CMC bfowke@vianet.ca
Don Fowke FCMC fowke@vianet.ca
1-800-387-2165
Jim Hayward
jimhayward@hotmail.com
(416) 559 6335
Herb Koplowitz PhD herb@tfmc.ca
(416) 324-9240
John Kuypers
johnk@performanceshift.com
905) 381 0341
Barbara Luedecke, PhD, CMC
barbluedecke@rogers.com
(416) 544-1091
Alan Pearson alanpearson@rogers.com
(416) 955 0854
Ken Shepard, PhD
kenshepard@canadiancentre.com
(416) 463-0423

VANCOUVER BC Canada
Jim Cranston JimCran@telus.net
(604) 222-1036

Don Fowke FCMC
Consults in strategy, structure, staffing and culture. Formerly Chairman and CEO of Hickling-Johnston and Managing Director of William M. Mercer. He is a graduate of the University of Saskatchewan, MIT's Sloan School of Management and a Visiting Scholar in Public Policy at Cal Berkeley. He is a Professional. Engineer.

Bonnie Fowke CMC
Consults in organizational development and change management. She was a Principal with Hickling-Johnston and an Associate with William M. Mercer. She is a graduate of the University of Saskatchewan, the Paul Rebillot School of Experiential Teaching and of the Gestalt Institute of Cleveland.