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University of Alberta

Bringing Rio and Kyoto to Canada: Evaluation of the Greenhouse Gas Emissions Reduction Strategies of Canada and Alberta

by

Bruce Douglas Laycock

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A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the

requirements for the degree of *Master of Laws*

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Dedicated to my wife, Susan, my daughters, Christel, Janelle, Stephanie, Jennifer and Katrina,

and my son, David.

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Abstract

Anthropogenic greenhouse gases emissions have increased and will continue to increase global mean temperatures, having some positive but many significant, negative impacts on human populations and on the Earth's ecosystems. If each Annex B Party to the *Kyoto Protocol* complies with its obligations under the Protocol, their actions will be an important but insufficient step in stabilizing global greenhouse gas concentrations.

The greenhouse gas emission reduction strategies of Canada and Alberta are discussed and evaluated against criteria based on principles of the *Rio Declaration on Environment and Development*. The strategies of Canada and Alberta lack detail and effective measures, are contradictory, and will not likely lead Canada to achieve its *Kyoto Protocol* commitment. Canada and its provinces (particularly Alberta) can work cooperatively to achieve Canada's *Kyoto Protocol* commitment by significantly reducing their greenhouse gas emissions and enhancing carbon sinks. Effective greenhouse gas emission reduction strategies are proposed.

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I am solely responsible for any errors in fact, law or logic that may have been included, inadvertently, in this document.

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LIST OF ACRONYMS, ABBREVIATIONS, AND UNITS

AAU	Assigned Amount Unit, unit of greenhouse gas emissions permitted under the *Kyoto Protocol*, equal to one metric tonne of CO_2e
AERI	Alberta Energy Research Institute
AEUB	Alberta Energy and Utilities Board
AGBM	Ad hoc Group on the Berlin Mandate
AIJ	Activities Implemented Jointly pilot projects conducted under the FCCC
Alberta Plan	"Albertans & Climate Change: Taking Action" (2002)
Annex B countries	OECD & EIT developed countries listed in Annex B to the *Kyoto Protocol*
Annex I countries	OECD developed countries listed in Annex I to the FCCC
Annex II countries	OECD & EIT developed countries listed in Annex II to the FCCC
AOSIS	Alliance of Small Island States
Ar	Argon
BAPA	Buenos Aires Plan of Action
BAU	business as usual
CASA	Clean Air Strategic Alliance
CCEM Act	*Climate Change and Emissions Management Act*
CCEM Fund	Climate Change and Emissions Management Fund
CCME	Canadian Council of Ministers of the Environment
CCPC or federal plan	"Climate Change Plan for Canada"(2002)
CDM	Clean Development Mechanism projects under the *Kyoto Protocol*
CEAA	*Canadian Environmental Assessment Act*
CEPA, 1999	*Canadian Environmental Protection Act, 1999*
CER	Certified Emission Reduction from a CDM project, equal to one metric tonne of CO_2e
CFCs	chlorofluorocarbons
CH_4	methane
CHP	combined heat and power

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CIPEC	Canadian Industry Program for Energy Conservation
CO_2	carbon dioxide
Constitution	*Constitution Act, 1867*
COP	Conference of the Parties
ECBM	enhanced coal bed methane recovery
EIA	environmental impact assessment
EIT countries	countries of the former Warsaw Pact whose economies are in transition
EOR	enhanced oil recovery
EPEA	*Environmental Protection and Enhancement Act*
ERU	emission reduction unit from a JI project, equal to one metric tonne of CO_2e
EU	European Union
FAR	First Assessment Report of the IPCC (1990)
FCCC	*United Nations Framework Convention on Climate Change*
GDP	gross domestic product
GEF	Global Environment Facility
GERT	Greenhouse Gas Emission Reduction Trading Pilot
GWP	global warming potential
H_2O	water
Harmonization Accord	Canada-wide Accord on Environmental Harmonization in 1998
HCFCs	halogenated chlorofluorocarbons
HFCs	hydrofluorocarbons
ICSU	International Council of Scientific Unions
IIR	Alberta Department of International and Intergovernmental Relations
INC	Intergovernmental Negotiating Committee
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation projects under the *Kyoto Protocol*
JMM	Joint Ministers of Energy and Environment

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JUSSCANNZ	Negotiating block of nations consisting of Japan, USA, Switzerland, Canada, Australia, Norway and New Zealand
Kyoto Protocol	Kyoto Protocol to the FCCC
leakage	the relocation of harmful environmental activities to another jurisdiction
LULUCF	Land Use, Land Use Change and Forestry
MOP	Meeting of the Parties
Mt	megatonne
MT CO_2e	Mega-tonnes of CO_2 equivalent
MW	megawatt
N_2	Nitrogen
N_2O	nitrous oxide
NAFTA	*North America Free Trade Agreement*
NCCP	National Climate Change Process
NGCC	combined cycle natural gas turbine
NGO	non-governmental organization
NH_3	ammonia
NOx	nitrogen oxides
NRTEE	National Round Table on the Environment and the Economy
O_2	Oxygen
O_3	ozone
ODS	ozone-depleting substances
OECD	Organisation for Economic Co-operation and Development
PCF	World Bank's Prototype Carbon Fund
PERT	Pilot Emission Reduction Trading Project
PFC	perfluorocarbon
PFCs	perfluorocarbons
POGG	Peace, Order and Good Government power under section 91 of the *Constitution*
ppb	part per billion

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ppbv	part per billion by volume
ppm	part per million
QELROs	quantified emission limitation and reduction objectives
REIO	regional economic integration organization (e.g., EU)
Rio Declaration	Rio Declaration on Environment and Development (1992)
RMU	Removal Unit equal to one metric tonne of CO_2e removed from the atmosphere through a sink
S.C.C.	Supreme Court of Canada
SAR	Second Assessment Report of the IPCC (1995)
SBI	Subsidiary Body for Implementation under the FCCC
SBSTA	Subsidiary Body for Scientific and Technological Advice under the FCCC
SF_6	sulphur hexafluoride
SGR Standard	*Specified Gas Reporting Standard* under the CCEM Act
SGR Regulation	*Specified Gas Reporting Regulation* under the CCEM Act
sink	mechanism for storage of carbon removed from the atmosphere (e.g., a forest)
SMEs	small and medium-sized manufacturing enterprises
SO_2	sulphur dioxide
TAR	Third Assessment Report of the IPCC (2001)
THC	thermohaline circulation (ocean currents)
UNCED	United Nations Conference on Environment and Development (1992)
UNEP	United Nations Environment Programme
USA	United States of America
VCR	Climate Change Voluntary Challenge and Registry Program
VOC	volatile organic compound
WCP	World Climate Programme
WGII	Working Group II of the IPCC
WMO	World Meteorological Organization
WTO	World Trade Organization

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Chapter 1

Introduction

Certain gases making up less than one-tenth of one percent of the atmosphere[1] act as a warming blanket[2] for the earth, allowing it to support life as we know it. These gases (including water vapour, carbon dioxide [CO_2], methane [CH_4], and nitrous oxide [N_2O], among others) are referred to as greenhouse gases[3] because they allow high frequency solar radiation to pass through the atmosphere to warm the earth, but absorb resulting lower frequency infrared radiation emitted from the earth's surface.[4] Without this thin gaseous blanket, the earth's average temperature, it is estimated, would be minus 18 °C or 32 ° colder than the current global average of plus 14 °C.[5]

Although there is clear evidence that greenhouse gas concentrations fluctuate naturally over thousands of years[6], human activities over the past two centuries have added to the atmosphere large amounts of CO_2, CH_4, N_2O and other greenhouse gases (such as the ozone-

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[1] Environment Canada, *A Primer on Ozone Depletion* (Ottawa: Environment Canada, 1993) at 3.

[2] UNEP & WMO, "Understanding Climate Change: A Beginner's Guide to the UN Framework Convention and its *Kyoto Protocol*" online: UNFCCC <http://unfccc.int/resource/beginner.html>.

[3] *Ibid.*

[4] U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990 - 1997* (Washington, D.C.: Environmental Protection Agency, April 1999) at T-6.

[5] *Supra* note 1; Working Group I of the Intergovernmental Panel on Climate Change [IPCC] concluded that the average global surface temperature is 14 degrees C, IPCC, *Climate Change 2001: The Scientific Basis* (Cambridge: Cambridge University Press, 2001), at 89.

[6] A. Bush "Climate Change: What we can learn from the study of the past" (ERSC Lecture, Department of Earth and Atmospheric Sciences, University of Alberta, 14 October 1998) [video tape available from the Winspear Library, University of Alberta].

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depleting chlorofluorocarbons [CFCs] and halogenated fluorocarbons [HCFCs]).[7] These anthropogenic emissions have changed the natural atmospheric greenhouse gas equilibrium[8], significantly increasing CO_2 concentrations[9] (CO_2 is the most important anthropogenic greenhouse gas) and raised the earth's average temperature by about 0.6 °C.[10] Although this change may seem innocuous, continuing emissions are expected to increase the frequency and severity of extreme weather events[11], alter plant growing conditions[12], melt permafrost[13] and polar ice caps[14], raise ocean levels[15], flood low-lying coastal areas, turn vast regions into deserts[16], increase the distribution of tropical diseases[17] and perhaps disrupt the flow of ocean

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[7] Global production of CFCs, HCFCs and other ozone-depleting substances is being eliminated under the *United Nations: Vienna Convention for the Protection of the Ozone Layer*, 22 March 1985, 26 I.L.M. 1516 (in force 22 September 1988) and its only protocol, the *United Nations: Protocol on Substances that Deplete the Ozone Layer*, 16 September 1987, 26 I.L.M. 1541 (in force 1 January 1989) [*Montreal Protocol*], as adjusted and amended. The *Kyoto Protocol*, *infra* note 19, is concerned with greenhouse gases not covered under the *Montreal Protocol*.

[8] *Supra* note 4, at ES-9

[9] See Government of Canada, "Global Climate Change" online: Environment Canada <http://www.ec.gc.ca/climate/>.

[10] Intergovernmental Panel on Climate Change [IPCC], *IPCC Second Assessment: Climate Change Report* (World Meteorological Organization, United Nations Energy Programme: 1995) at 5.

[11] L. Dotto, *Storm Warning: Gambling with the Climate of Our Planet* (Toronto: Doubleday Canada Limited, 1999) at 60-61.

[12] R. Kolasky, "Kyoto: One Year Later," online: *Intellectual Capital.com* (26 November 1998) <http://www.intellectualcapital.com/issues/98/1126/icnational2.asp>.

[13] D. Vitt, "Permafrost in the Boreal Forest: an Important Case Study in Climatic Change" (Lecture, Environmental Research and Studies Centre, University of Alberta, 4 November 1999) [unpublished].

[14] *Supra* note 10.

[15] *Ibid.*

[16] *Ibid*, at 7.

[17] K. Smoyer, "The Human Health Implications of Climate Change and Variability" (Lecture, Environmental Research and Studies Centre, University of Alberta, 3 March 1999)

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currents, including the gulf stream,[18] which brings western Europe its warm weather.

Under the *Kyoto Protocol*,[19] an international treaty negotiated for the purpose of preventing "dangerous anthropogenic interference with the climate system,"[20] Canada agrees to reduce greenhouse gas emissions below 1990 levels by 6%, during the commitment period 2008 to 2012.[21] Pressure is mounting for all countries (including developing countries) to do something about the anthropogenic climate change threat. Solutions to the climate change problem invariably involve reducing greenhouse gas emissions and increasing what are known as "carbon sinks."[22] Such actions will require fundamental changes to economies and lifestyles because humans rely daily upon processes that produce increasing amounts of greenhouse gases and pump them into the atmosphere,[23] such as electricity generation through fossil fuels, motorized transportation, agricultural operations and waste disposal. Alberta is particularly at risk[24] as our economy relies heavily on the production, sale and combustion of fossil fuels– the primary sources of anthropogenic greenhouse gases.

This work will investigate this threat in five stages: the review of the causes, extent and impacts of anthropogenic climate change, a discussion and evaluation of the international legal

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[unpublished, video tape available from the Winspear Library, University of Alberta].

[18] F. Pearce, "Nature Plants Doomsday Devices" online: *The Guardian* (25 November 1998) <http://go2.guardian.co.uk/science/912000568-disast.html> .

[19] *Conference of the Parties to the Framework Convention on Climate Change: Kyoto Protocol* [hereinafter *Kyoto Protocol* or Protocol], December 10, 1997, 37 I.L.M. 22 (1998).

[20] *United Nations Framework Convention on Climate Change*, 9 May 1992, 31 I.L.M. 849 (1992) (entered into force 21 March 1994), Art. 2, at 854.

[21] *Kyoto Protocol, supra* note 19, Article 3 and Annex B.

[22] A carbon "sink" is a mechanism for storage of carbon removed from the atmosphere (e.g., a forest), *supra* note 4, at T-3.

[23] UNEP, *Climate Change Information Kit*, (Geneva: UNEP, 1997) online: UNEP <http://www.unep.ch/iuc/submenu/infokit/factcont.htm>.

[24] See Alberta *Hansard*, Tuesday, November 17, 1998 1:30 p.m.

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response to climate change, a brief discussion of the constitutional framework affecting Canadian climate change legislation, an analysis of the plans of Canada and Alberta for addressing climate change within their respective jurisdictions during the period 2008 - 2012, and an evaluation of the emissions reduction strategies of Canada and Alberta including the identification of policy and legislative solutions to the climate change problem that may be effectively implemented in Canada and Alberta.

In particular, it will be shown that although the Earth's climate has shown natural variation including some rapid changes over its distant and recent past, anthropogenic emissions of greenhouse gases since the beginning of the industrial revolution have increased and will continue to increase significantly global mean temperatures. If each Annex B Party to the *Kyoto Protocol* complies with its obligations under the Protocol, their actions will be an important but clearly insufficient step in stabilizing global greenhouse gas concentrations. Arguably, however, Canada and its provinces (particularly Alberta) can work cooperatively to achieve Canada's *Kyoto Protocol* commitment by reducing their greenhouse gas emissions through the following measures:

1) the establishment of a complete and accurate emissions reporting system bolstered by effective monitoring and verification, and involving all large scale greenhouse gas emitters;

2) the establishment of a nationally-consistent, statutory domestic emissions and sink credit trading regime, including legislated emissions caps and effective emissions trading and enforcement provisions;

3) the implementation of sector-wide emissions reduction and sink enhancement standards and measures (especially those producing increased energy efficiency and use of renewable and alternate energy sources) for small and medium size emitters belonging

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to sectors with significant greenhouse gas emissions, and where sector-wide standards and targets make sense;

4) a clear, progressive and permanent phase-out of subsidies on fossil fuels and regulatory barriers to alternate and renewable energy production; and

5) a gradually phased-in carbon tax that raises the cost of fossil fuels to a level that accurately reflects their true cost, including costs respecting human health, environmental degradation and reclamation activities.

This document addresses the plans and laws of Canada and Alberta, and international legal developments respecting climate change, as they existed on 31 January 2005. Important developments respecting Canada's strategy to address climate change reflected in Government of Canada budget documents released 23 February 2005, are mentioned in Chapter 5 but are not discussed in detail and are not evaluated in Chapter 6.

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Chapter 2

The Causes, Extent and Impacts of Global Climate Change

A. Evidence of Natural Climate Change

Evidence is accumulating that the earth's climate has fluctuated widely over its geologic history, with extreme changes sometimes occurring over relatively short periods.[1] Evidence of climate change is found in the fossil and geologic record, with sedimentary rocks providing clues to the climate at the time the sediments were deposited.[2] For more recent periods, ocean sediment and ice core samples are instructive.[3] Evidence for recent climate changes (i.e., during the last 1000 years or so) is derived from ice core samples,[4] the analysis of ocean and lake sediments[5], the study of tree rings[6], historical accounts[7] and, more recently, detailed weather observations[8].

There are numerous examples of extraordinary, global climate fluctuations in the scientific literature.[9] Large scale changes to ocean and air circulation patterns, together with a change in the Earth's axis appear to have produced the great ice ages of the current Quaternary

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[1] William Burroughs, *Climate Change: A Multidisciplinary Approach*, (Cambridge: Cambridge University Press, 2001), at 74-76.

[2] *Ibid.*, at 76.

[3] UNEP and UNFCCC, "Climate Change Information Kit," "The evidence from past climates," (2001) Climate Change Information Sheet 8 [cc info kit], online: UNFCCC <http://unfccc.int/resource/iuckit/index.html>.

[4] Don MacIver & Rebecca Meyer, eds., *Decoding Canada's Environmental Past: Climate Variations and Biodiversity Change during the Last Millennium* (Downsview: Environment Canada, 1998) [MacIver], at 93.

[5] *Ibid.*, at 45 - 51, 69 - 84

[6] *Ibid.*, at 53 - 59, 61 - 67.

[7] *Ibid.*, at 62 - 65.

[8] *Ibid.*, at 85 - 89.

[9] See Burroughs, *supra* note 1, at 77-83.

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Period, beginning an estimated 1.6 million years ago, lasting roughly 100,000 years each.[10] There is abundant evidence in the Northern Hemisphere of glacial progression from the north pole as far south as the Alps, in Europe, and beyond the Great Lakes in North America.[11] Global temperatures fluctuated significantly during each glacial period and each ice age ended relatively abruptly leading to warm interglacial periods lasting from 10,000 to 20,000 years. The Earth has experienced its most recent interglacial period for approximately 10,000 years.[12]

Approximately 12,000 years ago during what is called the Younger Dryas event, global average temperatures first warmed then reverted quickly to near ice-age conditions.[13] The climate stabilized greatly about 10,000 years ago and achieved its maximum interglacial warming 6,000 years ago when average mid-latitude temperatures in the northern hemisphere were approximately 2 or 3 degrees Celsius warmer than now.[14] Beginning approximately 5,500 years ago, the average global climate has gradually cooled and become dryer.[15]

The Medieval warm period lasted from about 900 to 1300 AD,[16] during which

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[10] *Ibid.*, at 91.

[11] *Ibid.*, at 90.

[12] William K. Stevens, *The change in the weather: people, weather, and the science of climate* (New York: Random House, Inc., 1999), at 48.

[13] This may have been caused by an abrupt draining of melt water from the vast Laurentian ice sheet through the Gulf of St. Lawrence into the North Atlantic, briefly shutting down thermalhaline circulation, the oceanic conveyor that brings warm Gulf Stream water to western Europe. During this event, average global temperatures shifted by as much as ten degrees Celsius over very short periods of from 5 to 25 years. See Stevens, *ibid.*, and Gale E. Christianson, *Greenhouse: The 200-Year Story of Global Warming* (New York: Walker Publishing Company, Inc., 1999) at 128.

[14] Precipitation in sub-tropical latitudes (including what is now the Sahara desert) was much higher than it now is. See Burroughs, *supra* note 1, at 98.

[15] *Ibid.*, at 100.

[16] Christianson, *supra* note 13, at 120.

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agriculture and civilizations depending on it, flourished.[17] The end of the Medieval warm period produced massive agricultural failures and appears to have led to the end of the Anasazi civilization in southwestern U.S.A. and the Viking settlements in Greenland.[18]

There is ample evidence of cooling in Europe between 1550 and 1600, AD[19] when glaciers expanded in the Alps, canals froze in the Netherlands and the Thames River froze in England. Cooler average temperatures prevailed until the mid 19th century, when the last vestiges of what has been called, the "Little Ice Age,"disappeared with the entrenchment of the industrial revolution in western Europe and North America.

According to the Intergovernmental Panel on Climate Change's [IPCC's] Working Group I, the average global surface temperature has risen 0.6 ± 0.2 degrees Celsius over the last century.[20] Most of the increase occurred from 1910 to 1945 and 1976 to 2000. It appears from climate data taken from ice cores, tree rings and weather records, that in the Northern Hemisphere, the 1990s was the warmest decade and 1998 the warmest year of the last millennium.[21]

Global carbon dioxide [CO_2] concentrations have risen from 315 parts per million [ppm] in 1958 to over 360 ppm towards the end of the 1990s, an increase of 15%.[22] According to analyses of gases trapped in ice core samples, the current global concentration of CO_2 is the

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[17] Christianson, *ibid.*, at 41 and 120. However, tree ring data, supplementing Greenland ice core data, reveal that the warming was by no means uniform in amount or timing, Burroughs, *supra* note 1 at 104.

[18] Christianson, *supra* note 13, at 127.

[19] Burroughs, *supra* note 1, at 108.

[20] Intergovernmental Panel on Climate Change [IPCC], *Climate Change 2001: The Scientific Basis* (Cambridge: Cambridge University Press, 2001), at 2 (part of the IPCC's Third Assessment Report or TAR].

[21] *Ibid.*

[22] Taken from C. Keeling's readings on Mauna Loa, Stevens, *supra* note 12, at 141.

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highest in the most recent 420,000 years and at least 20% higher than during any previous interglacial interval during the Quaternary Period.[23]

B. Natural Climate Forces

The *Kyoto Protocol* concentrates on anthropogenic greenhouse gas emissions. However, there are numerous natural phenomena responsible for radiative forcing[24] that are capable of producing significant fluctuations in global climate. These include the sun, clouds, oceans (including ocean currents), volcanos, and the reflectivity of the earth's surface.

The sun is the ultimate source of energy affecting Earth's climate.[25] The sun-warmed Earth and oceans give off infrared radiation that helps heat the atmosphere. Solar energy currently produces a global mean surface temperature of 14 degrees Celsius.[26]

The atmosphere is composed of three primary gases (excluding water vapour): nitrogen [N_2] (78.1% by volume), oxygen [O_2] (20.9%) and argon [Ar] (0.93%).[27] These diatomic or monatomic gases are relatively ineffective as greenhouse gases. Naturally occurring trace gases that have three or more atoms per molecule such as water vapour [H_2O], carbon dioxide [CO_2], methane [CH_4] and ozone [O_3] are much more effective than monatomic or diatomic gases at absorbing solar energy, not only because they have more atoms but also because they have at

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[23] *Ibid.*

[24] The term "radiative forcing" as used by the IPCC means: "the change in the net vertical irradiance (expressed in Watts per square metre: Wm-2) at the tropopause due to an internal change or a change in the external forcing of the climate system, such as, for example, a change in the concentration of carbon dioxide or the output of the Sun," IPCC, *supra* note 20, at 795. The "tropopause" is the boundary between the troposphere (where all the weather occurs) and the stratosphere. The tropopause is approximately 10 km above sea level, *ibid.*, at 797.

[25] Approximately 47% of solar energy that strikes the earth warms the planet, 20% is absorbed by the atmosphere and 33% is reflected back into space, *ibid.*, at 89.

[26] *Ibid.*

[27] See the IPCC's definition of "atmosphere," *Ibid.*, at 787.

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least twice as many chemical bonds per molecule capable of absorbing energy.[28]

The atmosphere also naturally includes clouds (consisting of water droplets and ice crystals) and aerosols (sulphate and dust particles ejected by volcanoes or lifted by winds). Clouds and natural aerosols typically reflect solar radiation and have a cooling effect[29]

Oceans moderate climate. Globally interconnected ocean currents (also referred to as thermohaline circulation) transport solar energy absorbed by tropical oceans to higher latitudes.[30] For example, the Gulf Stream brings vast amounts of warm water from the Carribean Sea, across the North Atlantic, to warm western Europe, raising average temperatures up to 10 degrees Celsius.[31] The Gulf Stream is responsible for making the weather at Inverness, Scotland significantly warmer than that of Churchill, Manitoba, located at roughly the same latitude.[32]

Volcanoes caused by movements of the Earth's crust eject many tons of aerosols into the atmosphere, cooling the earth's surface.[33] This negative radiative forcing can last from months to several years.[34] The eruption of Mt. Pinatubo in the Philippines in 1991 cooled the globe for

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[28] H_2O is the most important greenhouse gas and its presence in the atmosphere varies widely, but is typically about 1% of the atmosphere (by volume). The next most important natural greenhouse gases are CO_2, CH_4 and O_3. Although CO_2 makes up only about .035 % of the atmosphere, through the ages it has played an enormous role in global climate, IPCC, *ibid.*, at 787.

[29] *Ibid.*, at 44, 45, 775, 776.

[30] *Ibid.*, at 50.

[31] Bezinningsgroep Energiebeleid (Dutch Energy Policy Platform) [CE], "Climate Change: Solution in Sight, A Dutch Perspective," 10 August 2000, at 27, online: CE <http://www.ce.nl/bg.pdf>.

[32] "Warming Up for the Ice Age," *Times of London*, 4 November 2000, online: <http://www.thetimes.co.uk/article/0,,29684,00.html>.

[33] IPCC, *supra* note 20, at 25, 303.

[34] Significant continental and global cooling over short periods corresponded with major volcanic events in Huaynaputina, Peru in 1600, Komagatake, Hokkaido, Japan in 1640, Awu, Indonesia in 1641, Laki, Iceland in 1783-84, and in Indonesia's eruptions of Mt. Tamboro in 1815 and Krakatau in 1883. See IPCC, *ibid.*, at 25 and 401 and MacIver and Meyer, *supra* note 4, at 62-64.

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more than a year, decreasing average temperatures by from 1 to 1.5 degrees Celsius[35]

The amount of solar energy reflected into space by oceans and land masses depends upon the reflectivity or albedo of the water, rock, soil or plant life on the surface. Snow and ice have a very high albedo,[36] reflecting most of the solar energy that strikes them back into space. The oceans, covering most of the Earth's surface, and vegetation-covered terrestrial areas have a relatively low albedo, absorbing most of the solar energy that reaches them.[37]

Climate feedback mechanisms may accelerate climate trends, whether naturally or anthropogenically induced. A cooling climate increases the proportion of land and ocean covered with ice and snow. The high albedo of snow and ice creates a feedback loop, making the planet colder, leading to more snow and longer winters. Conversely, a warming planet melts snow and high latitude ocean ice, exposing low albedo oceans, and allowing heat absorbing boreal forests to move farther north, displacing areas of permafrost that previously were snow-covered for much of the year.[38] Water vapour, a powerful greenhouse gas, produces a strong positive feedback, accelerating warming trends.[39]

C. Anthropogenic Contributions to Climate Change

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[35] Stevens, *supra* note 12, at 44.

[36] IPCC, *supra* note 20 at 787.

[37] *Ibid.*

[38] cc info kit, *supra* note 3, Sheet 12.1.

[39] According to the IPCC: "Water vapour feedback continues to be the most consistently important feedback accounting for the large warming predicted by general circulation models in response to a doubling of CO_2. Water vapour feedback acting alone approximately doubles the warming from what it would be for fixed water vapour (Cess et al., 1990; Hall and Manabe, 1999; Schneider et al., 1999; Held and Soden, 2000). Furthermore, water vapour feedback acts to amplify other feedbacks in models, such as cloud feedback and ice albedo feedback. If cloud feedback is strongly positive, the water vapour feedback can lead to 3.5 times as much warming as would be the case if water vapour concentration were held fixed (Hall and Manabe, 1999)," *supra* note 29 at 425.

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1. Evolution of Understanding

It is now generally accepted that anthropogenic emissions of greenhouse gases affect the amount of infrared radiation (i.e., heat) retained in the atmosphere and have long-term impacts on climate. This understanding evolved over the past two centuries.

In 1824, Jean-Baptiste-Joseph Fourier published an article "General Remarks on the Temperature of the Terrestrial Globe and Planetary Spaces" in the scientific journal *Annales de chimie et de physique*. Fourier presented his hypothesis that the atmosphere absorbs heat from the sun and re-radiates some of that heat back to the Earth's surface.[40] Irish scientist John Tyndall published a paper in 1861, demonstrating that certain atmospheric gases (water vapour, CO_2 and ozone) had high heat absorbing capacity.[41] Tyndall hypothesized that an ice age might result if the concentration of CO_2 in the atmosphere were significantly reduced.[42]

Perhaps the most famous historical proponent of the hypothesis that anthropogenic global warming is caused by increasing concentrations of greenhouse gases was Svente Arrhenius. Arrhenius concluded in 1896 that water vapour and CO_2 are primarily responsible for the warming of the atmosphere. Sunlight passes through these transparent "hothouse" gases, strikes the earth and is converted to longer wavelength infrared radiation that is reflected from the surface back into the atmosphere and absorbed by water vapour and CO_2, some of which is radiated back to earth.[43] Based on extensive calculations, Arrhenius predicted that it would take 3000 years for atmospheric CO_2 concentrations to double, and such concentrations would lead to a 5 - 6 degree Celsius increase in global average temperature.[44]

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[40] Christianson, *supra* note 13, at 11.

[41] Stevens, *supra* note 12, at 135-136.

[42] *Ibid.*, at 110.

[43] *Ibid.*, at 136.

[44] *Ibid.* At 114, 115.

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George S. Callendar, a British coal engineer, published "The artificial production of carbon dioxide and its influence on temperature" in 1938.[45] Callendar estimated that 150 billion tons of CO_2 had been added by humans to the atmosphere and calculated that the global average temperature had increased one degree Fahrenheit over the period from 1880 through 1934.[46]

Charles Keeling demonstrated that the concentration of CO_2 in continental North America is virtually the same as that in Hawaii or in Antarctica at any given point in time.[47] Keeling's fastidious and tenacious measurements of CO_2 levels at Mauna Loa Hawaii demonstrate that global CO_2 concentrations increased from 315 ppm in 1958 to 365 ppm in 1997, a 15% increase.[48]

In 1957, Roger Revelle and Hans Seuss declared:

> [H]uman beings are now carrying out a large scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future. Within a few centuries we are returning to the atmosphere and oceans the concentrate organic carbon stored in sedimentary rocks over hundreds of millions of years.[49]

James E. Hansen, director of NASA's Goddard Institute of Space Studies testified before the U.S. Senate Committee on Energy and Natural Resources on 23 June 1988 that "the greenhouse effect has been detected and it is changing the climate now."[50] Hansen's conclusions have since been vindicated by the international scientific community.

2. Current Scientific Understanding

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[45] (1938) Q. J. Royal Met. Soc., 64: 223.

[46] Christianson, *supra* note 13, at 141-142.

[47] *Ibid.*, at 153.

[48] *Ibid.*, at 167.

[49] R. Revelle & H. Seuss, "Carbon Dioxide Exchanges Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO_2 During the Past Decades," (1957) Tellus 9: 18-27, as cited by Christianson, *supra* note 13, at 155-156.

[50] Christianson, *Ibid.*, at 196.

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The World Meteorological Organization [WMO] and the United Nations Environment Program [UNEP] created the IPCC in 1988 to fulfil two main objectives:

> (i) to assess available scientific and socioeconomic information on climate change and its impacts and on the options for mitigating climate change and adapting to it, and
>
> (ii) to provide, on request, scientific/technical/socioeconomic advice to the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC).[51]

Hundreds of the world's leading scientists contribute to the work of the IPCC, including a series of assessment reports, special reports and technical papers, beginning in 1990. In its Second Assessment Report [SAR] released in 1995, the IPCC concluded that "the balance of evidence suggests that there is a discernible human influence on global climate."[52] In its Third Assessment Report [TAR], completed in 2001, the IPCC concluded that: "In light of new evidence and taking into account the remaining uncertainties, most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations."[53] Working Group I of the IPCC, ranks the "Level of Scientific Understanding" associated with the effects of atmospheric CO_2, CH_4, N_2O and Halocarbons as "High."[54]

3. Radiative Forcing by Anthropogenic Greenhouse Emissions

CO_2 is the most important anthropogenic component affecting global climate change. The global carbon cycle is complex, involving natural and anthropogenic, organic and inorganic processes and includes carbon in many molecular and ionic forms, in solid, gaseous and

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[51] IPCC, *Climate Change 2001: Impacts, Adaptation, and Vulnerability*, contribution of Working Group II to the Third Assessment Report of the IPCC (Cambridge: Cambridge University Press, 2001) [IPCC WGII] at vii.

[52] IPCC, *supra* note 20, at 55.

[53] *Ibid.*, at 55 and 61.

[54] *Ibid.*, at 37 and 392.

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dissolved states.[55] Complex carbon interactions occur within oceans themselves. The net result in a natural setting is that the amount of CO_2 in the atmosphere varies slowly over long periods of time, with a gradual accumulation of fossil organic carbon (e.g., petroleum and coal), which is normally released only through tectonic activity or human intervention.[56]

Concentrations of anthropogenic CH_4, another important greenhouse gas, have more than doubled in the last 200 years,[57] an unprecedented increase over the past 420,000 years.[58] Anthropogenic sources in order of decreasing importance include: rice paddies, ruminants, biomass burning, landfills, fugitive emissions from natural gas production and coal mines.[59] Dr. St. Louis, a University of Alberta researcher, concluded that CH_4 emitted from human-made water reservoirs amounts to 20% of global anthropogenic CH_4 emissions. He concludes:

> Some tropical reservoirs release more emissions than the dirtiest fossil fuel plants . . . . Emissions from the 250-megawatt Balbina Dam in the middle of the Amazon basin in Brazil are exceptionally high: some 25-38 times higher than a modern coal plant of similar megawatt capacity.[60]

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[55] *Ibid.*, at 188-189

[56] Human perturbations are currently adding a net amount of 3.3 PgC / year to the atmosphere. Working Group I of the IPCC reports that only 3.8 PgC / year of 7.1 PgC / year gross anthropogenic CO_2 emissions through fossil fuel combustion (5.3 PgC / year), cement production (0.1 PgC / year) and land use change (1.7 PgC / year) can be absorbed by the land and oceans. (PgC = Peta grams (10^{15} grams) of Carbon. 1 PgC = 1 GtC (giga (10^9) tonnes Carbon). See IPCC, *ibid.*

[57] *Ibid.*, Table 6.1, at 358

[58] *Ibid.*, at 250.

[59] IPCC, *Ibid.* Natural sources of CH_4 in order of decreasing significance include: wetlands, termites, oceans and methane hydrates found in certain ocean locations where the temperature is sufficiently low and the pressure sufficiently high to maintain the material in a stable solid state, NASA, Goddard Space Flight Center, "Methane Explosion Warmed the Prehistoric Earth, Possible Again," 10 December 2001, online: <http://www.gsfc.nasa.gov/topstory/20011212methane.html>. See also IPCC, *supra* note 20, at 248-251.

[60] Vincent St. Louis, et al., "Reservoir Surfaces as Sources of Greenhouse Gases to the Atmosphere: A Global Estimate," *BioScience,* Vol. 50, No. 9, September 2000 at 766.

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N_2O is emitted from natural sources (oceans, atmospheric ammonia [NH_3] oxidation and natural soils) and from anthropogenic sources (agricultural - including nitrogen fertilized - soils, biomass burning, nylon production, nitric acid production, fossil fuel combustion in power plants and motor vehicles, and cattle production).[61] The atmospheric concentration of this long lived greenhouse gas[62] was stable until the industrial revolution[63] and has since grown by 16.3%.[64]

Anthropogenic black carbon aerosols, consisting of soot, charcoal and other minute light absorbing organic particles suspended in the atmosphere,[65] create a positive radiative forcing by absorbing solar energy and radiating it back to the atmosphere as heat. Carbon aerosols also impose significant negative health impacts on humans and other animals inhaling them.[66]

Although short-lived, ground-level ozone [O_3][67] is a powerful greenhouse gas with the third highest radiative forcing among anthropogenic greenhouse gases (after CO_2 and CH_4).[68] O_3 is a major contributor to urban smog and has significant negative health effects.

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[61] IPCC, *supra* note 20, at 251 -252.

[62] The estimated life of N_2O in the atmosphere is 120 years, before it is broken down by photodissociation or reaction with O_2 in the stratosphere, *Ibid.*

[63] *Ibid.*, at 253.

[64] *Ibid.*, at 358.

[65] *Ibid.*, at 788.

[66] Gale Koshida & W. Avis, *The Canada Country Study: Climate Impacts and Adaptation*, Volume VII: National Sectoral Volume, (1998) at 508, online: Environment Canada <http://www.ec.gc.ca/climate/ccs/volume7.htm>.

[67] "Ground-level ozone is produced when [nitrogen oxides] NOx and volatile organic compounds (VOCs) react in sunlight and stagnant air. About 95% of NOx emissions from human activity come from the burning of fossil fuels in vehicles, homes, industry and power plants. VOCs come mainly from gasoline combustion and the evaporation of liquid fuels and solvents," Johanne Whitmore & Mathew Bramley, "Green Power Programs in Canada — 2003 Overview of Government Green Power Policies, Utility Green Power Implementation Initiatives, Green Power and Certificate Marketing Programs, and Their Benefits," (September 2004) at 36, online: Pembina Institute <http://www.pembina.org/pdf/publications/GreenPowerProgramsCanada2003.pdf>.

[68] IPCC, *supra* note 20, at 261, 393.

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CFCs, HCFCs and Bromocarbons are strictly, and, for the most part, successfully controlled under an international treaty known as the *Montreal Protocol*.[69] HFCs, PFCs and SF_6 are used primarily as replacements for ozone-depleting substances [ODS], and in aluminum production, HCFC-22 production, semiconductor manufacturing, electrical transmission and distribution, and magnesium production and processing.[70] HFC concentrations in the atmosphere are rising exponentially due to society's new-found reliance on them.[71] These substances are extremely stable and long-lived in the atmosphere, contributing to their "stratospheric" global warming potentials [GWPs], meaning that each halocarbon molecule produced today will contribute to global warming for thousands of years; hence the reason for the inclusion of HFCs, PFCs and SF_6 under the *Kyoto Protocol*.[72]

To a minor extent, certain emissions and other impacts from mostly anthropogenic activities counteract positive radiative forcing by greenhouse gases. These agents of negative radiative forcing include emissions of sulphate aerosols, dust, sea salt, the indirect aerosol effect

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[69] *United Nations: Protocol on Substances that Deplete the Ozone Layer*, 16 September 1987, 26 I.L.M. 1541 (in force 1 January 1989) [*Montreal Protocol*], as adjusted and amended by the second Meeting of the Parties [MOP] held in London 27-29 June 1990, 30 I.L.M. 537 (amendments in force 10 August 1992) [London Adjustments and Amendments], as adjusted and amended by the fourth MOP held in Copenhagen, 23-25 November 1992, 32 I.L.M. 874 (amendments in force 14 June 1994) [Copenhagen Adjustments and Amendments], as adjusted by the seventh MOP held in Vienna, 5-7 November 1995,(adjustments in force 5 August 1996) [Vienna Adjustments], as adjusted and amended by the ninth MOP held at Montreal 15-17 September 1997 (amendments in force as of 10 November 1999) [Montreal Adjustments and Amendments], as adjusted and amended by the 11th MOP held at Beijing 29 November - 3 December 1999 (amendments in force 25 February 2002) [Beijing Adjustments and Amendments]; online: UNEP <http://www.unep.org/ozone/pdfs/Montreal-Protocol2000.pdf>.

[70] U.S. Environmental Protection Agency [EPA], *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990 - 2002*, (Washington, D.C.: EPA, 15 April 2004) Table ES-8 at ES-18, online: EPA <http://yosemite.epa.gov/OAR/globalwarming.nsf/UniqueKeyLookup/RAMR5WNMGY/>.

[71] IPCC, *supra* note 20, at 253 - 254.

[72] *Conference of the Parties to the Framework Convention on Climate Change: Kyoto Protocol*, 10 December 1997, 37 I.L.M. 22 (entered into force 16 February 2005).

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and increased albedo (reflection of sunlight back into space) due to land use change.

D. Current Calculations and Projections for the Future Global Climate

Concentrations of key greenhouse gases (CO_2, CH_4, N_2O, etc.) have risen steadily in the atmosphere since the beginning of the industrial revolution[73] resulting in a global average temperature increase of 0.6 ± 0.2 degrees Celsius.[74] Average temperature increases on land, particularly at higher latitudes, have been greater than those over the oceans or at lower latitudes.[75] If concentrations of these gases were to continue to increase in developed and developing countries at current rates, concentrations of CO_2 could treble, CH_4 could more than double and N_2O could increase by 150% by the end of this century. [76]

The use of climate models to predict future climate changes has progressed but their reliability is still uncertain.[77] According to climate models used by the IPCC, global average temperatures could increase by from 3.2 to 5.8 degrees Celsius if the world continues to rely on the combustion of fossil fuels for energy.[78]

E. Impacts from and Vulnerability to Climate Change

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[73] IPCC, *supra* note 20, at 36.

[74] *Ibid.*, at 26.

[75] *Ibid.*, Figures 2.9 and 2.10 at 116, 117.

[76] See A1FI values for CO_2, CH_4 and N_2O for the year 2100, *Ibid.*, at 807-810.

[77] Models coupling atmospheric and oceanic general circulation models are among the most useful. Few models take into account variations in solar radiation arriving at the top of the Earth's atmosphere and most climate models are unable to take into account the still uncertain effects of water vapour and cloud feedbacks. The impact of vegetation feedbacks is increasingly recognized as important, but not always included in the models, *ibid.*, at 473, 527, 788.

[78] Using IPCC's Special Report on Emissions Scenarios [SRES] A1FI, which involves very rapid economic growth, the rapid introduction of more efficient technologies and continued reliance on fossil fuels, *Ibid.*, at 70.

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Substantial human impacts, including benefits and environmental calamities have been predicted, as a consequence of anthropogenically-induced climate change.[79] Developing nations are more vulnerable to climate change, and much of their economic activities (including agricultural production) are sensitive to climate changes.[80] Compounding the problem, developing countries have fewer resources to direct to climate change adaptation strategies.[81]

Low to moderate warming may generate net economic benefits in some regions. A few studies purport to assess net effects on gross domestic product [GDP] of different regions of the globe that may be associated with certain levels of global warming,[82] but IPCC confidence levels in these studies are "very low."[83] Much more study is needed in this area.

Warming climates may allow poleward expansion of tropical, subtropical and temperate agriculture,[84] allowing, for example, grapes to be grown more extensively at higher latitudes[85] and altitudes. The increasing length of the growing season and long summer days of mid to higher latitudes will also benefit plant growth in these regions.[86] Boreal forests, acting as carbon

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[79] *Ibid.*, at 936.

[80] IPCC WGII, *supra* note 51, at 940.

[81] *Ibid.*

[82] One study projects increases in GDP of about 3.5% in North America and Western Europe, about 2% for Eastern Europe and China, about 1% for Japan and the Middle East, with losses of about 2% for Latin America and 4 % for Africa, for mean global warming of 1 degree Celsius. Other studies project primarily net decreases to GDP if global warming reaches a global mean of 2.5 degrees Celsius. Russia and China are notable exceptions to this negative GDP impact trend, with projected increases in two studies of 1% and 11% for Russia and -0.2% and 2% for China. In this scenario, India is the biggest loser with a projected net GDP decline of almost 5% in 1 study and 2% in another. The projected GDP loss for Africa is 4%, 3% for Western Europe, 2% for the Middle East, 1% for Eastern Europe and 0.5% and 0.1% for Japan. North America is projected to almost break even. See IPCC, WGII, *Ibid.*, Table 19-4, at 940.

[83] *Ibid.*

[84] *Ibid.*

[85] *Ibid.*

[86] Crop yields are expected to decrease in tropical latitudes, *Ibid.*, box 19-3, at 938.

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sinks, should be able to expand to areas where permafrost has melted, depending upon suitable soil conditions.[87]

Cold-related illnesses and deaths should decrease in middle to high latitude human and other animal populations.[88] Melting of Arctic sea ice could lead to the opening of the famed northwest passage for shipping, creating economic opportunities and environmental risks.[89] Unfortunately, global warming presents many significant risks.

1. Coastal Inundations

As surface temperatures rise, oceans absorb heat, raising sea levels through thermal expansion, the projected primary cause for rising ocean levels in the next century.[90] Sea levels may also rise due to glacier melting, although the vast Antarctic and Greenland ice sheets are not expected to melt quickly due to their high latitude.[91] Climate models predict that global mean sea levels will rise between 0.09 and 0.88 m by 2100.[92] If unchecked, global warming beyond 2100 could lead to devastating results. According to IPCC Working Group II:

> Disintegration of the West Antarctic Ice Sheet or melting of the Greenland Ice Sheet could raise global sea level up to 3 m each over the next 1,000 years, submerge many islands, and inundate extensive coastal areas. Depending on the rate of ice loss, the rate and magnitude of sea-level rise could greatly exceed the capacity of human and natural systems to adapt without substantial impacts.[93]

Sea level rises of this magnitude will be devastating to inhabitants of small island

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[87] Koshida and Avis, *supra* note 66, at xvii.

[88] IPCC WGII, *supra* note 51, at 620.

[89] Koshida & Avis, *supra* note 66, at 422, 434.

[90] IPCC, *supra* note 20, Box 2, at 31.

[91] *Ibid.*

[92] IPCC WGII, *supra* note 51, at 3.

[93] *Ibid.*, at 6.

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states,[94] deltas[95] and other low lying coastal areas. Rising ocean levels will exacerbate the impact of storm surges, particularly in developing countries. Storm surge floods in Bangladesh have already killed 225,000 in 1970 and 138,000 in 1991.[96]

Even small sea level rises can be expensive. Greenpeace estimated that a 12 to 20 cm sea level rise would cost Tuvalu, Kiribati and 7 other Polynesian and Micronesian states an extra $2 billion to $2.6 billion (USD) to fight.[97] Studies in the 1990s of costs of rising sea levels affecting the United States conclude that the economic cost to developed property would be $20.4 billion (USD).[98] A 1997 study concluded that the cost of land lost from the coast of Venezuela due to sea level rise would be $30 billion (USD), while the cost of protecting 2,200 km of coastline would be $6 billion.[99] Notably, most of these examples relate to developing countries not primarily responsible for greenhouse gas emissions and lacking resources to defend against climate impacts. The global cost of a large rise in sea level would be incalculable in loss of life, loss of land and damage to coastal properties and infrastructure.

2. Human Health Concerns

Global climate change will cause a wide range of human health concerns, most of them

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[94] Tuvalu, Kiribati, the Maldives have already experienced flooding that has reached the middle of their small island nations and are planning legal action against western nations for causing global warming. Rising sea levels are a particular threat in these and 39 other countries belonging to the Alliance of Small Island States [AOSIS]. See *Space Daily*, "Global warming not sinking Tuvalu -- but maybe its people are," Aukland (AFP), 28 March 2002 online: <http://spacedaily.com/news/020328041702.ixj7exir.html>.

[95] IPCC WGII, *supra* note 51, Box 19-2, at 937.

[96] *Ibid.*, at 366.

[97] Reuters,"Rising Seas Imperil Pacific Island Nations," Wellington, 9 November 2000, online: <http://dailynews.yahoo.com/h/nm/20001109/sc/climate_pacific_dc_1.html>.

[98] No time period or amount of sea level rise given, IPCC WGII, *supra* note 51, at 363.

[99] *Ibid.*, at 365.

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negative.[100] Expected increases in the number and intensity of heat waves will increase mortality and morbidity rates, particularly for the aged and the poor.[101] However, warmer winters in higher latitudes could reduce cold-related deaths and diseases.[102]

There is an increased risk that serious vector-borne[103] diseases will increase their ranges in a warming world, potentially affecting hundreds of millions of people. Developing countries have diminished financial capacity and public health infrastructure to cope with changing disease ranges.[104] Common vector-borne diseases likely to increase their range include malaria, dengue, acute viral syndrome, hanta virus, haemorrhagic fever, Lyme disease and several forms of viral encephalitis, including the West Nile virus.[105]

3. Changes to the Hydrological Cycle

Increasing energy in the atmosphere is expected to lead to a more vigorous hydrological cycle, causing more severe floods and droughts.[106] A warming climate is expected to reduce snow cover in temperate latitudes (more precipitation will fall as rain and less as snow), leading

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[100] *Ibid.*, at 453.

[101] According to a recent report in the *Canadian Medical Association Journal*, "The modest climate change that occurred between the mid 1970s and the year 2000 is estimated to have caused the annual loss of over 150 000 lives and 5 500 000 disability-adjusted life-years," R. Sari Kovats & Andrew Haines, "Global climate change and health: recent findings and future steps," (2005) 172 CMAJ, 501.

[102] IPCC WGII, *supra* note 51, at 453.

[103] The most common vectors are mosquitos and ticks, *Ibid.*, at 453.

[104] *Ibid.*, at 507.

[105] *Ibid.*, at 463-470.

[106] Researchers have determined that extreme rainfall events have become more frequent in the United States and in the United Kingdom. Climate models predict increased precipitation in most equatorial and mid to high latitudes, with decreases in sub-tropical regions. However, actual impacts are difficult to predict. Natural variations in precipitation over extended periods are often greater than those expected from global warming. See IPCC WGII, *ibid.*, at 197.

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to more evaporation in winter and spring and less in summer.[107]

4. Frequency of Extreme Weather Events

Although the extent is uncertain, it is expected that the frequency and intensity of extreme weather events will increase in a warming world.[108] Extreme weather includes extremes in temperature, wind and precipitation. These events are likely to raise serious health and economic concerns. The cost of extreme weather events rose from an average of $4 billion per year (1999 USD) to $40 billion per year (1999 USD) in the last half of the twentieth century.[109] Almost none of these losses were insured in 1950. By the end of the century, the insured portion of these losses had risen but was still less than 25%.[110] The growth in economic losses to severe weather is related partly to the increase in frequency and severity of events, but it also has been driven by increases in population, particularly in vulnerable, low-lying coastal, areas.[111]

5. Drought and Desertification

Global warming may bring drought[112] and exacerbate desertification. However, desertification is often a product of poor human stewardship over the biota and soil of a region.[113] According to the IPCC's Working Group II: "CO_2-induced climate change and

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[107] *Ibid.*, at 199. A decreased snow-pack in mountainous areas may lead to an increase in drought and less runoff for irrigation reservoirs upon which agriculture in semi-arid regions is dependant, U.S. Department of State, "U.S. Climate Action Report 2002," Washington, D.C., May 2002, online: <http://www.epa.gov/globalwarming/publications/car/uscar.pdf> at 100.

[108] IPCC WGII, *supra* note 51, at 21

[109] *Ibid.*, at 13, 422.

[110] *Ibid.*, at 13.

[111] *Ibid.*, at 39, 40.

[112] "Drought is an extended period of dry weather that lasts longer than expected or than normal and leads to measurable losses (crop damage, water supply shortages)." D. Phillips quoted in Koshida & Avis, *supra* note 66, at 13.

[113] According to Drumbl: "Triggered anthropocentrically by overgrazing, deforestation, overexploitation of the soil, and committing weak soils to exhaustive agricultural use, desertification diminishes the availability of arable land, reduces biodiversity and forests, and

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desertification remain inextricably linked because of feedbacks between land degradation and precipitation."[114]

6. Decline in Biodiversity

Biodiversity has been defined as: "the numbers and relative abundances of different genes (genetic diversity), species and ecosystems (communities) in a particular area."[115] It is significantly affected by habitat fragmentation and loss.[116] Rapid climate change may enhance the populations and distribution of some species but will diminish or remove those that cannot adapt or move.[117]

7. Disruption of Thermohaline Circulation

Some scientists have identified a risk that rapid warming could produce too much fresh meltwater in the northwest Atlantic, reducing ocean salinity and possibly impairing or shutting down the Gulf Stream. This could create weather in western Europe more like that of Labrador or Siberia.[118]

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creates erosion." Mark Drumbl, "Poverty, Wealth, and Obligation in International Environmental Law," Washington & Lee Public Law and Legal Theory Research Paper Series, Working Paper No. 01-19, September 2001, online: <http://papers.ssrn.com/abstract=283204> at 100. See also IPCC WGII, *supra* note 51, at 517.

[114] IPCC WGII, *Ibid.*, at 517.

[115] *Ibid.*, at 983.

[116] *Ibid.*, at 250.

[117] *Ibid.*

[118] CE, *supra* note 83, at 26. The IPCC's Working Group I concludes in the TAR: "Most [climate] models show weakening of the Northern Hemisphere Thermohaline Circulation (THC), which contributes to a reduction of the surface warming in the northern North Atlantic. Even in models where the THC weakens, there is still a warming over Europe due to increased greenhouse gases. In experiments where the atmospheric greenhouse gas concentration is stabilised at twice its present day value, the North Atlantic THC is projected to recover from initial weakening within one to several centuries. The THC could collapse entirely in either hemisphere if the rate of change in radiative forcing is large enough and applied long enough. . . . However, it is too early to say with confidence whether an irreversible collapse in the THC is likely or not, or at

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8. Extensive Methane Releases

Much of Canada's and Siberia's vast peat areas are underlain by permanent or sporadic permafrost. Global warming is expected to melt much of that permafrost,[119] leading to huge methane emissions and accelerating global warming. Permafrost underlying Alberta peat lands has already moved approximately 200 km north in only 30 years.[120]

Scientists hypothesize that a catastrophic release of methane hydrates from deposits in oceans about 55 million years ago rapidly raised the global average temperature by up to 7 degrees Celsius.[121] The likelihood of this occurring in the near future with current deposits is very low, but increases significantly as the deep oceans warm, even by a few degrees.[122]

9. Population Migrations

Historically, important climate shifts have been accompanied by large population migrations.[123] Movement of large populations causes significant unrest[124] among the displaced and receiving populations. New diseases[125] are often introduced, and spread quickly and widely

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what threshold it might occur and what the climate implications could be," IPCC, *supra* note 20, at 73.

[119] Koshida & Avis, *supra* note 66, at xiv.

[120] D. Vitt, "Permafrost in the Boreal Forest: an Important Case Study in Climatic Change" (ERSC Lecture, Department of Biological Sciences, University of Alberta, 4 November 1999) [unpublished].

[121] IPCC, *supra* note 29 at 248. See also, NASA, *supra* note 95.

[122] IPCC WGII, *supra* note 51, at 6, 830-831.

[123] The Anasazi culture inhabited the four corners area of the southwestern United States for thousands of years until cooling temperatures and drought associated with the little ice age forced them to abandon their cliff-side dwellings, Christianson, *supra* note 13, at 116-122.

[124] IPCC WGII, *supra* note 51, at 519 - 520. See also D. Sprinz & U. Luterbacher, eds., *International Relations and Global Climate Change*, 2nd Ed., Revised, (Potsdam: Potsdam Institute for Climate Impact Research, 1996), at 7, 8, online: Potsdam Institute <http://www.pik-potsdam.de/reports/pr.21/pr21.pdf>.

[125] IPCC, "Summary for Policymakers:Scientific-Technical Analyses of Impacts, Adaptations and Mitigation of Climate Change - IPCC Working Group II at 35, *Climate Change*

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where resistence to them is low. Political strife and changes may ensue.

F. Conclusions

An overview of the scientific basis of global climate change, including its history, causes, impacts and feedback mechanisms leads to the following conclusions:

1. The Earth's climate has fluctuated widely throughout its existence, the current interglacial period covering the past 10,000 years providing a relatively stable, bio-friendly interregnum.
2. The widespread anthropogenic combustion of, fugitive emission of, and dependence upon fossil fuels has produced and will continue to produce in the foreseeable future, a discernable and growing global warming.
3. The atmosphere and oceans are highly complex, making predetermination of local, regional and global climate change impacts difficult and uncertain.
4. Anthropogenic climate change will contribute significantly to numerous positive, negative and even catastrophic events.
5. Developing countries will bear a disproportionate share of the burdens of global warming.
6. The biome can be protected from climate change by prompt, concerted, and progressive reductions in anthropogenic greenhouse gases.

In subsequent chapters, it will be argued that reductions in anthropogenic greenhouse gas emissions necessary to address global warming can be accomplished through international legal, political and scientific cooperation, domestic legal incentives and regulation, and scientific research and development (funded primarily by developed country capital, but shared with

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1995: IPCC Second Assessment Report, online: <http://www.ipcc.ch/pub/sarsum2.htm#three>.

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developing countries). Enhanced and concerted international and domestic action in these areas can slow and reduce global warming, reduce toxic substances in the atmosphere, save energy and in some cases money, preserve resources, improve international relations, including north-south cooperation, and improve human and animal habitat and health. Canada and Alberta can and should do their fair share to meet Canada's *Kyoto Protocol* obligations, to enhance its provisions and ultimately, to stabilize global climate. Developed country compliance with the *Kyoto Protocol* (discussed in the next chapter) is a beginning, but as we shall see, the *Kyoto Protocol* alone, in its current form, is an inadequate international response to global warming, requiring that more be done.

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Chapter 3

International Legal Response to Climate Change

A. Introduction

The carbon dioxide [CO_2] and other substances emitted by automobiles and electric utilities in Alberta, Canada have a small, unquantifiable, but anticipated impact on the weather in North Africa.[1] Similarly, children growing up on a coral atoll in Tuvalu[2] have a vested interest in the CO_2 emitted by 30 million Canadians, particularly if these emissions contribute to the inundation of their Pacific island country.[3] Anthropogenic greenhouse gas emissions can only be controlled by the states that emit them. Where international causes and effects like these exist, there is clearly scope for the development and application of international law.

B. Principles of International Environmental Law Underlying a Response to Climate Change

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[1] For the effects of CO_2 and other greenhouse gases on global climate, see *supra*, chapter 2 at 18-26. Besides greenhouse gases, other emissions also affect global climate. Recent studies point to biomass burning and industrial sulphate emissions affecting cloud formation, reducing precipitation and contributing to drought. See Steven C. Sherwood, "Aerosols and Ice Particle Size in Tropical Cumulonimbus," (1 May 2002) American Meteorological Society, *Journal of Climate* 15:9 at 1051; and Leon D. Rotstayn & Ulrike Lohmann, "Tropical Rainfall Trends and the Indirect Aerosol Effect, "(1 August 2002), American Meteorological Society, *Journal of Climate* 15:15 at 2103. Rotstayn and Lohmann discuss whether industrial pollution from North America has contributed to drought and famine in North Africa between 1970 and 1985.

[2] The highest point on this group of coral atolls in the Pacific Ocean, home to about 11,000 persons, is only 5 metres above sea level. (U.S.A., Central Intelligence Agency, *The World Factbook 2004*, online: <http://www.cia.gov/cia/publications/factbook/geos/tv.html>.

[3] The CO_2 we cause to be emitted contributes to the global concentration, which is roughly the same everywhere on the planet, subject to normal diurnal and seasonal variations caused by changes in CO_2 uptake through photosynthesis. See William K. Stevens, *The change in the weather: people, weather, and the science of climate* (New York: Random House, Inc., 1999), at 141.

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Scientific understanding of anthropogenic climate change has developed recently, but the need for global action on this topic is undergirded by fundamental principles of international law that evolved during the twentieth century.

International law is derived from 5 main sources as outlined in article 38 of the *Statute of the International Court of Justice.* These sources are treaties;[4] customary international law;[5] "general principles of law recognized by civilized nations";[6] the evidence provided by judicial decisions;[7] and "teachings of the most highly qualified publicists."[8] Other sources of evidence

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[4] *Statute of the International Court of Justice,* 26 June 1945, 59 Stat. 1055 at 1060, T.I.A.S. No. 993 (entered into force Oct. 24, 1945). The first source includes bilateral and multilateral treaties. Primary examples for the purpose of this document include the *United Nations Framework Convention on Climate Change*, 9 May 1992, 31 I.L.M. 849 (1992) (entered into force 21 March 1994) [FCCC] and, the *Conference of the Parties to the Framework Convention on Climate Change: Kyoto Protocol*, 10 December 1997, 37 I.L.M. 22 (entered into force 16 February 2005) [*Kyoto Protocol*]. See also Patricia W. Birnie & Alan E. Boyle, *International Law and the Environment*, 2nd ed., (Oxford: Oxford University Press, 2002) [Birnie & Boyle], at 13-15. Although treaties constitute a primary source of international law, they may not abrogate principles of *jus cogens*, "a peremptory norm of general international law . . . [being] a norm accepted and recognized by the international community of states as a whole as a norm from which no derogation is permitted and which can be modified only by a subsequent norm of general international law having the same character", *Vienna Convention on the Law of Treaties* (1969) 1155 U.N.T.S. 331 (in force 1980), Article 53. Examples of *jus cogens* include the prohibition against torture and may include a prohibition of atmospheric nuclear tests. Philippe Sands, *Principles of International Environmental Law* (Cambridge: Cambridge University Press, 2003) [Sands], at 320.

[5] Two elements are required before a principle or practice can be considered customary international law. It must be supported by a consistent general practice of states over a period of time and there must be an acceptance of the principle or practice as law by the International Community (latter element referred to as *opinio juris*). Kindred, Hugh M. *et al.*, (eds.), *International Law Chiefly as Interpreted and Applied in Canada 6th ed.* (Toronto: Emond Montgomery Publications Ltd., 2000) [Kindred] at 129-130. See also Birnie & Boyle, *supra* note 4, at 16.

[6] It is not yet clear whether this source of international law includes generally accepted principles of domestic law primarily relating to basic rights of private law or procedure, such as *res judicata,* or *audi alteram partem,* or whether this source is limited exclusively to international law principles. See Kindred, *ibid.* at 148-149 and Birnie & Boyle, *supra* note 4, at 18-20.

[7] Judicial decisions, such as decisions of the International Court of Justice are considered as subsidiary or "secondary" sources of international law (Kindred, *supra* note 5, at 154). See

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relevant to international law include codifications of international law prepared by international bodies, United Nations General Assembly resolutions and declarations and various other forms of "soft law" that may include "codes of practice, recommendations, guidelines, resolutions, declarations of principles, standards," and the like prepared by authoritative international organizations such as the United Nations Environment Programme [UNEP].[9]

A component of customary international law relevant to climate change is reflected in the latin maxim *sic utere tuo, ut alienum non laedas* [*sic utere*], meaning "the obligation not to use your property in such a way as to damage your neighbour's" ["good neighbour" principle].[10] This principle evolved through a triad of international decisions in the mid-twentieth century. In the first of these, the *Trail Smelter Arbitration,* the Government of Canada was held liable to the Government of the United States for damages suffered in the Columbia River Valley in the State of Washington, from transboundary air pollution emitted by a zinc and lead smelter in British Columbia. The arbitral panel decided that:

> . . . no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.[11]

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also Birnie & Boyle, *supra* note 4, at 20, 21.

[8] This final source from Article 38 of the Statute of the International Court of Justice refers to respected legal commentaries. See Kindred, *supra* note 5 at 154-155 and Birnie & Boyle, *supra* note 4, at 21.

[9] Birnie & Boyle, *supra* note 4, at 24-27. Agenda 21, a complex 800 page document agreed to at Rio de Janeiro in 1992, and identifying numerous environmental actions needed across many sectors, may be cited as an example of "soft law," United Nations Conference on Environment and Development, U.N. Programme of Action for Sustainable Development, Agenda Item 21 (1992), U.N. Doc. A/CONF.151/4, online: UNEP <http://www.unep.org/Documents/Default.asp?DocumentID=52>.

[10] Francois A. Mathys, "International Environmental Law: A Canadian Perspective," 3 Pace Y.B. Int'l L. 91 [Mathys], at 92. See also Birnie & Boyle, *supra* note 4, at 104.

[11] *Trail Smelter Arbitration* (*U.S.A.* v. *Canada*) (1931-1941), 3 R.I.A.A. 1905 at 1965. The arbitration resulted from property damage in the United States caused by acid rain from the

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Although not adjudicating an environmental matter, the International Court of Justice asserted in the second decision, the *Corfu Channel* [12] case, that "a state may not knowingly allow its territory to be used to injure another state."[13] The third decision of the triad supports the proposition that a state is obligated to consider and make reasonable efforts to reconcile the interests of neighbouring states affected by the first state's activities.[14]

The "direct descendant"[15] of these three cases is Principle 21 of the 1972 *Declaration of the United Nations Conference on the Human Environment* [Stockholm Declaration]:

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.[16]

The principle is repeated in nearly identical language as Principle 2 of the *Rio Declaration on Environment and Development*[17] [Rio Declaration] adopted at the United Nations

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Cominco smelter operating in Trail, British Columbia, Canada.

[12] *Corfu Channel case (Merits)*, [1949] I.C.J. Rep. 4. The International Court of Justice held Albania responsible for not warning British warships of mines laid by a third nation in Albanian territorial waters. See Birnie & Boyle, *supra* note 4, at 109.

[13] Daniel M. Bodansky, "Customary (and not so Customary) International Environmental Law" (1995) 3:1 Indiana J. Global Leg. Stud. 105, n. 48.

[14] *Lac Lanoux Arbitration (France v. Spain)* (1957), 12 R.I.A.A. 281. This arbitration involved a dispute over an upstream hydraulic project by France on the Carol River affecting downstream Spanish interests. See Guruswamy, Lakshman D., *International Environmental Law in a Nutshell, 2nd ed.* (St. Paul: West Publishing Co., 2003) [Guruswamy] at 445, 446.

[15] Mathys, *supra* note 10, at 92.

[16] *United Nations Declaration on the Human Environment*, (1972), 11 I.L.M. 1416. In paragraph 1 of the U.N. G.A. Resolution 2995 (XXVII) on Co-operation between States in the Field of the Environment (15 December 1972), 27 UN GAOR (Supp. No. 30) 42, the General Assembly "*Emphasizes* that in the exploration, exploitation and development of their natural resources, States must not produce significant harmful effects in zones situated outside their national jurisdiction."

[17] *The Rio Declaration on Environment and Development* (1992), I.L.M. 874 (reproduced as Schedule I, following Chapter 7). (In the Rio Declaration, the words "and development" are inserted immediately before the word "policies." Otherwise Principle 21 of the

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Conference on Environment and Development [UNCED] held in Rio de Janeiro in June 1992 together with other instruments including the FCCC.[18]

Other important principles of international environmental law cited in the Rio Declaration are clearly relevant to international legal aspects of climate change, and include the pervasive principle of sustainable development (reflected in Rio Principles 1, 3-5, 7-10, 12, 17, 20-22, 25 and 27), intergenerational equity (Principle 3), common but differentiated responsibilities (Principles 6 and 7), the role of technology and technology sharing (Principles 7 and 9), the need for and right to public participation (Principle 10), the need for effective environmental legislation and standards (Principle 11), the responsibility of a polluting state to compensate those suffering from environmental damage it causes (an international law version of the "polluter pays" principle found in Rio Principles 13 and 16), the precautionary principle (Principle 15), and the use of environmental impact assessments [EIAs] (Principle 17).[19] The full text of the Rio Declaration is reproduced as Appendix I to this document.

The term "sustainable development" was defined in the World Commission on Environment and Development [Brundtland Commission] report as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".[20] Birnie & Boyle further explain the concept of sustainable development as follows:

> International environmental law encompasses both more and less than the law of sustainable development. There is a major overlap in rules, principles, techniques, and

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Stockholm Declaration is identical to Principle 2 of the Rio Declaration.

[18]FCCC, *supra* note 4.

[19] Rio Declaration, *supra* note 17. According to Birnie & Boyle, *supra* note 4, at 92-93, "Given [the wording of Principle 16 of the Rio Declaration], it cannot be said that the 'polluter pays' principle is intended to be legally binding. Principle 16 lacks the normative character of a rule of law. . . . Implementation has largely been left to national rather than international action."

[20] World Commission on Environment and Development, *Our Common Future* (Oxford: Oxford University Press, 1987), at 43.

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> institutions, but the goals are by no means identical. Most obviously, sustainable development is as much about economic development as about environmental protection; while these two aspects have to be integrated in order to achieve sustainable development, they remain distinct. Moreover, not all environmental questions necessarily involve sustainable development, or vice versa. We may wish to preserve Antarctica, or endangered species such as the great whales or the giant panda, for reasons that have little or nothing to do with sustainable development, or put another way, we may wish to preserve them *from* sustainable development. In this sense, international law may in some cases reflect environmental concerns that override or trump development, however sustainable. At the same time, developmental priorities may in other cases override environmental concerns without thereby ceasing to be 'sustainable development.'[21]

To be sustainable from the perspective of climate change, development should not contribute to "dangerous anthropogenic interference with the climate system," but should "allow ecosystems to adapt naturally to climate change."[22] Of necessity, sustainable development must be considered in the context of other Rio Declaration principles respecting the precautionary principle, intergenerational equity, common but differentiated responsibilities and the use of EIAs.[23] Each of these will be discussed in turn.

Application of the precautionary principle in international environmental law has been controversial, because, as James Cameron asserts, "it makes a difference."[24] According to Cameron:

> Where there is a proven risk of environmental harm, a regulatory action is preventive. When scientific uncertainty is present, the same action is called precautionary.[25]

Principle 15 of the Rio Declaration provides a succinct summary of the precautionary principle:

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[21] Birnie & Boyle, *supra* note 4 at 2-3.

[22] FCCC, *supra* note 4, Article 2.

[23] See Rio Declaration, *supra* note 17, Principles 3, 7, 9, 15 and 17, respectively.

[24] James Cameron, "Future Directions in International Environmental Law: Precaution, Integration and Non-state Actors" (1996) 19 Dal. L. J. 122 at 127.

[25] *Ibid.* at 124.

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> Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.[26]

The precautionary principle has been incorporated into several international environmental treaties.[27] Although originally a "guiding principle"[28] or a principle of soft law, some now argue that the precautionary principle has "attained the status of customary international law."[29] However, the degree or seriousness of potential environmental damage[30] and the amount of scientific uncertainty tolerated[31] before the precautionary principle could become binding under customary international law, are unclear. Ideally, the scientific community and the general public should be involved in assessing the degree of uncertainty required and in selecting what action will be most effective in addressing a risk.[32]

Some opposition to the FCCC and its *Kyoto Protocol* is purportedly based on scientific uncertainties surrounding the causes of global climatic changes and future impacts of

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[26] Rio Declaration, *supra* note 17.

[27] For examples, see Moffet, *infra* note 30.

[28] James Cameron & Juli Abouchar, "The Precautionary Principle: A Fundamental Principle of Law and Policy for the Protection of the Global Environment (1991) 14 B.C. Int'l & Comp. L. Rev. 1 at 2.

[29] Cameron, *supra* note 24 at 127.

[30] According to John Moffet, "Legislative Options for Implementing the Precautionary Principle" (1997) 7 J. Env. L. & Prac. 157 at 160: "The international community has not agreed upon the level of potential harm required to trigger the precautionary principle. Triggers range from 'serious or irreversible damage' in the Climate Change Convention [*supra* note 4] and in Principle 15 of the Rio Declaration, [*supra* note 17] through the more moderate 'significant' threat in the Convention on Biological Diversity, [9 May 1992 (1992) 31 I.L.M. 822 (entered into force 29 December 1993)] to the lower 'reasonable grounds for concern' in the 1992 OSPAR Convention [*Convention for the Protection of the Marine Environment of the North East Atlantic*, 22 September 1992 (1993) 32 I.L.M. 1068 (entered into force 25 March 1998)."

[31] Cameron, *supra* note 24 at 127.

[32] Moffet, *supra* note 30 at 169-170.

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anthropogenic greenhouse gas emissions.[33] Gro Harlem Brundtland described the logical impetus of the precautionary principle in light of then existing evidence of climate change, during an address at the 1990 Bergen Conference,[34] as follows:

> I will add my strong support to those who say that we cannot delay action until all scientific facts are on our tables. We already know enough to start to act–and to act more forcefully. we know the time it takes from decision through implementation to practical effects. We know that it costs more to repair environmental damage than to prevent it. If we err in our decisions affecting the future of our children and our planet, let us err on the side of caution.[35]

Scientific evidence of human impact on climate has grown significantly since 1990, but some questions necessarily remain unanswered. In light of decreasing scientific uncertainty,[36] concerted global action on reducing greenhouse gas emissions requires international respect for and adherence to the precautionary principle.[37] In the case of some states however, including Canada and the USA, respect for the precautionary principle may have degenerated into what has been referred to as the "no regrets policy", which prompts precautionary action only when it also provides an economic benefit.[38]

According to Edith Brown Weiss, intergenerational equity consists of three components: 1) a "conservation of options" for the benefit of future generations; 2) a "conservation of

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[33] Richard A. Rinkema, "Environmental Agreements, Non-state Actors, and the *Kyoto Protocol*: a 'Third Way' for International Climate Action?" (2003) 24 U. Pa. J. Int'l Econ. L. 729 at 739.

[34] *Action for a Common Future: Report of the Economic Commission for Europe on the Bergen Conference* U. N. GAOR, Prep. Comm. for UNCED, 1st Sess., Provisional Agenda Item 2(e), at 18, (1990) U.N. Doc. A/CONF. 151/PC/10.

[35] Cameron & Abouchar, *supra* note 28, at 1.

[36] *Supra* Chapter 2, at 14-18.

[37] William C. Burns, "Global Warming--the *United Nations Framework Convention on Climate Change* and the Future of Small Island States" (1997) 6 Dick. J. Envtl. L. & Pol'y 147 at 162-165.

[38] Moffet, *supra* note 30 at 167-168.

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[environmental] quality" for future generations; and 3) a "conservation of access" for the current generation.[39] In the case of anthropogenic climate change, intergenerational equity can only be assured through a precautionary approach. Ignoring the precautionary principle and a predominate focus on Brown Weiss' third component (above), would jeopardize the first two components necessary to complete her definition of intergenerational equity.[40]

Global climate change has been fuelled predominately by the greenhouse gas emissions of industrialized states,[41] which have the greatest technological and financial capacity to reduce emissions. Industrial states are therefore expected to reduce their emissions first and most substantially,[42] consistent with the principle of common but differentiated responsibilities.

The principle of common but differentiated responsibilities is founded upon fairness[43] and the recognition of this principle has been identified as an important factor leading to the success of treaties such as the *Montreal Protocol on Substances that Deplete the Ozone Layer* [*Montreal Protocol*].[44] Under the *Montreal Protocol*, industrialized countries took the lead in

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[39] Duncan A. French, "International Environmental Law and the Achievement of Intragenerational Equity" (2001) 31 Envtl. L. Rep. 10469 at 10479-10480.

[40] See Michael Weisslitz, "Rethinking the Equitable Principle of Common but Differentiated Responsibility: Differential Versus Absolute Norms of Compliance and Contribution in the Global Climate Change Context" (2002) 13 Colo. J. Int'l Envtl. L. & Pol'y 473 at 492.

[41] For example, in 1996, the USA was responsible for 23% of global CO_2 emissions. The largest non-Annex I emitting country was China, responsible for 12% of the global total, Hoong N. Young,, "An Analysis of a Global CO_2 Emissions Trading Program" (1998) 14 J. Land Use & Envtl. L. 125, at 126. See also Burns, *supra* note 37, n. 197 at 182.

[42] *See The Changing Atmosphere: Implications for Global Security*, Conference statement (Toronto: 27-30 June 1988), (1990) 5 Am. U. J. Int'l L. & Pol'y 515 [Toronto Conference] para. 13 at 519-520. See also Birnie & Boyle, *supra* note 4 at 524.

[43] Paul G. Harris, "Common but Differentiated Responsibility: the *Kyoto Protocol* and United States Policy" (1999) 7 N.Y.U. Envtl. L.J. 27 at 28.

[44] Laura Thoms, "A comparative Analysis of International Regimes on Ozone and Climate Change with Implications for Regime Design" (2003) 41 Colum. J. Transnat'l L. 795, at 805.

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ending use of harmful ozone depleting substances such as Chlorofluorocarbons [CFCs] and halons, providing financial and technological assistance to developing countries to enable them to follow suit.

The USA questions the application of the principle of common but differentiated responsibilities as applied in the *Kyoto Protocol* because it fails to adequately address rapidly increasing greenhouse gas emissions in developing countries.[45] However, there is no compelling reason why both issues cannot be addressed over time, as has been achieved under the *Montreal Protocol*.[46]

Rio Principle 11 refers to effective environmental legislation. It is anticipated that an effective domestic climate change regime will include greenhouse gas emission minimum product or process efficiency standards to ensure state treaty compliance.[47] Domestic legislation should provide for public participation[48] and process transparency in managing development, to provide an important "check against adverse environmental, social, and cultural impacts."[49]

Domestic legal requirements that include the assessment of greenhouse gas emissions in balanced EIAs, greatly enhance process transparency and engage public participation.[50] For

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[45] Stone, Christopher D., "Common but Differentiated Responsibilities in International Law" (2004) 98 Am. J. Int'l L. 276, n. 34 at 280.

[46] Thoms, *supra* note 44 at 805.

[47] Richard L. Ottinger & Rebecca Williams, "Renewable Energy Sources for Development" (2002) 32 Envtl. L. 331 at 349 [Ottinger & Williams]; Richard L. Ottinger & Mindy Jayne, "Global Climate Change *Kyoto Protocol* Implementation: Legal Frameworks for Implementing Clean Energy Solutions," [Ottinger & Jayne] 18 Pace Envtl. L. Rev. 19 at 48, 49. See also Rio Declaration, Principle 11, *supra* note 17.

[48] Rio Declaration, *ibid.*, Principle 10.

[49] Matthew Vespa, "Climate Change 2001: Kyoto at Bonn and Marrakech" (2002) 29 Ecology L.Q. 395 at 413.

[50] Ottinger & Jayne, *supra* note 47 at 49, 50. See also Rio Declaration, *supra* note 17, Principle 17.

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example, projects undertaken by federal authorities that have a significant impact on Canadian greenhouse gas emissions[51] could be brought under the *Canadian Environmental Assessment Act.*[52] Similarly, provincial legislatures could require that projects generating extensive greenhouse gas emissions be required to undergo EIAs.

Although Canadian greenhouse gas emissions may contribute to climate damage elsewhere, according to Birnie and Boyle, "it cannot be assumed that discharges of greenhouse gases . . . are necessarily unlawful" under customary international law principles.[53] Applying the the polluter pays principle,[54] however, states responsible for greenhouse gas emissions that contribute to serious climate-related damage in another state should contribute financially to repair or mitigate damage or to climate adaptation strategies in or for that other state.[55] The difficulty for an aggrieved state is to find a legal mechanism to enforce a claim for damages, or to prove that climate related damages within its borders were caused by the greenhouse gas emissions of a particular state. In the case of climate change, there appears to be a difference between responsibility and legal liability.[56]

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[51] Chris Rolfe, *Turning Down the Heat: Emissions Trading and Canadian Implementation of the Kyoto Protocol* (Vancouver: West Coast Environmental Law Research Foundation, 1998) at 382-383.

[52] S.C. 1992, c. 37.

[53]Birnie & Boyle, *supra* note 4 at 517.

[54] Rio Declaration, Principles 13 and 16, *supra* note 17.

[55] Sands *supra* note 4 at 900-901.

[56] Gerhard Hafner of the University of Vienna "explained that responsibility applies only when the wrongfulness of actions is established, while a liability regime is applicable whenever causation of damage exists, even in the absence of wrongful actions. He clarified that other legal mechanisms should be applied to deal with damage if the source of damage cannot be identified," International Institute for Sustainable Development, "Summary of the Stockholm Convention Workshop on Liability and Redress: 19-21 September 2002,"Sustainable Developments, Vol. 76, No. 1, 23 September 2002 at 3, online: <http://www.iisd.ca/linkages/download/pdf/sd/sdvol75num1.pdf>.

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C. Progress Towards a Climate Treaty

Ozone depletion by chlorofluorocarbons [CFCs], and other chemicals used in daily life in the developed and developing world, became a serious global atmospheric issue following the publication of Rowland and Molina's landmark article in *Nature* in 1974.[57] The article identified the potential for chlorine from CFCs to destroy ozone molecules in the stratosphere responsible for blocking dangerous solar ultra-violet [UV] "B" and "C" radiation.

In response to the impending threat from CFCs and other ozone depleting substances, the nations of the world united in 1985 to establish a framework convention, the *Vienna Convention for the Protection of the Ozone Layer*.[58] The *Montreal Protocol on Substances that Deplete the Ozone Layer*[59] followed two years later. The *Montreal Protocol*, together with its adjustments and amendments,[60] provides binding commitments for the eventual phase out of CFCs, halons, carbon tetrachloride, methyl chloroform, halogenated chlorofluorocarbons [HCFCs] and methyl bromide, all powerful greenhouse and ozone-depleting gases. The *Montreal Protocol* has since

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[57] Mario J. Molina & F. Sherwood Rowland, "Stratospheric Sink for Chlorofluoromethanes: Chlorine Atom-Catalyzed Destruction of Ozone," Nature 249:810 (28 June 1974).

[58] *United Nations: Vienna Convention for the Protection of the Ozone Layer*, 22 March 1985, 26 I.L.M. 1516 (entered into force 22 September 1988).

[59] *Montreal Protocol on Substances that Deplete the Ozone Layer*, 16 September 1987, 26 I.L.M. 1541 (entered into force 1 January 1989).

[60] *Montreal Protocol on Substances that Deplete the Ozone Layer*, (current version – as adjusted and amended by the second Meeting of the Parties, London, 1990 (amendment in force 10 August 1992), and by the fourth Meeting of the Parties, Copenhagen, 1992 (amendment in force 14 June 1994), and further adjusted by the seventh Meeting of the Parties, Vienna, 1995 (in force 5 August 1997), and further adjusted and amended by the ninth Meeting of the Parties, Montreal, 1997 (amendment in force 10 November 1999) and further adjusted and amended by the eleventh Meeting of the Parties, Beijing, 1999 (amendment in force 25 February 2002) online: UNEP, The Ozone Secretariat <http://www.unep.ch/ozone/pdf/Montreal-Protocol2000.pdf>.

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been adopted by 185 nations plus the European Union [EU],[61] providing an exemplary precedent for developed country leadership involving accelerating multilateral cooperation in reducing current globally damaging atmospheric emissions for the benefit of future generations.[62] For the other much more widely emitted greenhouse gases not covered by the *Montreal Protocol*, progress has been less decisive and much slower.

The international scientific community flagged climate change as a serious global problem[63] at the First World Climate Conference, held in Geneva in 1979.[64] A conference declaration asked governments "to foresee and prevent potential man-made changes in climate that might be adverse to the well-being of humanity."[65] The conference led to the creation of the World Climate Programme [WCP][66] by the World Meteorological Organization [WMO], UNEP, and the International Council of Scientific Unions [ICSU].[67]

By the late 1980s, climate change was being discussed by national and international

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[61] Ozone Secretariat, "Status of Ratification/Accession/Acceptance/Approval of the agreements on the protection of the stratospheric ozone layer," online: <http://www.unep.org/ozone/ratif.shtml>.

[62] See Edith Brown Weiss and Harold K. Jacobson (eds.), *Engaging Countries: Strengthening Compliance with International Environmental Accords* (Cambridge, Mass.: The MIT press, 1998) at 135-136.

[63] UNEP, *Climate Change Information Kit*, (Geneva: UNEP, 2002) [info kit], Sheet 17, online: <http://unfccc.int/files/essential_background/application/pdf/infokit_02_en.pdf>.

[64]Wayne A. Morrissey, "Global Climate Change: A Concise History of Negotiations and Chronology of Major Activities Preceding the 1992 U.N. Framework Convention" *Congressional Research Service Report for Congress* (5 May 1998) online: <http://www.cnie.org/nle/crsreports/climate/clim-6.cfm>.

[65] Info kit, Sheet 17, *supra* note 63.

[66]The WCP has four components: the World Climate Applications and Services Programme, the World Climate Data and Monitoring Programme, the World Climate Impact Assessment and Response Strategies Programme, and the World Climate Research Programme. See WCP online: <http://www.wmo.ch/web/wcp/wcp_prog.htm>.

[67] Info kit, Sheet 17, *supra* note 63.

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bodies throughout the world, including the USA Congress[68] and the United Nations General Assembly.[69] At the Toronto Conference on the Changing Atmosphere,[70] held in June 1988, Canada invited governments to negotiate a framework "law of the atmosphere," controlling atmospheric pollutants, including but not restricted to CO_2 emissions.[71] The Conference proposed reducing global CO_2 emissions by 20% by 2005.[72] A series of other international conferences were held in the next year including: the Ottawa Conference,[73] where progress toward an all-encompassing "law of the atmosphere" was unsuccessfully attempted;[74] the Tata Conference,[75] where developing country perspectives over the impacts and solutions to climate change were highlighted;[76] and the Hague Conference, which resulted in the Hague

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[68] Lewis D. Solomon & Bradley S. Freedberg, "The Greenhouse Effect: a Legal and Policy Analysis, (1990) 20 Envtl. L. 83 at 93.

[69] William C. Burns, "The Second Session of the Conference of the Parties to the *United Nations Framework Convention on Climate Change*: More Heat than Light?" (1996) Colo. J. Int'l Envtl. L. & Pol'y 153 at 156.

[70] See Toronto Conference, *supra* note 42 at 515. According to James T. Bryce, "Controlling the Temperature: An Analysis of the *Kyoto Protocol*" (1999) 62 Sask. L. Rev. 379 at 404 [Bryce], "[t]he Conference triggered the involvement by the United Nations and the international scientific community."

[71] Daniel Bodansky, "The *United Nations Framework Convention on Climate Change*: A Commentary," (1993) 18 Yale J. Int'l L 453 at 471-472.

[72] *Ibid.* at 462.

[73] See *Protection of the Atmosphere: Statement of the Meeting of Legal and Policy Experts* (Ottawa: 22 February 1989), (1990) 5 Am. U. J. Int'l L. & Pol'y 529.

[74] Bodansky, *supra* note 71 at 472.

[75] See *International Conference on Global Warming and Climate Change: Perspectives from Developing Countries*, Tata Conference Statement (New Delhi: 21-23 February 1989), (1990) 5 Am. U. J. Int'l L. & Pol'y 543.

[76] *Ibid.* at 553-556, 559-565.

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Declaration,[77] calling for a "vital, urgent and global" solution to the climate change problem.[78]

In November 1989, representatives of 67 states, the European Community and 10 other international organizations met in the Netherlands and formulated the *Noordwijk Declaration on Atmospheric Pollution and Climate Change* [*Noordwijk Declaration*],[79] urging states to control or reduce greenhouse gas emissions according to their capabilities and to negotiate a framework convention on climate change with associated protocols.[80] The divergent interests of northern (industrialized) and southern (developing) countries were recognized in the Noordwijk Declaration, identifying the responsibility of industrialized nations to initiate greenhouse gas emission reductions and to provide financial and technical assistance to developing countries who were already struggling with large external debts.[81]

The declaration of the May 1990 Bergen Conference on Sustainable Development[82] followed, which, according to Birnie & Boyle, recognized that "transboundary air pollution, ozone depletion, and climate change are interrelated problems, whose solution goes to the heart of a policy of sustainable development."[83]

UNEP and the WMO established the Intergovernmental Panel on Climate Change

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[77] See *Declaration of The Hague* (The Hague: 11 March 1989), (1989) 28 I.L.M. 1308; (1990) 5 Am. U. J. Int'l L. & Pol'y 567.

[78] According to Bodansky, *supra* note 71 at 466, "The Hague Conference Declaration made the radical suggestion that countries develop 'new institutional authority' to preserve the earth's atmosphere and combat global warming. The Declaration proposed that this new institutional authority involve non-unanimous decision-making – in effect, a partial renunciation of sovereignty."

[79] Noordwijk: 7 November 1989), (1990) 5 Am. U. J. Int'l L. & Pol'y 592. See also Bodansky, *supra* note 71, at 467-468.

[80] Kindred, *supra* note 5, at 1018.

[81] *Noordwijk Declaration*, paras. (7), (13), (16), (19), (20), *supra* note 79 at 467-468.

[82] Bergen Conference, *supra* note 34 at 18.

[83] Birnie & Boyle, *supra* note 4, at 504.

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[IPCC] in November 1988 to perform the following functions:

> (i) assess available scientific information on climate change,
> (ii) assess the environmental and socio-economic impacts of climate change, and
> (iii) formulate response strategies.[84]

The IPCC is a group of more than 2000 respected scientists, providing expertise and decisions on scientific issues surrounding global climate change.[85] The IPCC vets its work through a peer review process,[86] which magnifies the credibility of its findings. The IPCC completed its First Assessment Report [FAR] in May and June, 1990,[87] predicting that then current emission rates would lead to an unprecedented 0.3° C per decade average rise in the global mean temperature during the 21st century.[88] The IPCC estimated that global greenhouse gas emissions would have to be reduced immediately by 60% to stabilize greenhouse gas concentrations at 1990 levels.[89]

In late 1990, with the support of UNEP and WMO, the UN General Assembly assigned responsibility for completing the *Framework Convention on Climate Change*, to an Intergovernmental Negotiating Committee [INC].[90] The INC, assisted by the IPCC, was to have

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[84]Intergovernmental Panel on Climate Change, *IPCC Second Assessment: Climate Change Report* (World Meteorological Organization, United Nations Energy Programme: 1995) at v.

[85] V. Nanda, "The *Kyoto Protocol* on Climate Change and the Challenges to its Implementation: a Commentary," (1999) 10 Colo. J. Int'l Envtl. L. & Pol'y 319, at 320. See also Thoms, *supra* note 44 at 813.

[86] IPCC, *Climate Change 2001: The Scientific Basis* (Cambridge: Cambridge University Press, 2001) [IPCC-TAR], at 22.

[87] IPCC, *Climate Change: The IPCC Scientific Assessment* (Cambridge ; New York : Cambridge University Press, 1990) [IPCC FAR].

[88] *Ibid.* at xi. See also Bodansky, *supra* note 71 at 469.

[89] IPCC FAR, *supra* note 87, at xi. See also Prue Taylor, "Heads in the Sand as the Tide Rises: Environmental Ethics and the Law on Climate Change" (2001) 19 UCLA J. Envtl. L. & Pol'y 247.

[90] Bodansky, *supra* note 71 at 474. See *Protection of Global Climate for Present and Future Generations of Mankind* GA Res. 45/212, UN GAOR, 45th Sess., Supp. No. 49, UN Doc.

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the treaty ready for UNCED in Rio de Janeiro in 1992.[91] The urgency reflected in the IPCC's FAR released in 1990 was salutary in motivating countries to sign the *UN Framework Convention on Climate Change* in Rio in 1992.[92]

D. *United Nations Framework Convention on Climate Change*[93]

A multilateral framework convention model as adopted in the FCCC provides institutional mechanisms for broad, collaborative feedback, growth in the number of participants, prospects for specific, substantive emission reduction commitments, and incremental progress.[94] The FCCC may be divided into four sections:[95] (1) an introductory section consisting of the preamble, definitions, convention objective and basic principles;[96] (2) commitments of the parties, including those pertaining to national inventories of sources and sinks, greenhouse gas emission reductions, sink enhancements, and mechanisms and modalities for scientific, educational, financial and technological cooperation among the parties;[97] (3) institutional mechanisms necessary to implement the convention;[98] and (4) miscellaneous concluding clauses

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A/45/49 (1990) 147; (1990) Am. U.J. Int'l L. & Pol'y 606.

[91] Bodansky, *Ibid.*, at 453.

[92] Fraser K. Cameron, "The Greenhouse Effect: Proposed Reforms for the Australian Environmental Regulatory Regime" (2000) 25 Colum. J. Envtl. L. 347 at 350; Laura H.Kosloff, "Linking Climate Change Mitigation with Sustainable Economic Development: a Status Report" (1998) 3 Widener L. Symp. J. 351 at 357.

[93] FCCC, *supra* note 4.

[94] Bodansky, *supra* note 71 at 494 - 495.

[95] *Ibid.*, at 492.

[96] FCCC, *supra* note 4, preamble and Arts. 1 - 3 at 851 - 855.

[97] *Ibid.*, Arts. 4 - 6 at 855 - 860.

[98] *Ibid.*, Arts. 7 - 14 at 860 - 867.

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dealing with ratification, entry into force, amendments, protocols, and annexes.[99]

1. FCCC and the 1992 Rio Declaration

The FCCC incorporates within its structure (incompletely, in some cases), diverse environmental pillars from the 1992 Rio Declaration,[100] which was also agreed to at UNCED. In summary, the FCCC incorporates, at least in part, Rio Principles 2, 3, 6, 7, 9 - 12, 15 and 17.[101]

The "legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty" are acknowledged in the preamble[102] The FCCC preserves the right of states to promote and determine their own economic development[103] while reducing greenhouse gas emissions.[104] The objective of the FCCC, as stated in Article 2, is inextricably bound to the concept and purpose of sustainable development. The Convention's objective is:

> . . . to achieve . . . stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.[105]

Rio Principle 2 (*sic utere* or "good neighbour") is repeated word for word in the Preamble to the FCCC.[106] Convention parties recognize that their emissions of greenhouse gases

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[99] *Ibid.*, Arts. 15 - 26 and Annexes I and II at 868 - 873.

[100] Rio Declaration, *supra* note 17.

[101] *Ibid.*

[102] FCCC, *supra* note 4 at 852-853.

[103] *Ibid.*, preamble at 851, and art. 3.4, 3.5 at 855.

[104] *Ibid.*, art. 4.1(b), at 855 and 4.2(a) and (b) at 856-857.

[105] *Ibid.*, Art. 2 at 854.

[106] *Ibid.*, at 851.

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contribute to climate impacts elsewhere.[107] However, despite these impacts, the FCCC does not purport to prevent convention parties from continuing to emit apparently harmful anthropogenic greenhouse gases. Only marginally respecting Rio Declaration Principle 2, the FCCC includes a vague emission reduction commitment for Annex I (developed) countries,[108] but no mechanisms to assure compliance.

The FCCC acknowledges that developed countries were the main contributors to global levels of anthropogenic greenhouse gases,[109] but there is nothing in the convention that requires developed countries to compensate countries, including many of the least developed countries, that have been or will be negatively impacted by climate change. The closest the FCCC comes to implementing the polluter pays principle is in Article 4(4), wherein Annex II countries commit to "assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse affects."[110] However, the FCCC is unclear as to whether Annex II countries are required to "assist" particularly vulnerable developing countries because Annex II nations helped create the problem, or because they possess the resources needed to provide assistance,[111] these being more closely tied to the concept of common but differentiated responsibilities and reflecting Rio Declaration Principles 6 and 7.[112]

The developed Annex I countries have more onerous burdens placed on them under the

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[107] *Ibid.*, preamble at 854.

[108] *Ibid.*, Art. 4(2)(a) and (b), at 856, 857. The Annex I country commitment is normally construed as a return to 1990 emission levels of CO_2 and other non-specified greenhouse gases, by 2000.

[109] *Ibid.*, preamble at 854.

[110] *Ibid.*, at 853.

[111] Bodansky, *supra* note 71 at 527-528.

[112] Rio Declaration, *supra* note 17.

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FCCC than do the developing countries, demonstrating common but differentiated responsibilities acknowledged in the preamble[113] and incorporated into the convention "Principles,"[114] "Commitments,"[115] functions of the COP,[116] and timing of reporting to the COP.[117] The FCCC recognizes that developed countries, as the primary historic producers of greenhouse gases and as having more economic resources, should take the lead in global emissions reductions and in providing financial and technical assistance to developing countries, to help them reduce their emissions.[118]

The principle of intergenerational equity expressed in Principle 3 of the Rio Declaration[119] underlies the FCCC and is expressed in the preamble[120] and in the first principle set out in Article 3, which states: "The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity."[121]

In light of "threats of serious or irreversible damage" caused by anthropogenic

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[113] FCCC, *supra* note 4, at 851.

[114] *Ibid.*, Art. 3(1), (3), at 854.

[115] *Ibid.*, Art. 4(1) and (2), at 855- 857. The principle of common but differentiated responsibilities applies to all commitments under Art. 4(1) and (2) of the FCCC, including national inventories of anthropogenic greenhouse gas emissions, including reporting to the Conference of the Parties [COP], climate change mitigation programmes, technological research, development and transfer, promotion of sustainable management of greenhouse gas sinks and reservoirs, cooperation in preparing for adapting to climate impacts, and, most importantly, the first (although vague) commitment to reduce anthropogenic greenhouse gas emissions to 1990 levels by 2000.

[116] *Ibid.*, Art. 7(2)(b) and (c), at 861.

[117] *Ibid.*, Art. 12(5), at 866.

[118] *Ibid.*, Art. 3(1), at 854 and Art. 4(1), 4(3) - (10), at 855 - 859.

[119] Rio Declaration, *supra* note 17.

[120] FCCC, *supra* note 4, at 852 and 853.

[121] *Ibid.*, at 854.

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greenhouse gas emissions, the precautionary principle [122] provides the necessary rationale for international action, despite the lack of full scientific certainty respecting the causes and extent, and the need for prevention, mitigation and global adaptation to anthropogenic climate change. The FCCC refers to these uncertainties in its preamble[123] and restates the precautionary principle in Article 3(3).[124]

The need to employ environmental impact assessments,[125] to produce public information and elicit public participation,[126] and to adopt effective environmental legislation and standards[127], reflecting Rio Principles 17, 10 and 11,[128] respectively, are incorporated into the FCCC text. However, the FCCC has no mechanism enforcing compliance by its parties with these provisions .

2. Other Key FCCC Provisions

The FCCC establishes organizational structures, crucial to the convention's success, the principal one being the Conference of the Parties [COP], being "the supreme [or decision-making] body of [the] Convention."[129] The COP is responsible to: examine Party obligations under the Convention; facilitate the exchange of information and the coordination of measures among Parties; agree on methods for preparing inventories of greenhouse gas sources and sinks; consider, adopt and ensure publication of reports on Convention implementation; mobilize

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[122] Rio Declaration, Principle 15, *supra* note 17.

[123] FCCC, *supra* note 4, at 851.

[124] *Ibid.*, at 853.

[125] FCCC, Art. 4(1)(f), *supra* note 4, at 856.

[126] *Ibid.*, Art. 4(1)(i), at 856 and Art. 6, at 860.

[127] *Ibid.*, preamble, at 851, Art. 4(1)(b), at 855, and Art. 4(2)(a), at 856.

[128] Rio Declaration, *supra* note 17.

[129] FCCC, Article 7, *supra* note 4, at 860-862. See also Bodansky, *supra* note 71, at 533.

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financial resources; establish necessary subsidiary bodies; perform other functions required to stabilize global greenhouse gas emissions;[130] and adopt protocols to the Convention.[131]

The convention creates two subsidiary bodies, being the Subsidiary Body for Scientific and Technological Advice [SBSTA] and the Subsidiary Body for Implementation [SBI], to provide, respectively, "timely information and advice on scientific and technological matters" to the COP[132] and to assist the COP "in the assessment and review of the effective implementation of the Convention."[133] Some Parties hoped that the creation of the SBSTA would help the COP base its decisions "on relevant scientific, technical and economic considerations"[134] and to keep politics out of the IPCC.[135]

The FCCC also provides for a purely administrative secretariat to support the COP by arranging sessions of the COP and the subsidiary bodies, helping Parties prepare national communications, compiling reports submitted to the COP by Parties and coordinating with the secretariats of other relevant international bodies.[136] COP-1 determined that the permanent Secretariat of the FCCC will be headquartered in Bonn, Germany.[137]

Article 11 of the FCCC provides for the financial mechanism of the convention[138] to be

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[130] *Ibid.*, Article 7(2), at 860-861.

[131] *Ibid.*, Article 17, at 869.

[132] *Ibid*, Article 9(1), at 863.

[133] *Ibid.*, Article 10(1), at 863-864.

[134] *Ibid.*, Preamble, at 852.

[135] Bodansky, *supra* note 71 at 535.

[136] FCCC, Article 8, *supra* note 4 at 862-863.

[137] *United Nations Framework Convention on Climate Change, Conference of the Parties: Decisions Adopted by the First Session (Berlin)*, March 28 - April 7, 1995, 34 I.L.M. 1671 at 1710.

[138] FCCC, *supra* note 4 at 864-865.

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funded by the developed countries listed in Annex II to the Convention, for the purpose of funding technology transfers to developing nations, and to help developing nations to meet their reporting obligations, adapt to climate change, and perform other obligations under the Convention.[139] A North-South split developed over the financial mechanism in negotiations leading to the convention. Southern or developing countries wanted a new financial mechanism not dominated by the World Bank, which is controlled by the developing countries that fund it. Developing countries were anxious to participate in the financial mechanism's decision-making processes. Northern or developed countries argued that the Global Environment Facility [GEF] should be used as it was already in existence.[140] A compromise was reached making the GEF more democratic in its governance and its activities more transparent.[141] However, important concerns remain that the GEF is operated largely by the World Bank, reputed for funding projects that are unfriendly to the environment.[142] In 1999, 35% of GEF funding pertained to climate change mitigation.[143]

In addition to establishing organizations to assist the Parties in administering and carrying out the objects of the Convention, the FCCC expressly authorizes non-parties, including governmental and non-governmental organizations [NGOs], to participate as observers, "subject

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[139] *Ibid.*, Article 4(3)-(5), (7)-(9), at 858 and Article 11(1), at 864.

[140] Bodansky, *supra* note 71 at 538 - 539.

[141] *The Global Environment Facility: Instrument Establishing*, (1994), 33 I.L.M. 1273 at 1273. The 32 members of the GEF include 16 developing countries, 14 developed countries and 2 countries with economies in transition.

[142] Barratt-Brown, Elizabeth P., Hajost, Scott A. & Sterne, John H., Jr., "A Forum for Action on Global Warming: the *UN Framework Convention on Climate Change*" (1993) 4) Colo. J. Int'l Envtl. L. & Pol'y 103 at 114, 115.

[143] Drumbl, Mark A., "Poverty, Wealth, and Obligation in International Environmental Law" (2002) 76 Tul. L. Rev. 843 at 882.

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to the rules of procedure adopted by the [COP]."[144] The attendance of NGOs at the meetings of the COP promotes transparency thereby improving public participation and the accountability of the Parties.[145]

The FCCC came into force, 21 March 1994.[146] Although it was a significant first step towards developing institutional structures to support multilateral cooperation in controlling and eventually reducing anthropogenic greenhouse gas emissions, the FCCC was a "modest" achievement in that it includes vague emission reduction commitments, imposes no sanctions for non-compliance and allows Parties to "opt out" of amendments.[147] As revealed by Annex I Party communications, the FCCC has not yet been effective in reducing most developed country anthropogenic greenhouse gas emissions and has not begun to address rapidly increasing developing country emissions.[148] Some Annex I Parties achieved or came close to reducing their emissions of anthropogenic greenhouse gases not controlled by the *Montreal Protocol*, to 1990 levels by 2000,[149] but many of the major emitters did not.[150]

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[144] FCCC, *supra* note 4, Article 7(6) at 862.

[145] Bodansky, *supra* note 71 at 534.

[146] FCCC, *supra* note 4, Article 23(1) provides that the Convention "shall enter into force on the ninetieth day after the date of deposit of the fiftieth instrument of ratification, acceptance, approval or accession."

[147] Bodansky, *supra* note 71 at 554, 555, 558.

[148] *United Nations Framework Convention on Climate Change*, "Table of National Communications," online: http://unfccc.int/resource/natcom/nctable.html. See also Barratt-Brown, *supra* note 142, at 109.

[149]Industrial production of greenhouse gases in all of the former Warsaw Pact Countries tumbled following the economic "crash"in eastern Europe in the early 1990s. These countries had no difficulty meeting their emission reduction commitments under the convention. Similarly, a united Germany achieved lower overall emissions due at least in part to the economic downturn in the former East Germany. The United Kingdom was able to achieve its FCCC target due to the widespread replacement of coal heating with natural gas. See individual country entries under the "Table of National Communications, *ibid.*

[150]Canada's anthropogenic greenhouse gas emissions increased by 2000 to almost 20% over 1990 levels. (See Matthew Bramley, "An Assessment of Alberta's Climate Change Action

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3. Negotiations Leading to the *Kyoto Protocol*

At the first Conference of the Parties [COP-1] to the FCCC, held 28 March through 7 April 1995 in Berlin,[151] the Parties agreed that the somewhat vague and unenforceable commitments of the Convention were inadequate.[152] COP-1 produced the Berlin Mandate, which identified the need for quantified emission limitation and reduction objectives [QELROs].[153] The Ad hoc Group on the Berlin Mandate [AGBM] was established at COP-1 to prepare a draft protocol in time for the third Conference of the Parties [COP-3] in Kyoto, Japan.[154]

The IPCC's Second Assessment Report [SAR], released in April 1996,[155] added momentum to negotiations leading to a Convention Protocol.[156] COP-2, held in Geneva in 1996, formally endorsed the SAR, in which the IPCC made its now famous conclusion that "the

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Plan," Pembina Institute for Appropriate Development, September 2002, at 7, online: http://www.pembina.org/pdf/publications/plan_critique020906.pdf>. This compounds Canada's challenge in meeting its subsequent Kyoto commitment.

[151] Article7(4) of the FCCC, *supra* note 4 at 862, provides that the first COP must be held "not later than one year after the date of entry into force of the Convention." Characteristic of international adherence to time deadlines under the FCCC, COP-1 began 4 days late.

[152] Vespa, *supra* note 49 at 399-400; Sands, *supra* note 4 at 369.

[153] Kosloff, *supra* note 92, at 362.

[154] Detlef Sprinz & Urs Luterbacher, (eds.), *International Relations and Global Climate Change*, 2nd Ed., Revised, (Potsdam: Potsdam Institute for Climate Impact Research, 1996), at 20, online: <http://www.pik-potsdam.de/pik_web/publications/pik_reports/reports/reports/pr.21/pr21_1.htm >.

[155] See, IPCC, *Climate Change 1995 : the Science of Climate Change* (New York : Cambridge University Press, 1996) [SAR-Science]; IPCC, *Climate Change 1995 : Impacts, Adaptations and Mitigation of Climate Change* (New York : Cambridge University Press, 1996) [SAR-Impacts]; IPCC, *Climate change 1995 : Economic and Social Dimensions of Climate Change* (New York : Cambridge University Press, 1996) [SAR-Social].

[156] C. Rolfe, "Comments on the British Columbia Greenhouse Gas Action Plan" (A Presentation to the Air and Water Management Association, 17 April 1996), online: West Coast Environmental Law Research Foundation <http://www.vcn.bc.ca/wcel/wcelpub/11026.html>.

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balance of evidence suggests a discernible human influence on global climate"[157] and that ongoing increases in greenhouse gas concentrations "will lead to dangerous interference with the climate system."[158] COP-2 also provided for the submission of emission information from developing countries beginning in 1997.

The AGBM met 8 times between COP-1 and COP-3, the latter of which was held in December 1997.[159] After negotiating through the night of December 10 - 11, 1997, 155 nations agreed at COP-3 in Kyoto, Japan to a protocol contributing to binding greenhouse gas emission reductions by 38 Annex I countries and the EU.[160]

E. *Kyoto Protocol* to the FCCC

1. Primary Focus of the *Kyoto Protocol*

The *Kyoto Protocol*'s ultimate purpose is to help fulfil Article 2 of the FCCC, to stabilize atmospheric GHG concentrations "at a level that would prevent dangerous anthropogenic interference with the climate system."[161] The *Kyoto Protocol* regulates six greenhouse gases or classes of greenhouse gases: carbon dioxide [CO_2], methane [CH_4], nitrous oxide [N_2O], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulphur hexafluoride [SF_6].[162] The Protocol is not concerned with ozone depleting greenhouse gases that have been regulated with

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[157] SAR-Science, *supra* note 155, at 5.

[158] Kosloff, *supra* note 92, at 363.

[159] Guruswamy, *supra* note 14 at 198.

[160]See P. Mansbridge et al., "Concern over Economics of Kyoto Pact," *The National Online* (CBC Television News, 11 December 1997) <http://www.tv.cbc.ca/national/trans/T971211.html>. See also *Kyoto Protocol*, *supra* note 4 at 22.

[161] FCCC, *supra* note 4 at 854.

[162] *Kyoto Protocol*, *supra* note 4, Article 3 at 33 and Annex A at 42.

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"remarkable success"[163] under the *Montreal Protocol*, such as chlorofluorocarbons [CFCs], halons, carbon tetrachloride and HCFCs.[164] Neither does the *Kyoto Protocol* apply to other significant greenhouse gases such as water vapour [H_2O] and ozone [O_3], or indirect greenhouse gases (gases that influence atmospheric concentrations of direct greenhouse gases) such as nitrogen oxides, carbon monoxide [CO], volatile organic compounds [VOCs] or aerosols.[165]

Article 3 has been referred to as the "centre, of the *Kyoto Protocol*."[166] Under this provision, Annex I parties to the FCCC, that are also parties under Annex B to the Protocol, agree to reduce their emissions of greenhouse gases regulated under the Protocol by the amounts specified in Annex B, which are generally at least 5%[167] below 1990 levels during the commitment period of 2008 through 2012.[168] Those Annex I parties in the process of transition to a market economy (i.e., former Eastern European communist economies) [economies in transition or EITs] had the option under the Protocol to set a base year other than 1990 for the purpose of calculating emission reductions.[169]

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[163] Thoms, *supra* note 44, at 795.

[164] *Montreal Protocol*, *supra* note 60.

[165] IPCC-TAR, *supra* note 85 at 43, 44.

[166] Sebastian Oberthur & Hermann E.Ott, *The Kyoto Protocol: International Climate Policy for the 21st Century*, (Berlin: Springer-Verlag, 1999) at 95.

[167] Canada negotiated a 6% emission reduction or "quantified emission limitation and reduction commitment" [QELRC]. Despite the general commitment to a QELRC of at least 5%, some countries listed in Annex B to the *Kyoto Protocol* negotiated lesser commitments. Three of these tentatively agreed to maintain their emissions at base year levels (New Zealand, Russian Federation and Ukraine), while 3 others tentatively agreed that their emissions will exceed base year levels by 1% (Norway), 8% (Australia) and 10% (Iceland). *Kyoto Protocol*, *supra* note 4, at 42.

[168] *Ibid.*, at 33.

[169] *Ibid.*, article 3(5), at 33, 34; FCCC, *supra* note 4, Article 4.6 at 858. The following EIT countries selected the following base years: Bulgaria (1989), Hungary (average for the years 1985 to 1987), Poland (1988) and Romania (1980), Conference of the Parties, *Communications from Parties included in Annex I to the Convention: guidelines, schedules and process for consideration*, Dec. 9/CP.2, UNFCCCOR, 2nd Sess., UN Doc. FCCC/CP/1996/15/Add.1 (1996)

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Once again, these basic commitments are underlain by principles found in the Rio Declaration[170] and reflect a hard-fought international compromise. The emission reductions commitments of the *Kyoto Protocol* were born out of respect for the precautionary principle[171] and a basic concern for environmental protection, intergenerational equity[172] and common but differentiated responsibilities.[173] Article 3 is clothed in some of the trappings of sustainable development reflected in Rio principles 1, 3, 7 and 8. However, due to the current inadequacy of the commitments[174] in article 3, which will be examined below, the Protocol is partially but not yet fully consistent with the Rio's version of the *sic utere*[175] ("good neighbour") or the "polluter pays" principles.[176]

Some of the first to ratify the *Kyoto Protocol* were small island states[177] that are particularly threatened with storm surge flooding or submersion if ocean levels rise due to thermal expansion of ocean water and the melting of land-based polar ice sheets.[178] Most Annex I parties have ratified the Protocol, with the exception of the United States of America [USA],

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clause 5 at 16, online: UNFCCC <http://unfccc.int/resource/docs/cop2/15a01.pdf>. Slovenia subsequently selected (1986) as a base year. Conference of the Parties, *National communications from Parties included in Annex I to the Convention*, Dec. 11/CP.4, UNFCCCOR, 4th Sess., UN Doc. FCCC/CP/1998/16/Add.1 (1999) clause 13 at 50, online: UNFCCC <http://unfccc.int/resource/docs/cop4/16a01.pdf>.

[170] Rio Declaration, *supra* note 17.

[171] *Ibid.*, Principle 15.

[172] *Ibid.*, Principle 3.

[173] *Ibid.*, Principles 7 and11.

[174] See discussion *infra* at 78-80.

[175] Rio Declaration, *supra* note 17, Principle 2.

[176] *Ibid.*, Principle 16.

[177] Canada, Commissioner of the Environment for Sustainable Development, "Climate Change and Energy Efficiency: A Progress Report, " 2001 Report to the Parliament of Canada (Ottawa: Office of the Auditor General, 2001), Chapter 6, paragraph 6.27.

[178] Barratt-Brown, *supra* note 142, at 105.

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Australia and Monaco.[179] Canada ratified the *Kyoto Protocol* on 12 December 2002.[180]

The *Kyoto Protocol* provides that it comes into force 90 days after at least 55 parties to the FCCC have deposited instruments of ratification, acceptance, approval or accession [ratification], including Annex I parties that account for at least 55% of the total 1990 Annex I greenhouse gas emissions.[181] Due to the ratification by the Russian Federation, the Protocol came into force on 16 February 2005.[182] As of 18 November 2004, 127 countries plus the European Union [EU] had ratified the Protocol, including 30 Annex I parties responsible for 61.6% of that group's 1990 greenhouse gas emissions.[183]

The world's leading greenhouse gas emitter, the USA (responsible for 36.1% of 1990 global greenhouse gas emissions among Annex I countries), does not intend to ratify the Protocol. Although the Clinton administration was supportive, doubts of USA participation in the protocol then under negotiation, loomed after the United States Senate voted 95 to 0 in July 1997 under the Byrd-Hagel resolution against ratifying any protocol under the Convention if developing countries are excluded from meaningful greenhouse gas reduction commitments, or if the protocol were to cause serious harm to the USA economy.[184] President George W. Bush announced in 2002 that the USA will not seek to ratify the Protocol under the current economic

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[179] UNFCCC, "*Kyoto Protocol* Status of Ratification," UNFCCC online: <http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf>.

[180] Tamara Harswick, "Developments in Climate Change," (2002) Colo. J. Int'l Envtl. L. & Pol'y 25 at 31.

[181] *Kyoto Protocol*, *supra* note 4, Article 24(1) (now Article 25(1)) at 43.

[182] Formal ratification by the Russian Federation took place on 18 November 2004. FCCC, Press Release, "*Kyoto Protocol* to Enter into Force 16 February 2005" (18 November 2004), online: *United Nations Framework Convention on Climate Change* <http://unfccc.int/files/press/news_room/press_releases_and_advisories/application/pdf/press041118_eng.pdf>.

[183] *Kyoto Protocol* Status of Ratification, *supra* note 179.

[184] Harris, *supra* note 43 at 36, 37.

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climate and as long as less developed nations are not required to reduce greenhouse gas emissions.[185] The USA remains "steadfastly opposed"[186] to the *Kyoto Protocol* and is not likely to change its position prior to the beginning of the *Kyoto Protocol* commitment period in 2008. As the world's largest emitter of greenhouse gases, the failure of the USA to participate is a major stumbling block to the success of the *Kyoto Protocol*.[187]

In addition to the specific emission reduction targets agreed to under Article 3, each Annex I party to the FCCC agrees to "have made demonstrable progress in achieving its commitments under this Protocol" by 2005.[188] Perhaps surprisingly, the Annex I parties who have ratified the *Kyoto Protocol* are *collectively* on track to achieve their Kyoto commitment. However, this is due to 2002 greenhouse gas emissions in EITs being almost 40% below 1990 levels.[189] In contrast, 2002 emissions from the non-EIT Annex I parties were on average 8.4% above 1990 levels.[190] Of the non-EIT Annex I countries, only Luxembourg (-19.8%), Germany[191] (-18.6%), United Kingdom (-14.5%) and Iceland (-4.2%) had in 2002, emissions sufficiently

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[185] S. Chase, "Canada shouldn't ratify Kyoto, U.S. envoy says,"*Globe and Mail*, Saturday, January 26, 2002, Page A10.

[186] "Global Warming," *Economist.com*, 12 November 2004, online: <http://www.economist.com/research/backgrounders/displaybackgrounder.cfm?bg=1010789 >.

[187] Harswick, *supra* note 180, at 33.

[188] *Kyoto Protocol*, Article 3.2, *supra* note 4 at 33.

[189] According to the FCCC website, collectively, emissions from Annex I parties were 6.3% lower in 2002 than they were in 1990, FCCC, "Trends in aggregate greenhouse gas emissions, 1990-2002," online: <http://unfccc.int/files/home/ghg/application/pdf/greenhouse_gas_emissions_1990-2002.pdf>

[190] *Ibid.*

[191] Germany's success is due primarily to what has been called "hot air" or "wall-fall profits," generated from the amalgamation of West Germany with the former, communist German Democratic Republic. See Oberthur & Ott, *supra* note 166 at 143.

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below 1990 levels to be on track to reach their Kyoto commitments.[192] Unfortunately, with 2002 greenhouse gas emissions from Spain and Portugal each being 40.5% above 1990 levels,[193] the EU will be challenged to meet its collective obligation. In 2002, Canada was 20.1% above its 1990 emission levels.[194] The ability (or lack thereof) of Annex I countries to show demonstrable progress by 2005 in achieving their Kyoto commitments, will likely affect negotiations over commitments required in the second commitment period beyond 2012.[195] Annex I parties are required to submit a report to the COP respecting their progress under Article 3.2 by 1 January 2006.[196]

2. Carbon Sinks and Flexibility Mechanisms

An Annex I country is expected to achieve most of its Kyoto commitment by reducing greenhouse gas emissions domestically.[197] However, the *Kyoto Protocol* provides a number of

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[192] FCCC, "Total aggregate greenhouse gas emissions of individual Annex I Parties, 1990-2002," online: <http://unfccc.int/files/home/ghg/application/pdf/greenhouse_gas_emissions_anx1_1990-2002.pdf>.

[193] *Ibid.*

[194] *Ibid.*

[195] Oberthur & Ott, *supra* note 166, at 124.

[196] Conference of the Parties, *Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol,* Dec. 22/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.3 (2002) paragraph 4 at 14,15, online: UNFCCC <http://unfccc.int/resource/docs/cop7/13a03.pdf>. The report is to include: "(a) A description of domestic measures, including any legal and institutional steps to prepare to implement its commitments under the *Kyoto Protocol* to mitigate greenhouse gas emissions, and any of its programmes for domestic compliance and enforcement; (b) Trends in, and projections of, its greenhouse gas emissions; (c) An evaluation of how such domestic measures, in light of these trends and projections, will contribute to the Party's meeting its commitments under Article 3; (d) A description of the activities, actions and programmes undertaken by the Party in fulfilment of its commitments under Articles 10 and 11."

[197] *Kyoto Protocol, supra* note 4, Article 3.1 at 33; and Conference of the Parties, *Principles, nature and scope of the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol,* Dec. 15/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.2 (2002) clause 1 at 3, online: UNFCCC <http://unfccc.int/resource/docs/cop7/13a02.pdf>.

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mechanisms that allow an Annex I country to take credit for CO_2 removed from the atmosphere through carbon sequestration activities at home[198] or for certain emission reductions or carbon sequestration it carries out in another country.[199] Carbon sequestration involves the removal of CO_2 from the atmosphere by storing it in carbon sinks.[200] According to generally accepted climate theory, a tonne of CO_2 removed from the atmosphere anywhere on the planet is equivalent to a reduction of one tonne of CO_2 emissions at home.[201]

Flexibility mechanisms under the *Kyoto Protocol* include bubbling,[202] Joint Implementation [JI] projects[203] in other Annex I countries, Clean Development Mechanism [CDM] projects[204] in developing countries and the trading of emission credits [emission trading].[205]

a. Land Use, Land Use Change and Forestry [LULUCF] (Sinks)

Under the *Kyoto Protocol*, an Annex I party can receive credit for natural processes that sequester atmospheric carbon in sinks. The term "sink" is defined in Article 1 of the FCCC as "any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor

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[198] *Ibid.*, Article 3.3 at 33.

[199] See discussions on Joint Implementation and the Clean Development Mechanism, *infra*, at 63-68.

[200] IPCC, *Climate Change 2001: Impacts, Adaptation, and Vulnerability*, contribution of Working Group II to the Third Assessment Report of the IPCC (Cambridge: Cambridge University Press, 2001) [IPCC WGII] at 993.

[201] Vespa, *supra* note 49 at 401. The anthropogenic planting of trees is known as afforestation (the planting of trees where they have been absent for a considerable period) or reforestation (the planting of trees to replace those harvested or lost to fire).

[202] *Kyoto Protocol*, Article 4, *supra* note 4 at 34, 35; Oberthur & Ott, *supra* note 166 at 141-150. See discussion on "bubbling," below, at 35-36.

[203] *Kyoto Protocol*, *ibid.*, Article 6, at 35; Oberthur & Ott, *Ibid.*, at 151-163.

[204] *Kyoto Protocol*, *ibid.*, Article 12, at 38; Oberthur & Ott, *Ibid.*, at 165-185.

[205] *Kyoto Protocol*, *ibid.*, Article 17 (originally Article 16 *bis*), at 40; Oberthur & Ott, *Ibid.*, at 187-205.

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of a greenhouse gas from the atmosphere."[206] In the *Kyoto Protocol* context, carbon sequestration involves the removal of CO_2 from the atmosphere by plants through photosynthesis[207] and soil management strategies that leave plant carbon in the soil for longer periods.[208]

The IPCC concluded in 1996 that forest sinks alone could offset from 12 - 15% of anthropogenic fossil fuel emissions.[209] However, concerns arise over the temporary nature of carbon stored in plant material and the problem of measuring and accounting for gains and losses to forest-sequestered carbon.[210] Article 3.3 of the Protocol provides for the netting of emission sources with carbon sinks "resulting from direct human-induced land use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990."[211] Article 3.4 provides that each Annex I party must establish to the SBSTA, data on its 1990 carbon stocks in sinks, and provides for the Meeting of the Parties to the *Kyoto Protocol* [MOP] to establish "modalities, rules and guidelines" for non-forest carbon sinks to be considered in the current and subsequent commitment periods.[212]

At COP-7 in Marrakech, the parties formalized draft LULUCF rules and guidelines agreed to earlier at Bonn at COP-6 *bis*, for adoption by the MOP after the *Kyoto Protocol* comes

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[206] FCCC, *supra* note 4, at 854.

[207] Virtually all plant material will eventually die and decompose, releasing CH_4 and CO_2 into the atmosphere, Oberthur & Ott, *supra* note 166 at 132.

[208] *Ibid.*, at 131.

[209] *Ibid.*, at 167.

[210] *Ibid.* See also Stephanie M.Haggerty, "Legal Requirements for Widespread Implementation of CO_2 Sequestration in Depleted Oil Reservoirs" (2003) 21 Pace Envtl. L. Rev. 197 at 213; and Steffen Kallbekken and Asbjørn Torvanger, "Can geological carbon storage be competitive?," Center for International Climate and Environmental Research, CICERO Working Paper 2004:05, at online: <http://www.cicero.uio.no/media/2735.pdf>.

[211] *Kyoto Protocol*, *supra* note 4 at 33.

[212] *Kyoto Protocol*, *supra* note 4 at 33.

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into force.[213] Due to uncertainties surrounding accounting for sinks, concerns over undue reliance upon sinks, and the temporary nature of most sinks, the draft rules set out important foundation principles designed to mitigate these risks. These principles include: the need to rely on sound science; the need for consistent methods of estimating and reporting on forestry activities; the importance of timing in accounting for removals of CO_2; and, that accounting not include removals resulting from elevated levels of CO_2 in the atmosphere, indirect nitrogen deposition and the impact of forest age tied to events that took place before the reference year.[214] In addition to accounting for CO_2 additions or removals through anthropogenic forestry activities, the annex to the draft decision permits Annex I parties to elect to account for net human-induced sources or sinks arising from revegetation projects, forest management, cropland management and grazing land management.[215] The election, once made, is irreversible during the first commitment period.

Through hard bargaining at COP-7 held in Marrakech, 29 October through 10 November 2001, members of the umbrella group[216] leveraged important concessions over LULUCF sinks from the other parties to the Protocol.[217] Unfortunately, many parties and observers felt that principles underlying the integrity of the *Kyoto Protocol* had been compromised to placate members of the umbrella group.[218] COP-7 in Marrakech set an annual limit for each Annex I

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[213] Conference of the Parties, *Land use, land-use change and forestry*, Dec. 11/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.1 (2002) [Dec. 11/CP.7] at 54, online: UNFCCC <http://unfccc.int/resource/docs/cop7/13a01.pdf>.

[214] *Ibid.*, paragraph 1 at 56.

[215] *Ibid.*, Annex, paragraphs 6 and 7 at 59.

[216] The umbrella group consists of members of JUSSCANNZ (which includes Japan, USA, Switzerland, Canada, Australia, Norway and New Zealand) plus the Russian Federation.

[217] International Institute for Sustainable Development, "Summary of the Seventh Conference of the Parties to the *UN Framework Convention on Climate Change*: 29 October - 10 November 2001," Earth Negotiations Bulletin, Vol. 12, No. 189, at 1, 14-16, online: <http://www.iisd.ca/linkages/download/pdf/enb12189e.pdf>.

[218] *Ibid.*, at 15, 16.

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country of the amount of net sources or sinks from forest management activities (including those from Joint Implementation activities under Article 6 of the Protocol). [219] With the exception of Canada, Japan and the Russian Federation, limits for most countries are modest. For example, fairly large countries such as France, Spain and Ukraine, are allowed a maximum of 0.88, 0.67 and 1.11 Mt C/yr, respectively. However, Canada is allowed 12 Mt C/yr, Japan, 13 and the Russian Federation 33.[220]

b. Bubbling

Articles 3.1 and 4 allow Annex I parties to act jointly in achieving emission reduction commitments under the *Kyoto Protocol*.[221] Basically, this process, referred to as "bubbling" allows each member of a regional economic integration organization [REIO] or other group of Annex I countries to be deemed to comply with their *Kyoto Protocol* commitments if the group achieves its combined emission reduction target equal to the sum of the assigned amounts for all participants in the group. Each participating member of a bubble organization must notify the Secretariat of its participation.[222] These pooling arrangements must be maintained until the end of 2012.[223] Bubbling provides similar benefits to emissions trading (primarily being flexibility and cost-effectiveness)[224] without the conditions or safeguards imposed by the COP on emissions

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[219] Dec. 11/CP.7 *supra* note 214, Annex, paragraphs 10 and 11 at 60, Appendix at 63. COP-7 formalized the agreement reached earlier in Bonn at COP-6 bis.

[220] *Ibid.*, Appendix at 63. The limit for net forest sinks for the Russian Federation was increased substantially at COP-7, Conference of the Parties, *Land use, land-use change and forestry*, Dec. 12/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.1 (2002) at 64, online: UNFCCC <http://unfccc.int/resource/docs/cop7/13a01.pdf>.

[221] *Kyoto Protocol supra* note 4, Articles 3.1 at 33 and 4 at 34.

[222] *Ibid.*, Article 3.2 at 33.

[223] *Ibid.*, Articles 4.3 and 3.7 at 34.

[224] Oberthur & Ott, *supra* note 166 at 141.

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trading.[225] However, a significant consequence of a bubbling arrangement is that should the pooling group fail to meet its combined emission reduction requirements, each party to the arrangement will be responsible for meeting its individual *Kyoto Protocol* commitment.[226]

The EU ratified the *Kyoto Protocol* as a separate party and EU members undertook to achieve their commitments jointly. Bubbling must be adopted by the parties to the bubble agreement at the time of the party's ratification of the Protocol.[227] Each of the 10 new EU members (including 8 EITs) that joined the EU at the beginning of 2004 ratified the Protocol before joining the EU and, therefore, are not eligible to be part of the EU bubble during the first commitment period. According to the magazine *Environment*, "[a]s early as the Kyoto conference itself, the USA, Japan, Canada, Australia, New Zealand, and Russia were engaged in bubble negotiations" but these negotiations were later abandoned.[228] No other group (besides the EU) has elected to act jointly under Article 4, whether as an REIO or otherwise, to achieve the group's combined Kyoto commitments.

c. Joint Implementation [JI] and the Clean Development Mechanism [CDM]

Article 6 of the *Kyoto Protocol* permits Annex I countries to agree to transfer emission reduction units [ERUs] among themselves, resulting from projects that reduce emissions or enhance sinks.[229] This process has been described as "Joint Implementation" or "JI," although these terms are not used in the *Kyoto Protocol*. Article 12 of the *Kyoto Protocol* describes a

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[225] *Ibid.* See discussion of conditions imposed on emissions trading by the COP, *supra*, at 70-71.

[226] *Kyoto Protocol*, *supra* note 4, Article 4.5 at 34

[227] *Ibid.*, Article 4.4 at 34.

[228] *Environment*, Jul/Aug 1998, Vol. 40 Issue 6, at 16.

[229] *Kyoto Protocol*, *supra* note 4 at 35.

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sister concept similar to JI, called the CDM,[230] involving a "project-based joint implementation between industrialised and developing countries."[231] The JI and CDM flexibility mechanisms were closely tied throughout negotiations leading to the *Kyoto Protocol*[232] and both are outgrowths of the Activities Implemented Jointly [AIJ] pilots conducted under the FCCC.[233] The primary benefits and purposes of JI and the Clean Development Mechanism projects are to reduce the cost of compliance for Annex I countries while simultaneously, increasing investment in and the transfer of environmentally-friendly technologies to, EIT and developing countries.[234]

Article 6 imposes a number of requirements on JI projects, including the following:

- all parties involved in a JI project must approve the project;[235]
- emission reductions or sink enhancements produced by the project must be "additional to any that would otherwise occur" [additionality] and "supplemental to domestic actions";[236]
- only parties in compliance with emission reporting requirements of Articles 5 and 7 may participate in JI projects;[237]
- if any questions over a party's implementation of or compliance with the *Kyoto Protocol* are raised under Article 8, the questions must be resolved by the COP serving as the

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[230] *Kyoto Protocol*, *supra* note 4 at 38.

[231] Oberthur & Ott, *supra* note 166 at 165.

[232] *Ibid.*

[233] Glenn M. Wiser, " The Clean Development Mechanism Versus the World Trade Organization: Can Free-market Greenhouse Gas Emissions Abatement Survive Free Trade?" (1999) 11 Geo. Int'l Envtl. L. Rev. 531, at 572.

[234] *Ibid.*, at 535-536.

[235] *Kyoto Protocol*, *supra* note 4, Article 6.1(a).

[236] *Ibid.*, Article 6.1(b), (d),.

[237] *Ibid.*, Article 6.1(c).

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MOP to the Protocol before that party can use ERUs transferred under Article 6 to count towards compliance with its Kyoto commitment.[238]

Guidelines on implementation of JI, adopted at COP-7 in Marrakech in 2001,[239] are to be considered by the first MOP,[240] to be held at COP-11/MOP-1, in Montreal in December 2005.

According to Article 12 of the Protocol, "[t]he purpose of the [CDM is] to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention."[241] The CDM benefits an Annex I country by allowing it to obtain Certified Emission Reductions [CERs], which it can use to offset its greenhouse gas emissions.[242] The non-Annex I, developing country hosts benefit from economic development and the transfer of environmentally cleaner technology,[243] while developing countries that are particularly vulnerable to climate change impacts may benefit from a CDM project fee to be used in part to fund adaptation measures in those vulnerable countries.[244] CERs from approved CDM projects may be credited from the year 2000.[245]

The CDM differs from JI in that CERs are not subtracted from the assigned amount of the host country because the host countries have no emission reduction commitments and no

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[238] *Ibid.*, Article 6.4, 8, at 35, 36.

[239] Conference of the Parties, *Guidelines for the implementation of Article 6 of the Kyoto Protocol,* Dec. 16/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.2 (2002) [Dec. 16/CP.7] Appendix B at 5-19, online: UNFCCC <http://unfccc.int/resource/docs/cop7/13a02.pdf>.

[240] *Kyoto Protocol*, *supra* note 4, Article 6.2 at 35.

[241] *Ibid.*, at 38.

[242] Oberthur & Ott, *supra* note 166 at 165.

[243] *Ibid.*

[244] *Ibid.* At 167.

[245] *Ibid.* At 165.

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assigned amounts.[246] Further, Article 12 of the Protocol does not refer to sinks as does Article 6. However, decisions made at COP-9 in 2003 in Milan permit CDM projects to engage in afforestation and reforestation projects, within specified limitations.[247] The principal limitation is that CERs from such afforestation and reforestation projects must not exceed 1% of the Annex I country's base year emissions.[248] The CDM must involve sustainable development projects that provide "[r]eal, measurable, and long-term benefits related to the mitigation of climate change . . . and [r]eductions in emissions that are additional to any that would occur in the absence of the certified project activity."[249] A CDM project should provide development and for the transfer of important environmental technologies to less industrialized countries that may not otherwise be able to afford them, and perhaps contribute to better North-South cooperation and understanding.[250]

JI and the CDM have been criticised because they permit industrialized nations, which have contributed the bulk of anthropogenic greenhouse gas emissions, to avoid investments in climate friendly technologies or avoid reducing emissions at home.[251] Another key concern with

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[246] *Ibid.* At 169.

[247] Conference of the Parties, *Modalities and procedures for a clean development mechanism as defined in Article 12 of the Kyoto Protocol*, Dec. 17/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.2 (2002) [Dec. 17/CP.7] paragraph 7 at 22, UNFCCC online: <http://unfccc.int/resource/docs/cop7/13a02.pdf>.

[248] *Ibid.*

[249] *Kyoto Protocol*, *supra* note 4, Article 12.5 at 38.

[250] See R.K Chung,., "The Role of Government in the Transfer of Environmentally Sound Technology," and, J. Chin, "The *Framework Convention on Climate Change*: A General Overview of Innovative Approaches to Technology Transfer," in T. Forsyth, ed., *Positive Measures for Technology Transfer under the Climate Change Convention*, (London: Royal Institute of International Affair; and Washington, D.C.: Brookings Institutions, 1998), 47-62; 77-98, compiled into "Technology Transfer and the Climate Change Debate" *Environment* 40:9 (November 1998) 16.

[251] Nanda, *supra* note 85 at 326.

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JI and CDM projects is determining whether the project produces greenhouse gas emission reductions or sink enhancements that would not occur if the project were not undertaken.[252]

High transaction costs resulting from one-off project identification, the need to bring together investors, sponsors, and host countries, and negotiating and framing individualized project agreements, are of concern to all parties involved in JI and CDM projects.[253] This competes against one of the principal benefits of JI and CDM projects–to reduce the cost of compliance.[254] However, transactions costs may be lowered by gaining experience through participation in multiple JI and CDM projects, by using proven project brokers, and by the establishment of emissions baselines by developing countries hoping to attract CDM projects.[255]

Although requiring further clarification, "criteria for baseline setting and monitoring" were established at COP-7 in Marrakech in 2001.[256] These criteria require setting an emissions baseline for a JI project "that reasonably represents the anthropogenic emissions by sources or anthropogenic removals by sinks of greenhouse gases that would occur in the absence of the proposed project." "Project participants [must] justify their choice of baseline," "taking into account . . . uncertainties and using conservative assumptions," such that "ERUs cannot be earned for decreases in activity levels outside the project activity or due to *force majeure.*"[257]

Another important problem associated with JI and CDM projects is that of project

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[252] See Articles 6.1(b) and 12.5(c) of the *Kyoto Protocol*, *supra* note 4, at 35, 38; Oberthur & Ott, *supra* note 166 at 152. See also *supra* note 51 at xv, where Chris Rolfe indicates that "a project is not additional if it does not represent a change from business as usual."

[253] Oberthur & Ott, *supra* note 166 at 151; Richard B. Stewart, James L. Connaughton & Lesley C. Foxhall, "Designing an International Greenhouse Gas Emissions Trading System" (2001) 15-WTR Nat. Resources & Env't 160 [Stewart, et al.] at 203.

[254] Wiser, *supra* note 233 at 535-536.

[255] *Ibid.*, at 544, 545, 551.

[256] Dec. 16/CP.7, *supra* note 239 at 18, 19.

[257] *Ibid.*

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leakage.[258] According to Glen M. Wiser, "[L]eakage occurs when the emissions-producing activity mitigated by a project simply moves somewhere else, so that no net emissions reductions are actually achieved."[259]

If an Annex I OECD country uses JI or CDM projects to undertake more cost-effective projects in EIT or developing countries, the OECD country reduces pressure for technological innovation at home and may make future emission reductions in the EIT or developing country more difficult and expensive.[260] It has been argued that CDM projects may amount to a form of neo-colonialism, by using a developing country to meet its own national development priorities.[261] This argument may be diffused, however, by the fact that developing countries lobbied strongly for inclusion of the CDM in the *Kyoto Protocol*, for the economic investment and scope for technology transfer that such projects enable. Further, the *Kyoto Protocol* requires that both JI and CDM projects require the consent of the host country,[262] inferring that only mutually beneficial projects will be approved. Another potential problem surrounding JI and CDM projects is the risk of collusion among parties to make a project appear to produce more greenhouse gas reduction benefits than it does in reality.[263]

d. Emissions Trading

The provision incorporating emissions trading was the last to be added to, but has become one of the most important elements of, the *Kyoto Protocol*.[264] It allows Annex B parties

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[258] Oberthur & Ott, *supra* note 166 at 152.

[259] Wiser, *supra* note 233, at 548.

[260] Oberthur & Ott, *supra* note 166 at 152.

[261] *Ibid.*

[262] *Kyoto Protocol*, *supra* note 4, Articles 6.1(a) and 12.5(a), at 35 and 39, respectively.

[263] Oberthur & Ott, *supra* note 166 at 152.

[264] *Kyoto Protocol*, *supra* note 4, Article 16 *bis* (now 17) at 40.

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to trade excess Assigned Amount Units [AAUs],[265] ERUs,[266] CERs[267] and Removal Units [RMUs][268] [collectively referred to below as emission units][269] to enable these parties to meet the emission reduction requirements listed in Annex B.[270] Article 17 (originally 16 *bis*) of the Protocol provides:

> The Conference of the Parties shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions trading. The Parties included in Annex B may participate in emissions trading for the purposes of fulfilling their commitments under Article 3 of this Protocol. Any such trading shall be supplemental to domestic actions for the purpose of meeting quantified emission limitation and reduction commitments under that Article.[271]

The inclusion of emissions trading was essential to the USA, fundamental to the JUSSCANNZ[272] group, supported by the UK, distrusted by most EU countries and vigorously opposed by China, India and other developing countries[273] because the latter felt emissions

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[265] An Annex I country's AAUs are the amount of greenhouse gas emissions permitted under the *Kyoto Protocol* during the commitment period.

[266] "ERUs" refers to Emission Reduction Units, obtained through JI projects.

[267] The term CERs means Certified Emission Reductions, obtained through CDM projects.

[268] RMUs are obtained through actions to increase LULUCF sinks.

[269] According to the Conference of the Parties, *Modalities, rules and guidelines for emissions trading under Article 17 of the Kyoto Protocol*, FCCC Dec. 18/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.2 (2002) [Dec. 18/CP.7], Annex, paragraph 1 at 52, online: UNFCCC <http://unfccc.int/files/kyoto_mechanisms/cdm/application/pdf/13a02.pdf#page=50>, each AAU, ERU, CER or RMU "is equal to one metric tonne of carbon dioxide equivalent, calculated using global warming potentials defined by decision 2/CP.3 or as subsequently revised in accordance with Article 5."

[270] *Kyoto Protocol*, *supra* note 4, Articles 16 *bis* (now 17) and 3.11, 3.12, 3.13 and 6.

[271] *Ibid.*

[272] *Supra* note 216.

[273] Oberthur & Ott, *supra* note 166 at 190-191.

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trading created a transferable "right to pollute."[274] Developing countries tacitly conceded to the inclusion of what is now Article 17 in exchange for the removal of all references in the Protocol to voluntary commitments by developing country parties.[275]

Some fear that the availability of emissions trading will remove incentives for early action.[276] Critics justifiably assert that allowing industrialized countries to purchase what has been dubbed "hot air"[277] without restrictions, undermines the purpose of the Protocol.[278] Annex II countries[279] such as Canada can avoid large domestic greenhouse gas emission reductions by purchasing plentiful emission credits at low cost from Russia and Ukraine. Those relying extensively on emissions trading to meet their Kyoto target are likely to incur significant purchase costs, but emissions trading provides considerable flexibility to industrialized nations in achieving their emission reduction commitments.[280]

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[274] Anastasia Telesetsky, "Annual Review of Environmental and Natural Resource Law International Law Treaties: The *Kyoto Protocol*" (1999) Ecology L.Q. 797 at 805. Developing countries resented the fact that emissions trading would allow industrialized countries to continue to emit prodigious amounts of greenhouse gases while asking developing countries to make commitments to maintain their emissions at traditional, low levels, thwarting critically needed future development opportunities, Oberthur & Ott, *supra* note 166 at 189.

[275] Oberthur & Ott, *ibid.* at 190-191.

[276] *Ibid.*, at 198.

[277] Greenhouse gas emissions in the Russian Federation and Ukraine decreased by 37 percent and 55 percent, respectively, between 1990 and 1998 due to an economic downturn and the end of subsidies to large industrial emitters. The resulting emissions trading opportunity for these countries is called "hot air" because it will lead to higher global emissions than if these emission units were not traded. See Vespa, *supra* note 49 at 403.

[278] The purpose of the *Kyoto Protocol* as expressed in the preamble, *supra* note 4, at 32, is to promote the "ultimate objective of the Convention as stated in its Article 2," which, in turn, is to achieve "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

[279] Annex II to the FCCC includes those countries listed in Annex I but excludes the EIT countries, *supra* note 4, at 873.

[280] Gary C. Bryner, "Carbon Markets: Reducing Greenhouse Gas Emissions Through Emissions Trading" (2004) 17 Tul. Envtl. L.J. 267 at 279.

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An Annex B party may participate in emissions trading, if:

- it meets the requirements specified by the COP, which include: accounting for its baseline year and subsequent emissions as prescribed by the COP under *Kyoto Protocol* Articles 3.7, 3.8 and 5.1;
- it has a national registry as required by guidelines issued under Article 7.4;
- it has submitted its most recent national inventory as required under Articles 5.2 and 7.1;
- the Party submits supplemental information as required under Articles 3.3, 3.4, 3.8, 3.8, 7.1 and 7.4; and
- the Party only transfers emission units it does not require for meeting its own emission reduction commitment.[281]

Each party transferring emission units is required to maintain a commitment period reserve equal to the lower of 90 per cent of its assigned amount or 100 per cent of its most recent greenhouse gas emissions.[282] Fundamentally, this means that very few states other than the EIT countries will be able to transfer emissions units to others on the international market. Apart from these limitations, the COP has endeavoured to "provide a standard, uniform, fungible commodity for trading."[283]

Ironically, emissions trading was included in the Protocol at the insistence of the USA, which has considerable domestic emissions trading experience. However, the Parties to the *Kyoto Protocol* designing, operating and using the regime, have little experience with emissions

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[281] FCCC Dec. 18/CP.7, *supra* note 269, Annex, paragraph 3 and 5 at 52-54.

[282] *Ibid.*, Annex, paragraph 6 at 54

[283] Stewart et al., *supra* note 253 at 162.

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trading at either the domestic or international level.[284] Other than participating in a few greenhouse gas emissions trading pilot schemes, Canada has little experience with domestic and international emissions trading but may have to rely heavily on emission unit purchases to achieve its Kyoto commitment.[285]

3. Financial, Educational and Technical Assistance to Developing Countries

Provisions in the FCCC and its *Kyoto Protocol* regarding capacity-building, financial assistance and technology transfer are constructed upon the principle of common but differentiated responsibilities, reflected in Rio Declaration Principle 7 [286] and cited in Articles 4 of the FCCC[287] and 10 of the *Kyoto Protocol*.[288] As Mark Drumbl pointed out:

> noncompliance yields the same result as nonratification. As a result, the building of 'capacity' to comply with multilateral agreements is becoming an important area of political and scientific focus. In fact, capacity-building has become so central to international environmental diplomacy that many developing countries . . . particularly lacking in capacity, are demanding that, before they make any multilateral commitments, developed nations must commit to the provision of financial resources and technical transfer.[289]

The purpose of capacity building under the "Framework for capacity building in developing countries" [the Framework] is "to promote sustainable development in developing countries through the effective implementation of the Convention and preparation for their effective participation in the *Kyoto Protocol* process."[290] Least developed countries, including

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[284] Oberthur & Ott, *supra* note 166, at 187.

[285] See chapters 5 and 6, *infra*.

[286] *Supra* note 17.

[287] FCCC, *supra* note 4, at 855.

[288] *Kyoto Protocol*, *supra* note 4, at 36-37.

[289] Drumbl, *supra* note 143 at 852.

[290] Conference of the Parties, *Capacity building in developing countries (non-Annex I Parties)*. Dec. 2/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.1 (2002) 5 [Dec. 2/CP.7], Annex, paragraph 4 at 8, UNFCCC online: <http://unfccc.int/resource/docs/cop7/13a01.pdf#page=5>.

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small island states are the most vulnerable to extreme weather and have the least capacity to respond to climate change.[291] Annex II countries are expected to provide financing through the GEF and technology to implement the Framework, particularly in least developed countries and small island states.[292]

Under Article 11 of the Protocol, Annex II countries agree to fund the agreed full cost of developing country greenhouse gas inventories required under Articles 4.1(a) of the FCCC and 10(a) of the Protocol[293] Annex II countries also agree to provide unspecified funding to support research, public education, sustainable management and the transfer of environmentally sound technologies to assist in a minor way with developing country climate change mitigation and adaptation planning.[294]

Under the Buenos Aires Plan of Action [BAPA], agreed to at COP-4 held in Buenos Aires in 1998, the COP selected the "restructured" GEF to operate the financial mechanism referred to in Convention Article 11.[295] The COP also concluded that the GEF should provide funding to developing countries to: "implement adaptation response measures under Article 4.1 of the Convention"; identify and submit their technology needs to the COP; increase their capacity to participate in systematic observational networks as per Article 5 of the Convention; fund the costs of national communications under Articles 4.3 and 12.5 of the Convention; assist them with studies on national programmes to address climate change and help with public

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[291] *Ibid.*, paragraph 17 at 11.

[292] *Ibid.*, paragraphs 20, 21 at 12.

[293] *Kyoto Protocol, supra* note 4, Article 11.2 at 37, 38.

[294] *Ibid.*

[295] Conference of the Parties, *Review of the financial mechanism,* Dec. 3/CP.4, UNFCCCOR, 4th Sess., UN Doc. FCCC/CP/1998/16/Add.1 (1998) 8 [Dec. 3/CP.4], UNFCCC online: <http://unfccc.int/resource/docs/cop4/16a01.pdf#page=8>.

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education and awareness of climate change.[296] The COP also invited the GEF to improve the effectiveness of its operations relating to climate change and provide for GEF accountability to the COP.[297]

Close to US $2 billion in funding has been provided through the GEF on climate-related activities since 1991.[298] In recent years, the COP has requested the GEF to work more effectively with it[299] and to continue to provide financing respecting: national communications by non-Annex I countries, capacity building in non-Annex I and EIT countries, climate change education, global climate observation systems,[300] and technology transfer to non-Annex I countries.[301]

The parties to the Protocol at COP-6 *bis* held in Bonn in 2001, agreed to establish a Special Climate Change Fund to finance climate change programmes complementary to those funded by the GEF, in the areas of adaptation, technology transfer, energy use, agriculture, forestry, waste management and assisting developing countries that are particularly dependent on

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[296] Conference of the Parties, *Additional guidance to the operating entity of the financial mechanism,* Dec. 2/CP.4, UNFCCCOR, 4th Sess., UN Doc. FCCC/CP/1998/16/Add.1 (1998), at 5,6 [Dec. 2/CP.4], UNFCCC online <http://unfccc.int/resource/docs/cop4/16a01.pdf#page=5>.

[297] *Ibid.*, at 7.

[298] UNFCCC Secretariat, "GEF Trust Fund," UNFCCC online: <http://unfccc.int/cooperation_and_support/funding/financial_mechanism/items/1061.php>.

[299] Conference of the Parties, *Review of the financial mechanism,* Dec. 5/CP.8, UNFCCCOR, 8th Sess., UN Doc. FCCC/CP/2002/7/Add.1 (2003) at 13, UNFCCC online: <http://unfccc.int/resource/docs/cop8/07a01.pdf#page=13>.

[300] Conference of the Parties, *Additional guidance to an operating entity of the financial mechanism,* Dec. 4/CP.9, UNFCCCOR, 9th Sess., UN Doc. FCCC/CP/2003/6/Add.1 (2004) paragraphs 1 and 2 at 9, UNFCCC online: <http://unfccc.int/resource/docs/cop9/06a01.pdf#page=9>.

[301] Conference of the Parties, *Additional guidance to an operating entity of the financial mechanism,* Dec. 6/CP.8, UNFCCCOR, 8th Sess., UN Doc. FCCC/CP/2002/7/Add.1 (2003) 15 at 15, UNFCCC online: <http://unfccc.int/resource/docs/cop8/07a01.pdf#page=15>.

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fossil fuel production or consumption.[302] A Least Developed Countries Fund to be operated by the GEF under the direction of the COP, to fund a work programme including "National Adaptation Programmes of Action"[303] was also established at COP-6 *bis*. The parties agreed at the same COP to establish a *Kyoto Protocol* adaptation fund from proceeds from operation of the CDM, "to finance concrete adaptation projects and programmes in developing country Parties . . . to the Protocol." Agreements were reached at COP-6 *bis* on technology transfer[304] and the implementation of Convention Articles 4.8 and 4.9 (financial assistance and technology transfers to developing country Parties) and Protocol Articles 2.3 and 3.14 (minimizing adverse impacts on developing country Parties).[305]

The Bonn Agreements were formalized at COP-7 held in Marrakech, 29 October through 10 November 2001.[306] The BAPA was finally implemented at COP-7 with decisions on: capacity building, guidance to the GEF, technology transfer, adverse effects, funding, Protocol Articles 5, 7 and 8, LULUCF, flexibility mechanisms and compliance.[307]

4. Reporting, Compliance and Dispute Resolution

It is important that monitoring and reporting under the *Kyoto Protocol* be "strong and transparent," for the purpose of encouraging compliance, to help identify potential compliance

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[302] Conference of the Parties, *The Bonn Agreements on the implementation of the Buenos Aires Plan of Action*, Dec. 5/CP.6, UNFCCCOR, 8th Sess., UN Doc. FCCC/CP/2001/5 (2003) 36 at 37, 38, UNFCCC online: <http://unfccc.int/resource/docs/cop6secpart/05.pdf>.

[303] *Ibid.*

[304] *Ibid.*, at 39, 40.

[305] *Ibid.*, at 40, 41.

[306] International Institute for Sustainable Development, "Summary of the Seventh Conference of the Parties to the *UN Framework Convention on Climate Change*: 29 October - 10 November 2001," Earth Negotiations Bulletin, Vol. 12, No. 189, at 1, 14-16, online: <http://www.iisd.ca/linkages/download/pdf/enb12189e.pdf>.

[307] *Ibid.*, at 3-8.

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problems early to deter non-compliance and to facilitate compliance assessment.[308] In addition to national communications required under Article 12 of the FCCC,[309] each Annex I party is required to have in place and operating according to guidelines established by the COP/MOP by 2007, "a national system for the estimation of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the *Montreal Protocol*."[310] The draft guidelines established by the COP contemplate a national system "designed and operated to ensure the transparency, consistency, comparability, completeness and accuracy of inventories."[311] The COP endorsed[312] the IPCC's "Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories,"[313] for estimating a country's anthropogenic greenhouse gas emissions. Each Annex I party is also required to submit an annual emissions inventory under Protocol Article 7,[314] reviewed by an expert review team

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[308] Jutta Brunnee,, "A Fine Balance: Facilitation and Enforcement in the Design of a Compliance Regime for the *Kyoto Protocol*" (2000) 13 Tul. Envtl. L.J. 224 [Brunnee (2000)] at 239.

[309] FCCC, *supra* note 4, at 865, 866. Each national communication is subject to an in-depth review conducted by an expert review team. See Conference of the Parties, *Review of first communications from the Parties included in Annex I to the Convention*, Dec. 2/CP.1, UNFCCCOR, 1st Sess., UN Doc. FCCC/CP/1995/7/Add.1 (1995) 7 at 7, UNFCCC online: <http://unfccc.int/resource/docs/cop1/07a01.pdf#page=7>.

[310] *Kyoto Protocol*, *supra* note 4, Article 5 at 35.

[311] Conference of the Parties, *Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol*, Dec. 20/CP.7, UNFCCCOR 7th Sess., UN Doc. FCCC/CP/2001/13/Add.3 (2002) 2, Annex, clause 6 at 6, UNFCCC online: <http://unfccc.int/resource/docs/cop7/13a03.pdf#page=2>.

[312] Conference of the Parties, *Good practice guidance and adjustments under Article 5, paragraph 2, of the Kyoto Protocol*, Dec. 21/CP.7, UNFCCCOR 7th Sess., UN Doc. FCCC/CP/2001/13/Add.3 (2002) 10, draft decision, clause 1 at 12, UNFCCC online: <http://unfccc.int/resource/docs/cop7/13a03.pdf#page=10>.

[313] IPCC, "Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories" (1996), IPCC online: <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

[314] *Kyoto Protocol*, *supra* note 4, at 35, 36.

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conducting a "comprehensive technical assessment" according to guidelines adopted by the COP/MOP.[315]

The *Kyoto Protocol* is "designed to promote compliance with commitments, rather than focus on allocation of blame for breaches of obligations."[316] The COP has approved "procedures and mechanisms to determine and to address cases of non-compliance"[317] as contemplated by Article 18.[318] However, it is difficult to achieve a compliance regime under a multilateral environmental agreement that is both "acceptable and credible," striking a "balance between efficiency and credibility."[319]

Decision 24/CP.7 approves the establishment of a compliance committee consisting of a facilitative branch and an enforcement branch, each made up of ten members elected by the COP/MOP.[320] The facilitative branch will be responsible for advising the parties, facilitating compliance with the Protocol and addressing implementation questions, keeping in mind the common but differentiated responsibilities of the parties.[321] The enforcement branch is similarly constituted, and will be responsible for determining parties' compliance with: quantified emission limitation or reduction commitments under Article 3.1 of the Protocol [QELRCs], reporting requirements under the Protocol, and eligibility to participate in the flexibility

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[315] *Ibid.*, Article 8, at 36.

[316] Jutta Brunnee, "Of Sense and Sensibility: Reflections on International Liability Regimes as Tools for Environmental Protection" (2004) 53 ICLQ 351 [Brunnee (2004)] at 352. See also Brunnee (2000), *supra* note 308 at 226, 227.

[317] Conference of the Parties, *Procedures and mechanisms relating to compliance under the Kyoto Protocol,* Dec. 24/CP.7, UNFCCCOR 7th Sess., UN Doc. FCCC/CP/2001/13/Add.3 (2002) 64, at 12, UNFCCC online: <http://unfccc.int/resource/docs/cop7/13a03.pdf#page=64>.

[318] *Kyoto Protocol*, *supra* note 4, Article 18 (originally, 17), at 40.

[319] Brunnee (2000), *supra* note 308, at 227, 236.

[320] Dec. 24/CP.7, *supra* note 317, Annex, section II, paragraphs 1-3, at 65.

[321] *Ibid.*, Annex, section IV, at 67-68

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mechanisms.[322] The enforcement branch will also have the power to adjust an inventory under Article 5.2 of the Protocol, or an accounting of an assigned amount under Article 7.4, in the event of a dispute between a party and an expert review team under Protocol Article 8.[323] The most serious consequences from an enforcement branch declaration of non-compliance with an Annex I party's QELRCs are: "(a) Deduction from the Party's assigned amount for the second commitment period of a number of tonnes equal to 1.3 times the amount in tonnes of excess emissions; . . . and (c) Suspension of the eligibility to make transfers under Article 17 of the Protocol until the Party is reinstated in accordance with section X, paragraph 3 or paragraph 4."[324] These consequences are very significant for a multilateral environmental agreement. However, Article 18 of the Protocol makes it clear that "Any procedures and mechanisms . . . entailing binding consequences shall be adopted by means of an amendment to this Protocol."[325] A party not complying with its QELRC will be able to avoid the consequences of non-compliance by not ratifying the necessary Protocol amendment,[326] thereby undercutting the Protocol's emission reduction goals and threatening its integrity.[327] The long-term success of the *Kyoto Protocol* will correlate with the extent of compliance by Annex I parties with their QELRCs during the first and subsequent commitment periods.[328] Further, there must a "level playing field" that eliminates any competitive advantage encouraging non-compliance by Annex

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[322] *Ibid.*, Annex, section V, paragraph 4, at 68.

[323] *Ibid.*, Annex, section V, paragraph 5, at 68, 69.

[324] *Ibid.*, Annex, section XV, paragraph 5, at 76.

[325] *Kyoto Protocol*, *supra* note 4, Article 18 (originally 17), at 40.

[326] Brunnee (2000), *supra* note 308, at 242.

[327] *Ibid.*, at 236.

[328] *Ibid.*, at 256.

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I countries.[329]

F. Summary

The *Kyoto Protocol* has a number of strengths and weaknesses, described above. *Kyoto Protocol* strengths include the following:

1. The Protocol is consistent with important principles included in the Rio Declaration on Environment and Development. These include the precautionary principle, intergenerational equity, and common but differentiated responsibilities. The *Kyoto Protocol* also at least partially reflects the Rio Declaration principles of sustainable development, *sic utere* ("good neighbour") and the "polluter pays." These are important environmental law concepts that apply in both domestic and international law settings;
2. The Protocol uses both a carrot and stick approach in that it facilitates compliance but also has significant consequences for non-compliance, each of which will make Annex I party compliance more likely;
3. The *Kyoto Protocol* finally begins the important process of anthropogenic greenhouse gas emissions reductions among over 60% of the most prolific emitters;
4. The Protocol will engender significant improvements and cost savings in energy efficiency and in environmentally sound alternate energy sources; and
5. Compliance by Annex I nations with their Article 3.1 commitments will produce significant secondary reductions of many harmful atmospheric pollutants.

The *Kyoto Protocol* does not purport to be a final or adequate answer to the problem of anthropogenic greenhouse gas emissions and climate change. It is a tangible first step,[330] helping

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[329] *Ibid.*

[330] Alison Bailie, et al., "The Bottom Line on Kyoto: Economic Benefits of Canadian Action," David Suzuki Foundation, April 2002 at 8, online:

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Annex I countries to begin, and pointing developing country parties in the direction of, reducing greenhouse gas emissions. Even if we assume that the Annex I parties to the *Kyoto Protocol* meet their commitments, experts anticipate that the greenhouse gas emission reductions the Protocol requires in its current form, are "seriously inadequate."[331] Some predict that to avoid rapid climate change, greenhouse gas emissions must be reduced by between 37% and 64% below 1990 levels.[332] New long-term targets incorporating significant additional reductions will be necessary to achieve the objective outlined in article 2 of the FCCC..[333] For the *Kyoto Protocol* to ultimately succeed, it will be necessary for Annex I parties (including the USA) to undertake more onerous greenhouse gas emission reductions and for developing countries to control their emissions through sustainable development practices, supported by financial, educational and technological aid from industrialized countries, perhaps in a manner analogous to the development of the *Montreal Protocol*.[334]

Thus, the principal problems of the *Kyoto Protocol* may be summarized as follows:

1. The QELRCs under Article 3.1 and Annex B are woefully inadequate to address the problem of global anthropogenic climate change;

<http://www.davidsuzuki.org/files/kyotoreport.pdf>.

[331] Taylor, *supra* note 89, at 248.

[332] J. Lanchbery, "The Politics of Buenos Aires" *Environment* 40:8 (October 1998) 16. A group of Dutch researchers estimated that anthropogenic GHG emissions should be reduced by from 37% to 64% by 2010 to maintain concentrations at a safe level. See Chris Rolfe, "*Kyoto Protocol* to the *United Nations Framework Convention on Climate Change*: A Guide to the Protocol and Analysis of its Effectiveness" *West Coast Environmental Law Association* (21 January 1998) at 4 of 13, online: West Coast Environmental Law Research Foundation <http://www.wcel.org/wcelpub/wrapper.cfm?docURL=http://www.wcel.org/wcelpub/1998/12152.html>.

[333] United States General Accounting Office, "International Environment: Experts Observations on Enhancing Compliance with a Climate Change Agreement," August 1999, GAO/RCED-99-248 at 7, online: <http://www.gao.gov/archive/1999/rc99248.pdf>.

[334] Thoms, *supra*, note 44 at 805.

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2. The failure of the USA, which is by far the worlds most prolific emitter of greenhouse gases, to ratify the Protocol is a serious blow to its effectiveness;

3. The *Kyoto Protocol* process has failed to this point, to even begin to address the rapidly increasing emissions of developing countries; and

4. The availability of prodigious amounts of "hot air" for sale by EIT countries to any Annex I country that prefers to avoid emission reductions at home is a significant problem.

With its Kyoto commitments in mind, Canada's ability to implement the protocol through domestic legislation is the next subject for discussion. In the next chapter, Canadian constitutional law issues governing domestic legislation to reduce greenhouse gas emissions, enhance sinks and implement emissions trading will be discussed. Thereafter, the greenhouse gas emission mitigation strategies of Canada and Alberta will be addressed and evaluated against criteria based on Principles of the Rio Declaration on Environment and Development.

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Chapter 4

Implementing the *Kyoto Protocol* in the Canadian Federal System - Issues of Cooperation and Jurisdiction under the *Constitution Act, 1867*

A. The Need for Cooperation Between Alberta and Canada to Achieve Canada's Kyoto Commitment

In 1990, Canada was responsible for approximately 3.3% or 607 MT CO_2 equivalent [CO_2e][1] of Annex I greenhouse gas emissions not covered by the *Montreal Protocol*.[2] That year, about 171 MT CO_2e or about 28% of all Canadian greenhouse gases were emitted in Alberta,[3] which has roughly 10% of Canada's population.[4]

According to Government of Canada estimates, Canada's emissions of greenhouse gases

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[1] The term "MT CO_2e" refers to Mega-tonnes of CO_2 equivalent. By definition, CO_2 has a Global Warming Potential [GWP] of 1. CH_4 has a GWP of 23. To reduce the impact on climate of the emission of 1 MT of CH_4, CO_2 emissions would have to be reduced by 23 MT. Therefore, 1 MT of CH_4 = 23 MT CO_2e. See Brian Evans, "Principles of Kyoto and Emissions Trading Systems: A Primer for Energy Lawyers" (2004) 42 Alta. L. Rev. 167 at 171.

[2] Canada, Environment Canada, *Canada's Third National Report on Climate Change: Actions to Meet Commitments under the United Nations Framework Convention on Climate Change,* (Ottawa: Minister of Public Works and Government Services, 2001) at 27.Canada's assessment of its 1990 greenhouse gas inventory has grown from 526 Mt in its first National Communication to the *United Nations Framework Convention on Climate Change* [FCCC] in 1994, through 567 Mt in its second National Communication in 1997. The figure varies as emissions estimates and the assessment of the global warming potential of greenhouse gases improves.

[3] Matthew Bramley, "An Assessment of Alberta's Climate Change Action Plan,", Pembina Institute for Appropriate Development, September 2002, note 15, p. 5, online: http://www.pembina.org/pdf/publications/plan_critique020906.pdf>.

[4] Statistics Canada, "Population and Dwelling Counts, for Canada, Provinces and Territories, 2001 and 1996 Censuses," online: <http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-PR.cfm>.

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covered by the *Kyoto Protocol*[5] were 725 MT CO_2e in 2000, 19% higher than its year 2000 commitment made eight years earlier under the *United Nations Framework Convention on Climate Change*[6] [FCCC].[7] Alberta contributed 222 Mt CO_2e (or 31%) to Canada's 2000 greenhouse gas emissions.[8] Canada's emissions declined to 716 MT CO_2e in 2001, the first annual decline since 1991.[9] The 2001 decline was perhaps attributable to a dip in Canadian economic performance, but the Federal Government contends that it was at least partly due to a decrease in the "overall GHG intensity of emissions by the Canadian economy."[10] Unfortunately, total Canadian emissions returned to 731 MT CO_2e in 2002. Canada projects its "business as usual" emissions would reach 809 MT CO_2e by 2010, the midpoint year of the five year Kyoto commitment period.[11]

A significant portion (41%) of Canada's greenhouse gas emission increases since 1990 are attributable to Alberta.[12] Alberta's 31% contribution to the national total in 2000 was up from

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[5] *Conference of the Parties to the Framework Convention on Climate Change: Kyoto Protocol*, 10 December 1997, 37 I.L.M. 22 (entered into force 16 February 2005).

[6] *United Nations Framework Convention on Climate Change*, 9 May 1992, 31 I.L.M. 849 (1992) (entered into force 21 March 1994).

[7] Canada, Environment Canada, *Canada's Greenhouse Gas Inventory 1990-2002*, (Ottawa: Environment Canada, August 2004) [2002 Inventory] at 207, online: Environment Canada <http://www.ec.gc.ca/pdb/ghg/1990_02_report/1990_02_report_e.pdf>.

[8] Bramley, *supra* note 3, Table 2, at p. 5.

[9] Government of Canada,"2001 Greenhouse Gas Inventory Shows Decline in Overall Emissions," News Release, Environment Canada, at p. 1 of 5, online: <http://www.ec.gc.ca/press/2003/030422_b_e.htm>.

[10] *Ibid.* According to the news release: "The overall GHG intensity of emissions by the Canadian economy continued to decline and was 2.6 percent better (lower) in 2001 than 2000. This is a measure of the amount of GHGs emitted per unit of economic activity and since 1990, has decreased the annualized equivalent of 1 percent per year."

[11] See Philip Barton, "Economic Instruments and The *Kyoto Protocol*: Can Parliament Implement Emissions Trading Without Provincial Co-operation?," (2002) 40:2 Alta. L.Rev. 417, note 13 at 419.

[12] 2002 Inventory, *supra* note 7, at 207, 216.

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28% in 1990.[13] It must be noted that although Alberta's greenhouse gas emissions rose by 31% in the 1990s, its Gross Domestic Product (hereafter GDP) grew by approximately 50% during the same period, indicating a drop in emissions intensity[14] of 13%.[15]

Canada acknowledges it must find a way to reduce its greenhouse gas emissions by an average of 240 MT CO_2e per year from its "business as usual" projections for the period 2008 through 2012 to meet its commitments under the *Kyoto Protocol*.[16] Logically, Alberta's fair share[17] of those reductions would be roughly 74 MT CO_2e per year for the same period. Canada's goal to reduce greenhouse gas emissions by 240Mt CO_2e for the period 2008 through 2012 addresses not only its *Kyoto Protocol* commitment, but also contributes directly to reducing emissions of other harmful substances, including: sulphur dioxide (SO_2), ground level ozone, nitrogen oxides, volatile organic compounds, ground-level ozone, particulates, and mercury.[18] In addition, it helps conserve energy for future generations.

The Parliament of Canada has jurisdiction under the *Constitution Act, 1867*[19] to implement measures that will lead to the reduction of greenhouse gas emissions across the

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[13] Bramley, *supra* note 3 at 3-5.

[14] Emissions intensity refers to Mt CO_2e / $ millions (1997 constant prices) of GDP. See Bramley, *supra*, note 3, at 4.

[15] Bramley, *ibid.*

[16] Government of Canada, "Climate Change Plan for Canada," (Ottawa: Government of Canada,, 2004) at 11 (last modified 25 October 2004) online: <http://www.climatechange.gc.ca/plan_for_canada/plan/pdf/full_version.pdf>.

[17] I.e., 31% of the total.

[18] See Robert B.McKinstry, Jr., "Laboratories for Local Solutions for Global Problems: State, Local and Private Leadership in Developing Strategies to Mitigate the Causes and Effects of Climate Change," (2004) 2 Penn St. Envtl. L. Rev. 15, at 42.

[19] *Constitution Act, 1867* (U.K.), 30 & 31 Vict., c. 3, reprinted in R.S.C. 1985, App. II, No. 5 [*Constitution*].

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nation, including in Alberta.[20] However, Parliament does not have exclusive jurisdiction over every area relevant to emission reductions, sink enhancements and emissions trading. By its very nature, our federal system incorporates the sharing of legislative responsibility between Parliament and the legislatures of the ten provinces and three territories. Successful climate change policies will require the cooperation of the federal, provincial and territorial governments, municipalities, private corporations and private citizens. Carefully coordinated, mutually supportive federal and provincial legislation will be needed if Canada is to comply with the *Kyoto Protocol*, including subsequent amendments and adjustments beyond 2012.

B. Constitutional Authority for the Implementation of the *Kyoto Protocol*

1. Need for Joint Federal-Provincial Legislative Action

It is important to keep in mind that one tonne of CO_2 emitted in Taber, Alberta directly affects the concentration of CO_2 in the air over Tuktoyaktuk, Northwest Territories and that over Tarawa, Kiribati. The impact of CO_2 and other greenhouse gas emissions covered under the *Kyoto Protocol* is by no means a local or private matter. Greenhouse gases and affected weather patterns are unimpeded by political borders and flow freely through the global atmosphere. Once greenhouse gases are released to the atmosphere, they cannot be retained within or restricted to the airmass above any one province, country or continent.[21] Thus, the global climate change problem cries out for coordinated international, national and local legal solutions, and Canada's Kyoto compliance challenge argues for concerted and effective federal, provincial and territorial legislation.

There is enough scope under Canada's *Constitution* for Parliament and provincial

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[20] Nigel D. Bankes & Alastair R.Lucas, "Kyoto, Constitutional Law and Alberta's Proposals," (2004) 42 Alta. L. Rev. 355, at 389-392.

[21] See references to the research of Charles Keeling in Chapter 2, *supra* at 8.

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legislatures to share jurisdiction over the regulation of greenhouse gas emissions. The legislative authority of each of the legislative bodies of the three territories is delegated directly by Parliament.[22] Ideally, each of Canada's 14 legislatures will work to fulfil the national need and support the global good, to arrive at an effective national legislative scheme. The ultimate goal is to reduce greenhouse gas emissions and enable Canada to do its part to limit the harmful effects of global warming. Canada's Kyoto compliance will not be assured by federal attempts to arbitrarily impose inflexible programs on the provinces nor by provincial refusals to contribute or to cooperate in good faith with the federal government and with each other.

In this chapter, major constitutional issues faced by the federal and provincial governments in preparing legislation to enable Canada to meet its Kyoto commitment will be highlighted. Exhaustive constitutional reviews have been done by others.[23] Such a review is beyond the scope of this chapter.

2. Environmental Matters under the *Constitution*

Greenhouse gas emissions, carbon sinks, emissions trading and climate change are not exclusively environmental matters. Legislative jurisdiction in Canada over climate change is tied to many matters, particularly including fossil fuel production and combustion, and to any substantial activity or industry closely linked to them. Legislation regulating greenhouse gas

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[22] *Constitution Act, 1871*, 34-35 Vict., c. 28. See also the *Northwest Territories Act*, R.S.C. 1985, c. N-27, ss. 9, 16; *Yukon Act*, S.C. 2002, c. 7, ss. 10, 18; *Nunavut Act*, S.C. 1993, c. 28, ss.12, 13, 23.

[23] See E. Mitchell Shier, *Climate Change and the Constitution* (LL.M. Thesis) (Calgary: University of Calgary, Faculty of Law, 1994) [unpublished] [Shier], Joseph F. Castrilli, "Legal Authority for Emissions Trading in Canada," *The Legislative Authority to Implement a Domestic Emissions Trading System* (Ottawa: National Round Table on the Environment and the Economy, 1999) App. 1 [Castrilli]; Chris Rolfe, "Putting Strategies into Law: The Constitutional and Legislative Basis for Action," from *Turning Down the Heat: Emissions Trading and Canadian Implementation of the Kyoto Protocol* (Vancouver: West Coast Environmental Law Research Foundation, 1998), Chapter 14, [Rolfe]; Barton, *supra*, note 11; Andrew Bachelder, "Using Credit Trading to Reduce Greenhouse Gas Emissions," (2000) 9 J. Enviro. L. & Practice 281, at 292 [Bachelder]; and Bankes and Lucas, *supra* note 20.

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emissions will almost certainly also impact electricity generation, transportation, agricultural practices and many other industrial and domestic activities. Depending on subject matter, jurisdiction to enact legislation affecting these activities may be federal, provincial or shared.

Climate change impacts are also clearly environmental. The *Constitution Act, 1867* does not assign authority over environmental concerns to either the Parliament of Canada or the legislatures of the provinces.[24] According to Justice Gerald La Forest, in *R.* v. *Hydro Québec*[25]:

> [T]he *Constitution Act, 1867* has not assigned the matter of 'environment' sui generis to either the provinces or Parliament" (p. 63). Rather, it is a diffuse subject that cuts across many different areas of constitutional responsibility, some federal, some provincial (pp. 63-64). Thus Parliament or a provincial legislature can, in advancing the scheme or purpose of a statute, enact provisions minimizing or preventing the detrimental impact that statute may have on the environment, prohibit pollution, and the like. In assessing the constitutional validity of a provision relating to the environment, therefore, what must first be done is to look at the catalogue of legislative powers listed in the *Constitution Act, 1867* to see if the provision falls within one or more of the powers assigned to the body (whether Parliament or a provincial legislature) that enacted the legislation (ibid. at p. 65). If the provision in essence, in pith and substance, falls within the parameters of any such power, then it is constitutionally valid.

Similarly, Professor Dale Gibson, as quoted by La Forest, J. in *Friends of the Oldman River Society* v. *Canada (Minister of Transport)*[26] stated:

> . . . 'environmental management' does not, under the existing situation, constitute a homogeneous constitutional unit. Instead, it cuts across many different areas of constitutional responsibility, some federal and some provincial. And it is no less obvious that 'environmental management' could never be treated as a constitutional unit under one order of government in any constitution that claimed to be federal, because no system in which one government was so powerful would be federal.[27]

Responsibility for environmental matters therefore follows related heads of power expressed in sections 91, 92 and 92A of the *Constitution Act, 1867*.

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[24] See sections 91 and 92 of the *Constitution*, *supra* note 19.

[25] [1997] 3 S.C.R. 213 [*Hydro Quebec*], at para. 112.

[26] [1992] 1 S.C.R. 3, at 63, 64.

[27] Dale Gibson, "Constitutional Jurisdiction over Environmental Management in Canada" (1973), 23 U.T.L.J. 54 at 85.

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3. Federal heads of power

Four heads of federal power have been identified as supporting greenhouse gas emission reduction and emission trading legislation. These are Parliament's residuary Peace, Order and Good Government power [28] [POGG] given in the introductory paragraph of section 91 (possibly but not necessarily including implementation powers pertaining to the federal executive's treaty-making power[29]) plus subsections 91(2) (trade and commerce), 91(3) (taxation) and 91(27) (criminal law) of the *Constitution Act, 1867*.[30]

a. Federal Treaty-Making Power

It is undisputed that the Federal Government has exclusive jurisdiction over the making of international treaties, such as the UNFCCC and its *Kyoto Protocol*.[31] However, ratification of a treaty does not incorporate the treaty's provisions into the domestic law of Canada.[32] Neither does the power to enter into a multilateral agreement include the power to domestically implement through legislation, all aspects of the agreement.[33] An effective legislative regime controlling greenhouse gas emissions in Canada will likely require the concerted effort and

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[28] Shier, *supra* note 23 at 150 - 258; Castrilli, *supra* note 23 at 10-12; Rolfe, *supra* note 23 at 3-7; Barton, *supra* note 9 at 423 - 431; Bachelder, *supra* note 23 at 292 - 293; Bankes and Lucas, *supra* note 20, at 391.

[29] *Re Regulation and Control of Radio Communication in Canada* [1932] A.C. 304, but see *A.-G. Canada* v. *A.-G. Ontario* (Labour Conventions) [1937] A.C. 326. See also Rolfe, *supra* note 23 at 7-8 and Hogg, *infra,* note 31, at 11-12 - 11-16.

[30] *Constitution*, *supra*, note 19.

[31] According to Professor Peter W. Hogg, *Constitutional Law of Canada*, Lose-leaf Edition (Scarborough: Thomson Canada Ltd., 1997) [Hogg] at 11-2 - 11.3, the treaty-making power is a prerogative of the Crown in Right of Canada, delegated by the British monarch under Letters Patent, most recently in 1947, to the Governor General of Canada, exercisable on the advice of the Canadian Government.

[32] *Ibid.*, at p. 11-5.

[33] See discussion by Professor Hogg, *ibid.*,at 11-10 to 11-16, of the Privy Council decision in the *Labour Conventions* case, *supra* note 29.

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cooperation of Parliament and the 10 provincial legislatures. Complimentary contributions by the governments of the 3 Canadian territories, large municipalities and aboriginal band councils, plus coordinated efforts from large industrial emitters and contributions from the general public, will also be important if lasting progress in limiting greenhouse gas emissions is to be made in Canada.

b. Peace Order and Good Government (POGG)

The text introducing section 91 of the *Constitution* provides a residual power to the Parliament of Canada "to make Laws for the Peace, Order, and good Government of Canada, in relation to all Matters not coming within the Classes of Subjects by this Act assigned exclusively to the Legislatures of the Provinces."[34] This power, commonly referred to as the "POGG power," includes 3 categories, being the "gap" branch, the "national concern" branch and the "emergency" branch.[35]

Professor Hogg speculates that the Supreme Court of Canada [S.C.C.] might, conceivably, overrule the *Labour Conventions* case, using the gap branch of the POGG power to authorize Parliament to legislate for the purpose of fully implementing treaties entered into by the Government of Canada.[36] This would help Parliament avoid a distinct impediment in meeting its international obligations in an increasingly globalized world, but would significantly alter the federal-provincial balance of power, something that would more appropriately be done through a negotiated amendment to the *Constitution* itself. The gap branch of the POGG power is probably not otherwise relevant to legislation regulating greenhouse gas emissions.

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[34] *Constitution*, *supra*, note 19, s. 91.

[35] Hogg, *supra*, note 31, at 17-5.

[36] *Ibid.*

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The S.C.C. held in *R.* v. *Crown Zellerbach Canada Ltd.*,[37] that the Federal Parliament has authority under the national concern branch (or "doctrine") of the POGG power to enact legislation regulating marine dumping in Canada, even where the dumping is clearly within provincial waters and there is no assertion that the regulated act could lead to the polluting of federal or international waters or damage to fish habitat (matters clearly within the legislative competence of the Parliament of Canada). Le Dain, J., for the majority in *R.* v. *Crown Zellerbach Canada Ltd.* held that section 4(1) of the federal *Ocean Dumping Control Act*[38] concerned a matter of national concern, possessing a "singleness, distinctiveness and indivisibility that clearly distinguishes it from matters of provincial concern and a scale of impact on provincial jurisdiction that is reconcilable with the fundamental distribution of legislative power under the *Constitution*."[39] A key element of the decision of Le Dain, J. is the "effect on extra-provincial interests of a provincial failure to deal effectively with the control or regulation of the intra-provincial aspects of the matter."[40]

The S.C.C.[41] has not yet extended the national concern doctrine to support federal legislation regulating emissions of air pollution under the *Canadian Environmental Protection Act*, [CEPA][42] or its successor, the *Canadian Environmental Protection Act, 1999*[43] [CEPA,

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[37] [1988] 1 S.C.R. 401 [*Crown Zellerbach*].

[38] Now, *Canadian Environmental Protection Act, 1999* [CEPA, 1999], *infra* note 43, Part 7, Division 3.

[39] *Ibid.*, at paragraph 33.

[40] *Ibid.*

[41] *Hydro Quebec, supra* note 25 at para. 110.

[42] R.S.C., 1985, c. 16 (4th Supp.).

[43] S.C. 1999, c. 33.

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1999].[44] The S.C.C. in *R. v. Hydro Québec*[45] strongly implied that the regulation of toxic substances under CEPA would not demonstrate a "singleness, distinctiveness and indivisibility that clearly distinguishes it from matters of provincial concern and a scale of impact on provincial jurisdiction that is reconcilable with the fundamental distribution of legislative power under the *Constitution*"[46] to qualify under the national concern doctrine of POGG. Although toxic substances found in soil or water are capable of moving between provinces, they suggest less of a "singleness, distinctiveness and indivisibility" to distinguish them "from matters of provincial concern"[47] than perhaps do greenhouse gas emissions which flow freely between provincial and international borders.

Only a concerted nation-wide effort is sufficient to enable Canada to meet its *Kyoto Protocol* commitments. Similarly, only concerted international action to significantly reduce global greenhouse gas emissions will slow the rate of climate change caused by increased concentrations of these gases in the atmosphere. Although the matter is not conclusive, the

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[44] The CEPA, 1999 definition of "Air pollution" appears to include the greenhouse gases controlled under the *Kyoto Protocol*. According to the definition in section 3, "Air pollution means a condition of the air, arising wholly or partly from the presence in the air of any substance, that directly or indirectly

(a) endangers the health, safety or welfare of humans;
(b) interferes with the normal enjoyment of life or property;
(c) endangers the health of animal life;
(d) causes damage to plant life or to property; or
(e) degrades or alters, or forms part of a process of degradation or alteration of, an ecosystem to an extent that is detrimental to its use by humans, animals or plants."

By their nature, these gases emitted in Canada contribute to "air pollution in a country other than Canada" or "air pollution that violates or is likely to violate an international agreement binding on Canada in relation to the prevention, control or correction of pollution" (s.166(1)). On the face of CEPA, 1999, the federal government could conceivably regulate emissions under section 166.

[45] *Hydro Quebec, supra*, note 25 at paras. 79 (minority opinion) and 115 (majority opinion).

[46] *Ibid.*, para. 115, quoting Le Dain, J. in *Crown Zellerbach, supra* note 37, para. 33.

[47] *Ibid.* at paragraph 33.

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national concern doctrine may support federal legislation regulating emissions trading in Canada. and perhaps even the regulation of greenhouse gas emissions themselves.[48]

At this point in time, the third or emergency branch under POGG probably will not support federal legislation regulating greenhouse gas emissions because there may not yet be an emergency and clearly, any legislation regulating greenhouse gas emissions will not be temporary in nature as is the *War Measures Act* and was federal anti-inflation legislation in the 1970s.[49]

In summary, the national concern branch of the federal POGG power may support federal legislation regulating greenhouse gas emissions, sink enhancements and emissions trading. The potential scope under the national concern branch of POGG for Parliament to unilaterally implement an effective greenhouse gas management regime in the absence of provincial cooperation should exert pressure on the Provinces to cooperate in a reasonable way.

c. Criminal Law Power

The S.C.C. made it clear in the *R.* v. *Hydro Québec*[50] that the federal criminal law power found in section 91(27) of the *Constitution*[51] is available to the Government of Canada to procure the enactment of federal law regulating the emission of harmful substances. Although greenhouse gases are not toxic in concentrations normally found in the atmosphere, their cumulative global impact is expected to be increasingly harmful. Legislation controlling the emission of greenhouse gases covered under the *Kyoto Protocol* may be supported under this

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[48] Shier, *supra* note 23, at 248 - 258; Castrilli, *supra* note 23, at 10-12; Rolfe, *supra* note 23, at 3-8; Barton, *supra* note 11, at 427 - 431; and Bachelder, *supra* note 23, at 293; Bankes and Lucas, *supra* note 20, at 391.

[49] See Hogg, *supra* note 31, at 17-26, note 153.

[50] *Supra*, note 19.

[51] *Constitution*, *supra* note 19, s. 91(27).

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federal constitutional power.[52]

d. Taxation and Trade and Commerce Powers

The Parliament of Canada clearly has power to levy its own fuel (or other carbon) taxes (whether direct or indirect).[53]

At least one commentator postulates that Parliament has the power to promulgate greenhouse gas emissions trading legislation under its trade and commerce power.[54] There may be some scope for this but I suggest the national concern doctrine under POGG is a more likely source of federal jurisdiction. This is due primarily to judicial restrictions imposed on the federal trade and commerce power in the face of broad interpretations of the provincial power over property and civil rights in the province.[55]

e. Interprovincial Transportation

26% of Canada's anthropogenic greenhouse gas emissions in 2002 were generated through air, land and water transportation.[56] The *Constitution* gives exclusive jurisdiction over aeronautics to the federal Parliament under the POGG clause.[57] Similarly, Parliament has exclusive jurisdiction over shipping, canals and navigable waters.[58] On the other hand, jurisdiction over modes of land transportation are shared under sections 91 and 92 of the

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[52] Castrilli, *supra* note 23, at 12-14; Rolfe, *supra* note 23, at 8-10; Barton, *supra* note 11, at 436 - 438; and Bachelder, *supra* note 23, at 294, 295; Bankes and Lucas, *supra* note 20, at 390-391.

[53] *Constitution*, *supra* note 19, s. 91(3) ; Rolfe, *supra* note 23, at 11, 12; Barton, *supra* note 11, at 443; Bankes and Lucas, *supra* note 20, at 390.

[54] *Constitution* , *supra* note 19, s. 91(2); Castrilli, *supra* note 23 at p. 14; Bankes and Lucas, *supra* note 20, at 391.

[55] Hogg, *supra,* note 31, at 20-1 to 20-2.

[56] *Canada's Greenhouse Gas Inventory 1990 - 2002*, *sura* note 7, at 206.

[57] *Constitution, supra* note 19, section 91 (chapeau); Hogg *supra* note 31, at 22-22.

[58] *Constitution, ibid.*, section 91(10), 92(10)(a), (b); Hogg, *ibid.*, at 22-19.

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Constitution.[59] Interprovincial motor vehicle and rail transportation are federally regulated under section 91(29) and 92(10)(a),[60] while the provinces exercise jurisdiction over intra-provincial land transportation.[61]

4. Provincial Heads of Power

Principal provincial heads of power relevant to the regulation of greenhouse gas emissions covered under the *Kyoto Protocol* include sections 92(13) (property and civil rights in the province)[62] and 92(16) (matters of a local and private nature in the province)[63]. However sections 92(2) (direct taxation within the province)[64], 92(5) (management of public lands and timber)[65], 92(8) (municipal institutions)[66], 92(15) (enforcement powers)[67], 92A (natural resources amendment)[68] and 109 (ownership of public lands) of the *Constitution Act, 1867*[69] and the 1930 Natural Resources Transfer Agreement[70] are relevant to provincial authority to regulate

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[59] Hogg, *ibid.*, at 22-18, 22-19.

[60] *Constitution, supra* note 19.

[61] *Constitution, ibid.*, section 92(13), (16).

[62] *Constitution*, *supra* note 19; Castrilli, *supra* note 23, at 18-19; Rolfe, *supra* note 23, at 2-3; Bachelder, *supra* note 23, at 292; and Bankes and Lucas, *supra* note 20, at 373, 376.

[63] Castrilli, *supra* note 23, at 19; Bankes and Lucas, *supra* note 20, at 374, 377.

[64] This power would be implemented through a tax levied on the ultimate consumers of fossil fuels, such as a gasoline tax. But see David G. Duff, "Tax Policy and Global Warming," University of Toronto, Faculty of Law, Public Law and Legal Theory Research Paper No. 03-03 at 64, online: http://papers.ssrn.com/abstract=428320.

[65] Environmental Law Centre, *The ABC's of Environmental Jurisdiction: an Alberta guide to federal, provincial and municipal responsibility* (Edmonton: Environmental Law Centre, 2003) [ELC ABC's] at 17; Bankes and Lucas, *supra* note 20, at 373,374, 377.

[66] Castrilli, *supra* note 23, at 19.

[67] ELC ABC's, *supra* note 65 at 17; Bankes and Lucas, *supra* note 20, at 374.

[68] *Ibid.*

[69] ELC ABC's, *ibid.*; Bankes and Lucas, *ibid.*, at 377-3814

[70] See *Alberta Natural Resources Transfer Act* S.C. 1930, c. 3.

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greenhouse gas emissions in a province.

The "argument that provincial ownership rights serve to insulate the provinces from the reach of federal regulation" is refuted by Bankes and Lucas.[71] Other than the immunity from federal taxation provided under section 125 of the *Constitution Act, 1867,*[72] provincial property is probably not immune to the application of otherwise valid federal environmental legislation.[73]

Regulation of local industrial emissions, electrical power generation with the province, intra-provincial transportation and domestic energy use in areas over which Parliament has not been given exclusive authority, are key areas where extensive greenhouse gas emission reductions are needed. Regulation of these industries would normally fall to the legislative capacity of the provinces under their pervasive authority to legislate concerning property and civil rights in the Province under section 92(13) of the *Constitution.*[74] Provinces typically have authority to control the development of provincial public lands[75] and natural resources[76] and to levy direct fuel taxes.[77] The delegation to municipalities by provincial legislatures[78] of the power to promote and implement municipal greenhouse gas emission reduction strategies is another significant arrow in the provincial quiver of powers to implement emission reduction solutions.

As Benedickson pointed out:

> Collectively these sources of legislative power provide the provinces with a strong constitutional basis for the extensive range of regulatory initiatives each has taken in

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[71] Bankes and Lucas, *supra* note 20, at 377-384.

[72] *Supra* note 19.

[73] Bankes and Lucas, *supra* note 20, at 382-384.

[74] *Supra* note 19.

[75] *Ibid.*, s. 92(5).

[76] *Ibid.*, s. 92a.

[77] *Ibid.*, s. 92(2).

[78] *Ibid.*, s. 92(8).

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relation to environmental protection. Yet certain constraints must be acknowledged beginning with the geographic restriction of provincial authority within provincial boundaries[79]

The above discussions demonstrate the scope for overlapping federal and provincial legislation regarding greenhouse gas emissions reductions, sink enhancements and emissions trading. Federal *Kyoto Protocol* compliance would be best served through cooperative legislative regimes implemented by Parliament, and the ten provincial and three territorial legislatures. Without significant provincial cooperation, Canada may not be able to achieve its commitments under the *Kyoto Protocol*.

In the absence of crucial provincial cooperation, the federal Parliament may be able to enact a Kyoto compliance regime that will enable Canada to meet its commitments under the Protocol. In the case of inconsistent federal and provincial legislation in areas of concurrent jurisdiction, federal law is paramount and the inconsistent provincial laws must yield to it.[80]

C. The Adequacy of Existing Mechanisms for Inter-jurisdictional Environmental Cooperation

The need for national unity of purpose and coordination of effort in reducing and remediating anthropogenic greenhouse gas emissions is evident. As discussed above, the Canadian Parliament has constitutional authority to implement at least partial solutions to the climate change problem. However, the scope of section 92(13) of the *Constitution Act, 1867* (the provincial power to legislate over "property and civil rights in the province"), is broad. Enduring national success in reducing greenhouse gas emissions and mitigating climate change in Canada would be extremely difficult without extensive inter-jurisdictional cooperation in planning,

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[79] Jamie Benidickson, *Environmental Law, 2nd ed.* (Toronto: Irwin Law Inc., 2002), at 33.

[80] Hogg, *supra* note 31 at 16-17.

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public relations, programs, proscriptions, legislation, research and development, accountability reporting, evaluation, reevaluation, and the like. Integrated cooperation by large municipalities, major industrial emitters, first nations governments and ordinary citizens is highly desirable, if not necessary. Several vehicles to federal-provincial-territorial environmental cooperation already exist. These could be expanded to include major municipal, aboriginal and perhaps even industrial players.

1. Canadian Council of Ministers of the Environment [CCME]

The need for inter-jurisdictional environmental consultation and cooperation in Canada precipitated the creation of the CCME approximately 15 years ago.[81] The CCME provides a forum for federal, provincial and territorial environment ministers to discuss, negotiate and cooperate on finding solutions to national environmental issues.[82] According to its 2003/04 to 2005/06 business plan, the "CCME is the principal intergovernmental forum in Canada for discussion and joint action on environmental issues of national, international and global concern."[83] CCME objectives include:[84]

- harmonization of environmental measures, environmental assessment and review procedures in all governments, including policies and procedures, legislation regulations and programs;
- coordinated approaches to the strategic management of inter-jurisdictional environmental matters and emerging environmental issues of national and international significance;
- continued cooperation in developing and maintaining the scientific information base required to support sound environmental decision making;

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[81] According to Jaime Benedickson, *supra* note 79 at 40: "The CCME is an offshoot of the Canadian Council of Resource and Environment Ministers (1971), which itself was a reconfiguration of the Canadian Council of Resource Ministers (1964)."

[82] ELC ABCs, *supra* note 65, at 21.

[83] Canadian Council of Ministers of the Environment, "The Canadian Council of Ministers of the Environment (CCME) Business Plan 2003/04 to 2005/06," at 3, CCME online: <http://www.ccme.ca/assets/pdf/businessplan.pdf>.

[84] *Ibid.*, at 4.

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- establishment of national environmental standards and objectives;
- close cooperation with other ministerial councils and fora, as appropriate, to address environmental issues.

All Canadian jurisdictions participating in the CCME except Quebec[85] signed the Canada-wide Accord on Environmental Harmonization in 1998 [Harmonization Accord]. The Harmonization accord specifically approves and adopts as its first two principles, the "polluter pays"[86] and "precautionary"[87] principles.[88] It includes the following additional principles that are particularly relevant to interjurisdictional cooperation on climate change:

> 3. pollution prevention is the preferred approach to environmental protection;
> 4. environmental measures should be performance-based, results-oriented and science-based;
> 5. openness, transparency, accountability and the effective participation of stakeholders and the public in environmental decision-making is necessary for an effective environmental management regime;
> 6. working cooperatively with Aboriginal people and their structures of governance is necessary for an effective environmental management regime;
> 7. Canada-wide approaches on how to meet the objectives of this Accord will allow for flexible implementation required to reflect variations in ecosystems and local, regional, provincial and territorial conditions.

Since 1998, a number of sub-agreements have been signed under the Harmonization Accord, including: the Canada-wide Environmental Standards Sub-agreement[89], the

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[85] According to the CCME website, online: <http://www.ccme.ca/initiatives/environment.html?category_id=25> "Quebec indicated it still requires certain conditions to be met before it signs the accord and sub-agreements. Among them, Quebec would like to see Parliament adopt amendments to federal legislation that recognize the need to reduce overlap and duplication between jurisdictions."

[86] *The Rio Declaration on Environment and Development* (1992), I.L.M. 874, Principles 13 and 16 (reproduced as Schedule I, following Chapter 7).

[87] *Ibid.*, Principle 15.

[88] Canadian Council of Ministers of the Environment, "A Canada-Wide Accord on Environmental Harmonization," (1998), principles no. 1 and 2, at p. 2, online <http://www.ccme.ca/assets/pdf/accord_harmonization_e.pdf>.

[89] CCME, "Canada-wide Standards Sub-agreement," online: CCME <http://www.ccme.ca/assets/pdf/cws_envstandards_subagreement.pdf>. Under this sub-agreement, standards have been published for the reduction of or elimination from the environment of benzene, mercury, particulate matter, ground level ozone, dioxins, furans and

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Environmental Assessment Sub-agreement[90] and the Inspections and Enforcement Sub-Agreement (2001)[91]. The CCME adopted numerous Canada-Wide Standards under the Canada-Wide Environmental Standards Sub-Agreement, including standards on various toxic chemicals, water quality and contaminated sites, among others.

The CCME is an obvious vehicle available to Canada's federal and provincial governments for coordinating federal and provincial action on greenhouse gas emissions reductions and climate change. CCME members have not yet agreed to cooperate fully on climate change, but the CCME published a document in November 2003 on Canadian climate change indicators.[92] Having agreed that climate change is occurring in Canada, the federal, provincial and territorial governments should use the CCME to help formulate an effective concerted response.

2. National Action Committee [NAC]

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petroleum hydrocarbons in soils.

[90] CCME, "Sub-Agreement on Environmental Assessment," online: CCME <http://www.ccme.ca/assets/pdf/envtlassesssubagr_e.pdf>. This sub-agreement is designed to remove overlap in federal and provincial environmental impact assessments [EIAs] by providing for one formal EIA per project to be relied on by both the federal and relevant provincial jurisdictions.

[91] CCME, "Inspections and Enforcement Sub-Agreement," online: CCME <http://www.ccme.ca/assets/pdf/insp_enfsubagr_e.pdf>. According to D. Besner and Associates in its report on the "Five-Year Review Of Canada-Wide Accord on Environmental Harmonization," respecting the terms of the Inspection and Enforcement Sub-agreement, its objectives are: "1. To achieve a consistent, high level of compliance with environmental protection laws across Canada, and 2. To serve as an enabling framework for future bilateral and multilateral implementation agreements that: i. Deliver a range of inspection and enforcement activities across Canada that are fair, consistent and predictable; ii. Provide a cooperative work sharing approach for inspection and enforcement activities related to environmental protection laws, where appropriate; iii. Identify a process to set priorities for inspection and enforcement programs; and iv. Provide an efficient and cost effective approach to inspection and enforcement activities in Canada."

[92] Canadian Council of Ministers of the Environment, "Climate, Nature, People: Indicators of Canada's Changing Climate," (November 2003) online: <http://www.ccme.ca/assets/pdf/cc_ind_full_doc_e.pdf>.

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Section 6 of CEPA, 1999[93] provides for the creation of the National Action Committee (hereafter NAC) "for the purpose of enabling national action to be carried out and taking cooperative action in matters affecting the environment and for the purpose of avoiding duplication in regulatory activity among governments."[94] CEPA, 1999 requires the NAC to use the Precautionary Principle in giving advice and making recommendations.[95] Although at least one commentator questions the usefulness of the NAC in light of the work of the CCME,[96] the NAC could be especially useful in obtaining aboriginal, corporate and public feedback and to avoid duplication or overlap[97] on coordinated action on climate change.

3. National Round Table on the Environment and the Economy [NRTEE]

The NRTEE was incorporated by section 3 of the *National Round Table on the Environment and the Economy Act*[98] [NRTEE Act]. The NRTEE is an advisory and educative body whose members include representatives from "government, industry, labour, academia, environmental organizations and aboriginal groups,"[99] who are appointed by the Governor in Council[100] Its operations are funded primarily by Parliament, but also by project sponsors and by

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[93] *Supra*, note 43.

[94] *Ibid.*, s. 6(1).

[95] *Ibid.*, s. 6(1.1).

[96] Davies, Ward & Beck, "Canada: An Overview of the Canadian Environmental Protection Act 1999," Mondaq Business Briefing, 29 November 1999, at 9 of 16 (QL).

[97] *Ibid.*

[98] S.C. 1993, c. 31.

[99] Office of the Prime Minister of Canada, News Release, "Prime Minister announces appointments to the National Round Table on the Environment and the Economy" (16 February 2005) online: <http://www.pm.gc.ca/eng/news.asp?id=418>.

[100] NRTEE Act, *supra* note 98, s. 6.

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gifts.[101]

At least since 1998, the NRTEE has been providing expertise, education and advice on climate change and more particularly on emissions trading.[102] Recently, the Prime Minister of Canada announced:

> With the coming into force of the *Kyoto Protocol* and building on climate change action already underway, the Government of Canada is requesting the NRTEE's advice and recommendations in the development of a long-term energy and climate change strategy for Canada.[103]

4. Multilateral and Bilateral Agreements

It is always open to the governments of Canada and the 10 provinces and 3 territories to coordinate strategies and action on environmental issues through bilateral or multilateral intergovernmental agreements. The power to make these agreements is part of the inherent executive powers of Her Majesty in Right of Canada or a province,[104] but they are also provided for and regulated by statute.

In Alberta, all intergovernmental agreements,[105] including intergovernmental

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[101] *Ibid.*, s. 5(f), NRTEE Annual Report, 2002-03 online: NRTEE <http://www.nrtee-trnee.ca/Publications/AnnualReports/AnnualReport_2002-2003/AR2002-2003_E/AR2002-2003_E.pdf>.

[102] National Round Table on the Environment and the Economy, Canada's Options for a Domestic Greenhouse Gas Emissions Trading Program, (Ottawa: National Round Table on the Environment and the Economy, 1999) at p. 5.

[103] *Supra* note 99.

[104] Hogg, *supra* note 31, at 13-12.1. See also Franklin S. Gertler, "Lost in (Intergovernmental) Space: Cooperative Federalism in Environmental Protection," in, Steven A. Kennett, (ed.) *Law and Process in Environmental Management: Essays from the sixth CIRL Conference on Natural Resources Law* (Ottawa: Canadian Institute of Resources Law, 1993) at 271.

[105] The term "intergovernmental agreements" is defined for the purposes of section 11, in section 11(1)(a) of the *Government Organization Act, infra* note 106, as: "an agreement or arrangement under which (i) one of the one of the parties is the Government of Alberta or a Minister, agency or official of the Government of Alberta, and (ii) the other party or one of the other parties is the Government of Canada or a minister, agency or official of it, the government of another province or territory of Canada or any minister, agency or official of it, or the

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environmental agreements are subject to section 11 of the *Government Organization Act*.[106]

Section 11(2)(c) provides:

> Notwithstanding any other Act, an Intergovernmental agreement to which this section applies is not binding on the Government of Alberta or any Minister, agency or official of it unless . . . (c) it is approved by the [Minister of International and Intergovernmental Relations (IIR)].

It is interesting to note that the 1998 CCME Canada-Wide Accord on Environmental Harmonization was signed by the Hon. Ty Lund, then Minister of Environmental Protection. However, there is no evidence on the copy of the Accord available on the CCME website that the Accord was approved by the Hon. David Hancock, then Minister of Federal and Intergovernmental Affairs (the 1998 equivalent of the current IIR) or that Minister Hancock was a party to its negotiation, as required by section 1(c) of Schedule 6 of the *Government Organization Act*.[107] Alberta should ensure its intergovernmental agreements comply with its own legislation. However, the importance of an intergovernmental agreement may be in its implementation rather than its enforceability through the application of public and private law principles.[108]

Subject to the requirements of the *Government Organization Act*, the Minister of Environment has authority under the *Environmental Protection and Enhancement Act* [EPEA] to enter into environmental agreements as follows:

> Agreements
> 19 The Minister may on behalf of the Government enter into agreements relating to any matter pertaining to the environment with

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government of a foreign country or any state, minister, agency or official of it."

[106] R.S.A. 2000, c. G-10.

[107] *Ibid.*

[108] Gertler points out that "the legal nature of such agreements is unclear, particularly as regards enforceability and the application of public and private law principles," Gertler, *supra* note 104, at 271.

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(a) the government of another jurisdiction or an agency of that government,
(b) a Government agency, or
(c) any person.[109]

The Federal Minister of Environment may negotiate agreements under section 9 of CEPA, 1999 with one or more provincial governments or with an aboriginal people respecting the administration of CEPA, 1999.[110] After the federal minister publishes notice of an agreement under this section, "any person may file with the Minister comments or a notice of objection."[111] The Minister is then responsible to report on how the Minister dealt with comments and objections. Thereafter, with the approval of the Governor in Council, the Federal Minister of Environment may enter into an agreement for a maximum term of 5 years, respecting the administration of CEPA, 1999.[112] However, the Minister may not by an agreement under s. 9, "limit or restrict the carrying out of any action the Minister deems necessary for the administration and enforcement of this Act, including the conduct of inspections or investigations."[113] An intergovernmental agreement under s. 9 of the CEPA, 1999 could cover the administration of CEPA, 1999 provisions respecting regulation of greenhouse gases throughout Canada.

CEPA, 1999 provides another way for provincial governments to coordinate their actions on the control of greenhouse gas emissions with those of the Federal Government. Where a province has legislation equivalent to regulations under section 167 of CEPA, 1999, controlling air pollution (which should, by definition under section 3, includes the emission of greenhouse gases), including provisions for investigation and enforcement at the instigation of private

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[109] RSA, 2000, c. E-12, s. 19.

[110] *Supra* note 43, s. 9.

[111] *Ibid.*, s. 9(3).

[112] *Ibid.*, s. 9(4), (5) and (7).

[113] *Ibid.*, s. 9(9).

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complainants, the Governor in Council may suspend the operation of the relevant CEPA, 1999 provisions, to allow the provincial provisions to operate.[114] However, intergovernmental agreements under this provision have often been seen as a means to avoids public input, public accountability and the application of federal environmental enforcement mechanisms.[115]

The Commissioner of the Environment for Sustainable Development (hereafter, CESD) established 7 criteria for evaluating the effectiveness of federal-provincial environmental agreements that, if used, should help avoid the pitfalls of past experience:

- a clear goal of protecting the environment while decreasing the costs to the taxpayer;
- mechanisms designed to hold responsible parties accountable, such as requirements for audit;
- regular reporting to Parliament so that everyone can understand whether the agreements are working;
- an analysis of the associated risks before entering into an agreement;
- a plan in place to reassume federal responsibilities if necessary;
- a clear understanding of who is responsible for what;
- an evaluation of how well the agreements are working, both in improving environmental quality and in streamlining administrative overlap and duplication.[116]

Of course, interjurisdictional cooperation should not be limited to federal, provincial and territorial governments but also should include larger municipalities, aboriginal groups, corporations, trade unions and not-for-profit organizations. The cooperation, innovation and determination of leaders and members from these organizations would be invaluable in a national effort to reduce greenhouse gas emissions.

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[114] *Ibid.*, s. 10. There is currently nothing in the *Alberta Equivalency Order*, SOR/94-752, made under the predecessor of section 10 of CEPA, 1999 that relates to greenhouse gas emissions.

[115] See Gertler, *supra* note 104, at 263, 270, 271.

[116] Commissioner of the Environment for Sustainable Development, "Streamlining Environmental Protection Through Federal-Provincial Agreements: Are They Working?," 1999 Report to the Parliament of Canada, Ch. 5.

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D. Conclusion

It is evident that there is sufficient scope and abundant need for federal-provincial cooperation in policies and legislation promoting and regulating greenhouse gas emissions reductions, sink enhancements and emission trading in Canada, to ensure national compliance with Canada's *Kyoto Protocol* commitments.

The next section will examine and evaluate what the Governments of Alberta and Canada have done, plan to do and must yet do to substantially reduce greenhouse gas emissions, enhance sinks and promote flexibility mechanisms, while adhering to the principles of the Rio Declaration.

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Chapter 5

Greenhouse Gas Emission Reduction Strategies of Canada and Alberta

A. Introduction

Much has occurred politically at the international level (and considerable amounts of carbon dioxide [CO_2] have been emitted globally) since 1957 when Roger Revelle and Hans Suess declared that "human beings are now carrying out a large scale geophysical experiment"[1] by returning millions of years worth of sedimentary carbon stores to the atmosphere within only a few centuries. The international scientific community took two decades to awaken to the risks raised by Revelle and Suess,[2] but once awake, it has attempted, metaphorically speaking, to raise the international political and legal communities from their mattresses. Many countries are trying to focus their vision as they awaken to the risks of climate change. However, many governments, including the governments of Canada and Alberta, are attempting to focus one eye on reducing greenhouse gas emissions, but the other eye (the dominant eye) is turned in a different direction, towards generating economic prosperity. These areas of focus need not be mutually exclusive.[3] However, in the cases of Canada and Alberta, due to divergent directions of

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[1] Roger Revelle & Hans S. Seuss, "Carbon Dioxide Exchanges Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO_2 During the Past Decades," (1957) 9 Tellus 18, at 18-27.

[2] Lydia Dotto, *Storm Warning: Gambling with the Climate of Our Planet* (Toronto: Doubleday Canada Limited, 1999) at 212.

[3] As will be discussed below, greenhouse gas emissions reductions are consistent with economic development, as long as development is sustainable. See *United Nations Framework Convention on Climate Change*, 9 May 1992, 31 I.L.M. 849 (1992) (entered into force 21 March 1994) [FCCC], Article 3.4 at 855. Mark Drumbl points out: "International environmental law is, and will remain, as concerned with economic development as with protecting the environment," Mark A.Drumbl, "Poverty, Wealth, and Obligation in International Environmental Law" (2002) 76 Tul. L. Rev. 843 at 845.

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focus and short-sightedness, vision is double, uncoordinated and blurred. The prescription lenses of scientific scrutiny and public education may correct governmental myopia, but corrective legislative surgery involving muscles controlling the direction of focus may be necessary to ensure that each pair of eyes, being those of the Governments of Canada and of Alberta, are able to focus clearly on a more complete picture. The complete picture necessarily includes climate change mitigation and adaptation[4] together with sustainable economic development.

In this chapter the plans of the Governments of Canada and Alberta to reduce greenhouse gas emissions, enhance carbon sinks and prepare for domestic and international emission trading are discussed. In chapter 6, these plans will be evaluated in light of twelve selected evaluation criteria, and suggestions made for improvements.

As discussed in chapter 4, due to Canada's federal system and inherent jurisdictional limitations imposed by the Canadian *Constitution*[5] on federal powers to control many aspects of national greenhouse gas emissions, it is necessary to consider provincial actions when discussing Canada's compliance with the *Kyoto Protocol*.[6] Alberta was selected due to its significant economic activity fuelled by petroleum, natural gas and oil sands, and its accompanying high per

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[4] See *supra* chapter 2, conclusion nos. 2 through 6, at 26.

[5] *Constitution Act, 1867* (U.K.), 30 & 31 Vict., c. 3, as amended, reprinted in R.S.C. 1985, App. II, No. 5 [*Constitution*]. See also *supra* Chapter 4.

[6] *Conference of the Parties to the Framework Convention on Climate Change: Kyoto Protocol*, 10 December 1997, 37 I.L.M. 22 (entered into force 16 February 2005). According to the Government of Canada: "The hallmarks of any successful approach to addressing climate change in Canada will be extensive federal-provincial-territorial cooperation and collaboration and many public-private partnerships," Canada, Government of Canada, "A Discussion Paper on Canada's Contribution to Addressing Global Climate Change," (not dated) Government of Canada online: <http://climatechange.gc.ca/english/publications/canadascontribution/index.html.>

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capita level of greenhouse gas emissions,[7] making emissions control in this province through provincial policies and measures, an important part of a national *Kyoto Protocol* compliance strategy. Alberta was also selected because Alberta has been leading Canadian provinces in adopting a position, a plan and legislation respecting anthropogenic greenhouse gas emissions. However, Alberta's plan does not concentrate on reducing its total anthropogenic greenhouse gas emissions, but rather, Alberta's plan focusses on reducing emissions intensity.[8] Further, Alberta has adopted a longer term strategy than that adopted by Canada, which could make Canada's compliance with its *Kyoto Protocol* commitments during the period 2008 - 2012, significantly more difficult.[9]

The Governments of Canada and Alberta each published plans in the fall of 2002 for dealing with anthropogenic greenhouse gas emissions. The Alberta plan, entitled "Albertans & Climate Change: Taking Action"[10] was published in October 2002. The Government of Canada followed shortly thereafter by publishing in November 2002, its "Climate Change Plan for Canada."[11]

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[7] In 2000, Alberta had 31% of Canadian greenhouse gas emissions, but only about 10% of the nation's population. See Matthew Bramley, "An Assessment of Alberta's Climate Change Action Plan,", Pembina Institute for Appropriate Development, September 2002, Table 2, at p. 5., online: http://www.pembina.org/pdf/publications/plan_critique020906.pdf>; Government of Canada,"2001 Greenhouse Gas Inventory Shows Decline in Overall Emissions," News Release, Environment Canada, at p. 1 of 5, online: <http://www.ec.gc.ca/press/2003/030422_b_e.htm>; and Statistics Canada, "Population and Dwelling Counts, for Canada, Provinces and Territories, 2001 and 1996 Censuses," online: <http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-PR.cfm>.

[8] See *infra* chapter 6, evaluation of Alberta's plans at 150-173.

[9] See discussion *infra*, at 127.

[10] Alberta, Government of Alberta, "Albertans & Climate Change: Taking Action" (2002) [Alberta Plan] online: <http://www3.gov.ab.ca/env/climate/actionplan/docs/takingaction.pdf>.

[11] Canada, Government of Canada, "Climate Change Plan for Canada"(2002) [CCPC or the federal plan] online: <http://www.climatechange.gc.ca/plan_for_canada/plan/pdf/full_version.pdf>.

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B. Climate Change Plan for Canada

This section focuses on the current strategy set out in the "Climate Change Plan for Canada"[12] [CCPC], published in November 2002. The CCPC replaced Canada's "Action Plan 2000," released in October 2000. The Government of Canada first agreed to emission reductions under the FCCC, at UNCED in Rio de Janeiro in 1992. Canada agreed to the terms of the *Kyoto Protocol* in December 1997, but did not formally ratify the treaty until December 2002.

1. Key Components and Principles

The CCPC establishes short and medium-term actions to achieve Canada's *Kyoto Protocol* target during the commitment period, 2008 through 2012.[13] The CCPC outlines principles and premises upon which the federal plan is based,[14] sets emissions reduction targets for seven economic sectors,[15] and encourages each Canadian to reduce his or her personal greenhouse gas emissions by one tonne of CO_2 equivalent [CO_2e] per year.[16] It refers to climate change adaptation[17] and accountability,[18] but only briefly. The CCPC acknowledges that climate change is already occurring and cites evidence, including: the melting of the polar ice cap, warming temperatures, decreasing water levels in the Great Lakes, increasing forest insect infestations in British Columbia and an increase in extreme weather events across the country.[19]

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[12] *Ibid.*

[13] *Ibid.*, at iii.

[14] *Ibid.*, at 9.

[15] These include: transportation; housing and commercial/institutional buildings; large industrial emitters; renewable energy and cleaner fossil fuels; small and medium-sized enterprises and fugitive emissions; agriculture, forestry and landfills; and international emissions reductions, *Ibid.*, at 19.

[16] *Ibid.*, at 45.

[17] *Ibid.*, at 52.

[18] *Ibid.*, at 53.

[19] *Ibid.*, at 1.

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The CCPC recognizes the need to engage Canadians in every region, and that benefits and burdens of the plan should be shared across the nation.[20]

Based on Canada's *Kyoto Protocol* commitment and its greenhouse gas emissions increases since the 1990 base year through anticipated "business as usual" emissions through 2008, the CCPC sets a goal to reduce Canadian emissions by 240 megatonnes [MT] for each year of the five year Kyoto commitment period. Of this total, 80 MT in emissions reductions will be achieved through existing strategies announced in the Government of Canada's Action Plan 2000, in the 2001 federal budget and through sinks,[21] and 100 MT, through new strategies outlined in the federal plan. The CCPC does not address the remaining 60 MT of emissions reductions required under the *Kyoto Protocol*.[22]

The CCPC lists the following six key guiding principles:

> It must be a made-in Canada approach that is based on collaboration, partnerships and respect for jurisdiction. . . .
>
> There must be a reasonable sharing of benefits and burdens requiring responsible investment by all. . . .
>
> Our approach must be transparent and proceed step by step, keeping our Plan evergreen. . . .
>
> Minimize mitigation costs and maximize benefits. . . .
>
> Promote innovation. . . .
>
> Limit uncertainties and risks.[23]

Of the 80 MT emission reductions to be achieved through actions currently underway, the Plan specifies that 13 MT are to come from savings involving transportation and buildings,

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[20] *Ibid.*

[21] *Ibid.*, at 12.

[22] *Ibid.*, at 2.

[23] *Ibid.*, at 9-11.

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25 MT are to come from industrial emitters, 38 MT from agricultural and forestry sinks and from methane recoveries from landfills, and 2 MT of emission credits will be purchased from the international emissions market.[24]

The reduction of 100 MT from new actions are anticipated as follows: 12 MT from the transportation sector, 4 MT from buildings, 55 MT from large industrial emitters, 16 MT from other industrial emitters through technology, infrastructure and efficiency gains plus at least 10 MT purchased from the international emissions market.[25] A total of 20 to 28 MT are expected to be made available through agricultural and forest sinks and from other offsets[26] obtained from landfill recovery of methane. However, as these sink and offset credits will be available through the domestic Canadian emission market, it is anticipated these credits cannot be counted by Canada in reaching its *Kyoto Protocol* commitment.[27]

2. Transportation Sector

The Government of Canada plans to achieve 5.3 MT of its emission reductions in the transportation sector through a voluntary agreement negotiated in April 2005 with motor vehicle manufacturers to increase the fuel efficiency of new motor vehicles by 2010.[28] An additional 0.8 MT is to be achieved through consumer pressure to increase motor vehicle fuel efficiency

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[24] *Ibid.*, Table 1, at 11.

[25] *Ibid.*

[26] According to Rolfe, "in the context of greenhouse gases, offsets are often used to describe either projects that reduce net greenhouse gas emissions and are used to offset the emissions from another firm or the credits generated by such a project," Chris Rolfe, *Turning Down the Heat: Emissions Trading and Canadian Implementation of the Kyoto Protocol* (Vancouver: West Coast Environmental Law Research Foundation, 1998) at 167.

[27] CCPC, *supra* note 11, at 12.

[28] Natural Resources Canada, News Release, 2005/22, "Automobile Industry and Government Agree on Climate Change Action" 5 April 2005, online: Natural Resources Canada <http://www.nrcan-rncan.gc.ca/media/newsreleases/2005/200522_e.htm>.

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through a federal new vehicle ranking program.[29] The new standards could be included in regulations made under Part 7, Division V of CEPA, 1999,[30] which deals with national emissions marks of motor vehicles and associated vehicle emissions standards.

Under CEPA, 1999, Parliament, using the criminal law power, could in theory provide for minimum emissions efficiency requirements for cars and trucks, or it may choose to regulate vehicles operated across provincial or international borders under the federal power to regulate trade and commerce or interprovincial transportation.[31] However, to this point, Canada has adopted American standards for Canada's national emissions marks program as most motor vehicles purchased in Canada are manufactured in the USA or designed to meet American emission standards.[32] As the USA does not intend to ratify the *Kyoto Protocol*, there is cause for concern that American vehicle emission standards may prove inadequate for Canadian purposes during 2008 - 2012 or that the Canadian market may not be large enough to influence the direction of the American-based auto manufacturers. However, a recent California law requires stricter greenhouse gas emissions standards for motor vehicles manufactured in the 2009 and subsequent model years.[33] In the past, California law has had a powerful effect on North American motor vehicle fuel efficiency standards. However, subject to potential restraint of trade issues respecting the World Trade Organization [WTO] or *North America Free Trade Agreement*

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[29] CCPC, *supra* note 11, at 22.

[30] *Canadian Environmental Protection Act, 1999* [CEPA, 1999], S.C. 1999, c. 33. See also the *On-Road Vehicle and Engine Emission Regulations*, (2002) SOR/2003-2 and the *Motor Vehicle Fuel Consumption Standards Act*, R.S.C. 1985, c. M-9 [Not in force].

[31] *Constitution, supra* note 5, sections 91(2), (27), (29) and 92(10)(a).

[32] *On-Road Vehicle and Engine Emission Regulations*, *supra* note 30.

[33] Matthew Bramley, "A comparison of Current Government Action on Climate Change in the U.S. and Canada,", Pembina Institute for Appropriate Development, May 2002, at 4, 5 and 35, online: http://www.pembina.org/pdf/publications/reportcard_020517.pdf.

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[NAFTA],[34] Canada could act independently of the USA, imposing stricter emission standards on new vehicles manufactured in or imported into Canada, than those imposed by the USA.

Other concerns that arise over the federal Plan are that the proposed new vehicle emission standards will apply only to new vehicles and may not be introduced until 2010.[35] National emissions reductions would be small during the first year, due to a limited number of new vehicles on the roads although they would increase in subsequent years. However, successful achievement of Canada's Plan requires 6 MT emissions reductions from new vehicles for each of the five years of the commitment period, meaning that much more than 6 MT in reductions must be achieved in latter years if reductions in earlier years are at a lower level.

Canada also intends to achieve 7.8 MT of emission reductions through public transit, urban planning and other approaches designed to reduce urban transportation emissions.[36] Less than a MT of these reductions are expected through the current Urban Transportation Showcase Program that demonstrates effective urban transportation projects across the country. The other 7 MT are to be achieved through federal infrastructure funding for urban public transit.[37] Emissions reductions in the area of urban transit will depend upon Federal-provincial-municipal cooperation. Federal jurisdiction in this area may be effectively limited to incentive funding, fuel taxes and perhaps, promoting transit vehicle emission standards.

Federal and provincial fuel tax exemptions for renewable ethanol fuel mixed with

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[34] See Glenn M.Wiser, " The Clean Development Mechanism Versus the World Trade Organization: Can Free-market Greenhouse Gas Emissions Abatement Survive Free Trade?" (1999) 11 Geo. Int'l Envtl. L. Rev. 531 at 553; and James P. III Duffy, "The Environmental Implications of a North American Free Trade Agreement" (1993) 10 Hofstra Lab. L.J. 561 at 586-590.

[35] CCPC, *supra* note 11 at 21.

[36] *Ibid.*, at 23.

[37] *Ibid.*

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gasolene and biodiesel are to provide consumer incentives for 2.8 MT in greenhouse gas emission reductions during the period 2008-2012. The federal government hopes that 35% of the gasoline purchased by Canadians will be from renewable sources.[38] A further 4.3 MT is to be achieved through voluntary industry agreements, education and demonstration projects, creating increased efficiencies in transporting goods by truck, rail, ship and aeroplane.[39] Unfortunately, voluntary environmental programs have been criticized as ineffective.[40]

3. Housing and Commercial/Institutional Buildings

The Government of Canada plans to reduce emissions in this sector by 8 MT per year during the Kyoto commitment period, primarily through energy efficiency gains.[41] Building energy efficiency gains are to be achieved through improved design standards and building codes for new housing and commercial buildings, by retrofitting existing buildings and improving standards for appliances and equipment used within buildings. The federal government currently regulates the energy efficiency and labelling of household and other appliances under the *Energy Efficiency Act*.[42] It is also able to promote design standards such as its R2000 standard for new house construction, and can provide public education and financial incentives in these areas, but building codes are generally under provincial legislative jurisdiction. Emission reductions may be best achieved by this sector through federal-provincial-municipal program coordination.

4. Large Industrial Emitters

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[38] *Ibid.*, at 21, 22.

[39] *Ibid.*, at 23, 24.

[40] David R. Boyd, "Sustainability Law: (R)Evolutionary Directions for the Future of Environmental Law" (2004) 14 J. Env. L. & Prac. 357, at 376, 377. See also David Suzuki Foundation, et al., Open letter to the Right Honourable Paul Martin, "Re: Canada's Implementation of the *Kyoto Protocol*," 12 January 2005, at 2 of 3, Pembina Institute online: <http://www.pembina.org/pdf/whatsnew/Letter_to_PM_final.pdf>.

[41] CCPC, *supra* note 11, at 25.

[42] S.C. 1992, c. 36. See also the *Energy Efficiency Regulations*, SOR/94-651.

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This massive sector, which produces about half of all Canadian greenhouse gas emissions, includes the oil and gas industry, electricity generators, the mining and manufacturing industries, cement plants and iron and steel mills.[43] As the sector with the highest emissions, it has the greatest scope for emission reductions. However, the industries listed above are regulated primarily by provincial governments. Federal legislative control over these emissions may be limited, unless Parliament establishes an effective national emissions trading regime that includes regulated emissions caps. Such a regime may be possible under the national concern doctrine of the federal government's POGG power, combined perhaps with federal trade and commerce and criminal law powers.[44]

Canada's currently operating programs for this sector include the Climate Change Voluntary Challenge and Registry Program [VCR], the Canadian Industry Program for Energy Conservation [CIPEC] plus an additional $370 million pledged to be spent over 5 years to support wind energy electricity generation, CO_2 audit and bench-marking programs and CO_2 capture and storage projects.[45] The government expects to reduce greenhouse gas emissions during the commitment period by an average of 25 MT per year under these existing programs.[46]

The Government of Canada, supported by all provincial and territorial ministers of energy and environment established the VCR in 1995. It became a private-public partnership in 1997, a majority of its funding coming from industry.[47] Voluntary registrants are invited to report

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[43] *Ibid.*, at 28.

[44] *Constitution*, *supra* note 5, s. 91(chapeau), (2) and (27). See the discussion *supra* in Chapter 4, at 89-92.

[45] CCPC, *supra* note 11, at 29. See also Rolfe, *supra* note 26 at 142, 143 and 146.

[46] CCPC, *ibid.*, at 28, 29.

[47] Richard L. Ottinger & Mindy Janye, "Global Climate Change *Kyoto Protocol* Implementation: Legal Frameworks for Implementing Clean Energy Solutions," 18 Pace Envtl. L. Rev. 19 at 73. See also Alastair R. Lucas, "Voluntary Initiatives for Greenhouse Gas Reduction: The Legal Implications" (2000) J. Envtl. L. & Prac. 89 at 89, 90.

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on greenhouse gas emissions and to set emissions reduction targets. Many VCR participants have reduced costs and improved management and competitiveness through greenhouse gas emissions reductions while participating in the VCR program.[48] However, Hornung and Bramley indicate that in general, the greenhouse gas emissions of VCR participants that reported their emissions (many did not) have been rising at approximately national average rates, raising questions of the overall effectiveness of this voluntary program[49] and the reasonableness of the government's emissions reduction expectations from existing and future voluntary programs.

The Government of Canada plans to achieve a further 55 MT in emissions reductions in this sector are vague, although the CCPC indicates that the government will use negotiated or perhaps imposed covenants by using regulatory controls or financial incentives or penalties.[50] The Plan implies that regulatory controls over Alberta's oil and gas industry would be imposed by Alberta.[51] The authority of the Government of Canada to regulate Alberta's petroleum, natural gas and oil sands industries within boundaries of the province is limited.[52] However, Parliament has authority to regulate the off-shore oil and gas industry.[53]

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[48] Sylvie Boustie, Marlo Raynolds and Matthew Bramley, "How Ratifying the *Kyoto Protocol* Will Benefit Canada's Competitiveness," (June 2002) at 28, Pembina Institute for Appropriate Development, online: <http://www.pembina.org/pdf/publications/competitiveness_report.pdf>.

[49] Robert Hornung & Matthew Bramley, "Five Years of Failure: Federal and Provincial Government Inaction on Climate Change During a Peirod of Rising Industrial Emissions," (March 2000) at 7-11, Pembina Institute of Appropriate Development, online: <http://www.pembina.org/pdf/publications/fiveyears.pdf>.

[50] CCPC, *supra* note 11, at 29, 30.

[51] *Ibid.*, at 31.

[52] See Peter W. Hogg, *Constitutional Law of Canada*, Lose-leaf Edition (Scarborough: Thomson Canada Ltd., 1997) [Hogg] at 29-2 - 29.5 and the *National Energy Board Act*, R.S.C. 1985, c. N-7.

[53] See: *Reference Re: Ownership of Off Shore Mineral Rights (British Columbia)* [1967] S.C.R. 792; *Reference re: Seabed and subsoil of the continental shelf offshore Newfoundland* [1984] 1 S.C.R. 86; *Canada Oil and Gas Operations Act*, R.S.C. 1985, c.

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The federal government also plans to rely at least in part on domestic and international emissions trading.[54] Canada probably will not qualify to sell emissions credits internationally under emissions trading rules established by the Conference of the Parties [COP] under the *Kyoto Protocol* because it will have to retain all of its emission units in its commitment period reserve, as required by a decision of the COP.[55] Any domestic Canadian emission trading regime must clearly establish and track ownership of credits or offsets to ensure that emission reductions are not double counted.[56]

The vagueness of the federal government Plan and its apparently heavy reliance on voluntary measures, domestic offsets and international emission credits are reasons for concern. Although international emission credits may be readily available, their cost is uncertain. The federal government has assured Canadian industry that it will not have to pay more than $15 per tonne for emission credits. (The federal government will subsidize any additional costs).[57] However, precise terms have not been established and there is a possibility that the federal emission credit price guarantee might become prohibitively expensive or that a future

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O-7; *Canada Petroleum Resources Act*, R.S.C. 1985, c. 36 (2nd Supp.); *Hibernia Development Project Act*, S.C. 1990, c. 41; *Canada-Newfoundland Atlantic Accord Implementation Act*, S.C. 1987, c. 3; *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, S.C. 1988, c. 28.

[54] CCPC, *supra* note 11, at 31.

[55] Conference of the Parties, *Modalities, rules and guidelines for emissions trading under Article 17 of the Kyoto Protocol*, FCCC Dec. 18/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.2 (2002) [Dec. 18/CP.7], Annex, paragraph 6 at 54, online: UNFCCC <http://unfccc.int/files/kyoto_mechanisms/cdm/application/pdf/13a02.pdf#page=50>.

[56] Chris Rolfe cites a case under Canada's VCR, where each of three contributing parties (the pulpmill owners, the energy company that built the natural gas pipeline and the government that subsidized the pipeline) claimed full credit for switching from oil to natural gas at pulpmills on Vancouver Island. See Rolfe, *supra* note 26, at 11, 220-222.

[57] Elisabeth DeMarco, Robert Routliffe & Heather Landymore, "Canadian Challenges in Implementing the *Kyoto Protocol*: A Cause for Harmonization," (2004) 42 Alta. L. Rev. 209 at 213.

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government may change its mind for other reasons. An additional problem with emissions trading is that a wide-spread purchase of emissions credits could mean that Canada is taking credit for emissions reductions achieved more than 15 years ago in Russia or Ukraine instead of reducing emissions domestically.[58] The CCPC indicates that "Canada . . . would buy such permits only if the selling country agrees to invest the proceeds from the sale in projects and activities that contribute to emissions reductions."[59] One potential problem with this arrangement is that the "green" project undertaking with the proceeds of sale could generate additional AAUs or RMUs for the EIT country, that could subsequently be used to offset the country's emissions in a future commitment period or sold to other Annex I countries, in either case, negating the benefits of the original arrangement.

5. Electricity Generation Through Renewable Energy or Cleaner Coal Technologies

This sector covers electricity generated from renewable energy sources including hydro, wind, solar and biomass.[60] It also includes potential, but experimental projects for CO_2 capture and storage at a new or a retrofitted electrical generation facility.[61] The Government of Canada plans to reduce greenhouse gas emissions by 23 MT per year in these areas.[62]

Hydro-electricity is already used extensively in those parts of Canada where the resource is available.[63] However, large hydro-electric projects incur huge capital costs,[64] create significant,

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[58] Emission units purchased from EIT countries are often referred to as "hot air." See Jutta Brunnee, "A Fine Balance: Facilitation and Enforcement in the Design of a Compliance Regime for the *Kyoto Protocol*" (2000) 13 Tul. Envtl. L.J. 223 at 233.

[59] CCPC, *supra* note 11 at 43.

[60] *Ibid.*, at 34.

[61] *Ibid.*, at 36.

[62] *Ibid.*, at 33.

[63] For example, Quebec, Manitoba and British Columbia already generate most of their electricity from hydro-electric sources, *ibid.*, at 46.

[64] Ottinger & Janye, *supra* note 47, at 38.

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negative environmental consequences[65] and produce prodigious amounts of greenhouse gas emissions in flooded areas.[66] The federal government intends to focus on what it terms "low-impact, large-scale hydro projects,"[67] but based on scientific research,[68] it is difficult to see how credit for emission reductions would be available, when greenhouse gas emissions from reservoirs appear to be so high.

The Government of Canada has pledged $260 million to promote wind power production, in hopes of increasing wind power capacity in Canada by over 1,000 Megawatts by 2007.[69] Although wind resources are plentiful in some areas of the country, they are not always found close to electrical demand, necessitating large expenditures on transmission facilities to bring the electricity to large industrial or urban centres.[70]

The cost of wind, solar and other renewable power projects is "plummeting" as technology and efficiency improve substantially.[71] Although currently more expensive to generate, solar power has the advantage of availability during peak demand times during the day, and may be particularly useful in bringing power to remote areas of Canada to which

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[65] *Ibid.*

[66] Vincent St. Louis, et al., "Reservoir Surfaces as Sources of Greenhouse Gases to the Atmosphere: A Global Estimate," *BioScience*, Vol. 50, No. 9, September 2000 at 766. See also Danielle Knight, "Report Highlights Dams' Role in Global Warming," Inter Press Service, Washington, 12 June 2002, online: <http://www.southbaymobilization.org/newsroom/earth/articles/02.0612.DamsPlayBigRoleInGlobalWarming.htm>.

[67] CCPC, *supra* note 11 at 34.

[68] St. Louis, *supra* note 66.

[69] CCPC, *supra* note 11 at 34.

[70] Climate Change Central, "Changes Needed to Re-establish Alberta Dominance in the Canadian Wind Energy Market"(8 January 2004), online: <http://www.climatechangecentral.com/default.asp?V_DOC_ID=1062&V_LANG_ID=5>.

[71] Howard A. Learner, "Cleaning, Greening, and Modernizing the Electric Power Sector in the Twenty-first Century," (2002) 14 Tul. Envtl. L.J. 277 at 279.

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transmission facilities have not yet been constructed.[72]

In addition, under the CCPC, the Government of Canada proposes to promote use of CO_2 capture and storage technologies to return CO_2 emitted from intensive greenhouse gas emission sources such as coal-fired power plants and injecting it into oil reservoirs to enhance oil recovery or into underground aquifers or other depleted reservoirs for long-term storage.[73]

6. Small and Medium-Sized Enterprises and Fugitive Emissions

The CCPC refers to more than 34,000 small and medium-sized manufacturing enterprises [SMEs] in Canada that account for about 5 percent of industrial greenhouse gas emissions.[74] The federal plan does not contemplate participation by these operations in the domestic Canadian emissions trading regime, but proposes to achieve two to three MT emissions reductions during the commitment period through cost incentives related to improved energy efficiency in these industries.[75] The federal government proposes to extend CIPEC to SMEs, encouraging the latter to set voluntary emission reduction targets and providing at least partial funding for energy audits, feasibility studies, and setting standards for best practices.[76] Once again, reliance on voluntary measures is probably insufficient to enable Canada to meet its Kyoto commitment.[77]

The Government of Canada plans to achieve 4 MT emissions reductions per year by reducing venting and flaring during petroleum production and from physical process leakage

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[72] *Ibid.*, at 285 and 298.

[73] CCPC, *supra* note 11 at 35, 36.

[74] *Ibid.*, at 37.

[75] *Ibid.*

[76] *Ibid.*, at 38.

[77] See *supra* note 40 and accompanying text.

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during natural gas processing, transmission and storage.[78] The federal government expects to rely on the relevant provincial governments such as the Alberta Government to establish voluntary or regulated industry standards to achieve this goal.[79]

7. Agriculture and Forestry Sinks, and Landfill Offsets

According to the CCPC, Canadian agriculture produces approximately 60 MT of greenhouse gas emissions (primarily methane and nitrous oxide) annually and landfills emit a further 24 MT of methane.[80] Gross emissions from Canadian forestry activities are less certain, although some have concluded that forestry has become a net carbon source.[81] This is a serious concern if Canada expects significant greenhouse gas emissions reductions from Canadian forest sinks. It is expected that Canadian agricultural soils will be net sinks during the commitment period. They were net sources in 1990.[82] However, the soil is capable of storing only so much organic carbon and sinks developed over several years through low-till agricultural practices could be lost in a single season of intensive cultivation.

The federal government anticipates reducing national agricultural emissions by 5.8 MT per year through Action Plan 2000 and the Greencover Canada program under the federal-provincial-territorial Agriculture Policy Framework,[83] committing $110 million in farm incentives to plant shelter belts and replace annual crops with perennial forage crops.[84] The

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[78] CCPC, *supra* note 11 at 38.

[79] *Ibid.*

[80] *Ibid.*, at 39.

[81] Rolfe, *supra* note 26, at 248, 338.

[82] David Suzuki Foundation, "Taking Credit: Canada and the Role of Sinks in International Climate Negotiations," (2001) at 11, online: <http://www.davidsuzuki.org/files/Sinks_Final2.pdf>.

[83] CCPC, *supra* note 11 at 39.

[84] Stepan Wood, "Canada's 'Forgotten Forests': Or, How Ottawa is Failing Local Communities and the World in Peri-Urban Forest Protection" (2004) 14 J. Env. L. & Prac. 217 at

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CCPC anticipates that these agricultural and forest sinks will make available up to 28 MT for domestic offsets usable by the large industrial emitters.[85] This figure is doubtful due to the uncertainty surrounding forest sinks mentioned above.[86] In any event, Canada can only claim a maximum of 12 MT CO_2e from forest sinks for each year of the commitment period.[87] The CCPC indicates that a further 8 MT of landfill methane could be captured during the commitment period at a reasonable cost.[88]

8. International Emission Reduction Activities

The Government of Canada proposes reducing Canadian emissions by 2MT through payments of $15 million to the World Bank's Prototype Carbon Fund [PCF], which funds, in developing countries, sustainable development projects that reduce greenhouse gas emissions.[89] For Canada to obtain credit for such payments, Canada and the project must qualify under *Kyoto Protocol* and COP rules as a Clean Development Mechanism [CDM] project.[90] Canada also plans under the CCPC to pay $100 million to the Canada Climate Change Development Fund, most of which will support other CDM or Joint Implementation [JI] projects in former Warsaw Pact [EIT] countries whose economies are in transition, and a further $20 million directly to

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247-248.

[85] CCPC, *supra* note 11 at 13.

[86] See comment by Rolfe, *supra* note 56 and accompanying text.

[87] Conference of the Parties, *Land use, land-use change and forestry*, Dec. 11/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.1 (2002) [Dec. 11/CP.7], at 54, online: UNFCCC <http://unfccc.int/resource/docs/cop7/13a01.pdf>.

[88] CCPC, *supra* note 11 at 41.

[89] *Ibid.*, at 43.

[90] *Kyoto Protocol*, *supra* note 6, Art. 12, at 38; and Conference of the Parties, *Modalities and procedures for a clean development mechanism as defined in Article 12 of the Kyoto Protocol*, Dec. 17/CP.7, UNFCCCOR, 7th Sess., UN Doc. FCCC/CP/2001/13/Add.2 (2002) [Dec. 17/CP.7], at 20, UNFCCC online: <http://unfccc.int/resource/docs/cop7/13a02.pdf> .

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Canada's CDM/JI Office to further private sector participation in these projects.[91] Finally, Canada indicates in the CCPC that it plans to purchase at least 10 MT of emissions units from the international market, to help Canada achieve its Kyoto emissions reduction target.[92] Estimating a price of roughly $10 per tonne on the international emissions units market, this will cost Canada about $100 million.

C. Albertans and Climate Change: Taking Action

1. Introduction

In this section, the October 2002 plan of the Government of Alberta, "Albertans & Climate Change: Taking Action" [Alberta Plan][93] is discussed. The Alberta Plan followed the release of its draft "Plan for Action" in May 2002 and consultations with stakeholders.[94] It focuses on greenhouse gas emissions reductions among key emissions sectors, emissions trading, reducing Government of Alberta emissions, energy conservation and efficiency, technology development, underground CO_2 storage, renewable and alternative energy sources, forest and agricultural sinks, and climate change adaptation.[95]

Alberta's stated goal is to cut greenhouse gas "emissions in the province relative to gross domestic product [GDP] by 50 per cent below 1990 levels" by 2020.[96] The term "emissions intensity" is used to describe emissions relative to provincial GDP.[97] The Alberta Government

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[91] CCPC, *supra* note 11 at 42.

[92] *Ibid.*

[93] Alberta Plan, *supra* note 10.

[94] *Ibid.*, at 1.

[95] *Ibid.*, at 1-3.

[96] *Ibid.*, at 2.

[97] *Ibid.*, at 41.

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expects to reduce emissions from its business as usual [BAU] level by 20 MT CO_2e per year by 2010 and by 60 MT per year by 2020.[98] However, if the Alberta goals are achieved, provincial emissions will be 67 MT (39%) higher in 2010 than in 1990 and remain 47 MT (27%) higher in 2020 than in 1990.[99] In other words, over the next 15 years, Alberta plans to increase provincial greenhouse gas emissions from 1990 levels, which conflicts with Canada's *Kyoto Protocol* commitment to reduce emissions 6% from 1990 levels during the commitment period.[100] One of the main driving forces behind the emissions increases are large increases in energy-intensive oil sands processing capacity since 1990.[101]

Alberta argues that its emissions intensity approach promotes energy efficiency, decreases emissions from BAU levels, is consistent with the approach of the U.S.A. (a major trading partner), and preserves economic development in the province.[102] Alberta further argues that this approach promotes use of best industry practices and best available technology, eventually leading to actual emissions reductions.[103] A potential benefit of this approach is that pressure to improve energy efficiency will continue to exist even when economic activity levels off or decreases, contributing to global decreases in greenhouse gas concentrations. However, in an expanding economy, Alberta's target does not respond to the global need to reduce greenhouse gas emissions or to Canada's need to reduce its emissions to meet its Kyoto commitment. Matthew Bramley of the Pembina Institute points out that a plan to reduce

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[98] *Ibid.*, at 10.

[99] *Ibid.*, at 11.

[100] *Kyoto Protocol*, *supra* note 6, Annex B, at 42. See Bramley, *supra* note 7, at 3-6.

[101] Hornung & Bramley, *supra* note 49, at 15.

[102] Alberta Plan, *supra* note 10, at 10-12.

[103] *Ibid.*, at 12, 14.

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emissions intensity while increasing emissions has "no direct environmental relevance."[104]

If Alberta were to reduce its annual emissions to levels 6% below 1990 levels, which arguably is its fair share of planned Canadian reductions, these emissions would be approximately 161 MT in 2010 instead of the planned 258 MT, a difference of 97 MT CO_2e from what is in the Alberta Plan. Under the Alberta Plan, for Canada to reach its Kyoto Commitment, Canada will have to reduce its emissions by the planned 240 MT CO_2e in the 9 other provinces and 3 territories, which combined are responsible for less than 70% of Canadian emissions.[105] This significantly magnifies the Canadian Kyoto compliance challenge. Other provinces are unlikely to agree to make up Alberta's share of emission reductions, while Alberta thrives economically at their expense. From this perspective, the Alberta Plan appears to make Canadian compliance with the *Kyoto Protocol* virtually impossible under the negotiated and voluntary measures that dominate the CCPC. In substance, barring a severe economic recession, the Alberta Plan effectively forces the Government of Canada to impose clear emissions limits on all large industries in the country, including the Alberta oil, gas and oil sands industries, if Canada seriously plans to meet its *Kyoto Protocol* commitment.

Alberta in its Plan expressly recognizes the need for action on global climate change,[106] implicitly acknowledging the precautionary principle. However, the Alberta Government asserts that: "Environmental progress cannot be achieved in isolation of other policy objectives, including the need to maintain economic prosperity."[107] Alberta later states in its Plan:

> Responding to climate change requires substantive long-term improvements in efficiency and reductions in emissions. Absolute emission reduction targets simply force a

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[104] Bramley, *supra* note 7, at 3.

[105] *Ibid,* at 8.

[106] Alberta Plan, *supra* note 10 at 5.

[107] *Ibid.*, at 7.

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jurisdiction to bear the costs of emission reductions while displacing investment, jobs and emissions to nations without greenhouse gas emission reduction targets.[108]

An elected government in Canada cannot expect to survive for long if it ignores economic development. However, unless economic development is sustainable, it will lead to environmental and economic costs for current and future generations, just as financial debt must be repaid with interest at some future time or times. Significant increases in anthropogenic greenhouse gas emissions exacerbate climate change, resulting in future environmental damage and will require future, more drastic emissions reductions bound together with their economic, environmental and social costs.

Alberta is caught between two important, and under current technological constraints, almost unavoidably conflicting issues: one is developing extremely valuable oil sands resources while these resources retain their global market value;[109] the other is global climate change and resulting environmental damage. Alberta can choose to promote one issue over the other or seek a compromise between the two. Perhaps as an alternative, Alberta is looking for a way to develop its oil sands resources while making its processes significantly more energy efficient. However, unless Alberta can reduce its greenhouse gas emissions more than it has planned, its oil sands developments do not appear to be sustainable and may be inconsistent with several Rio Declaration principles discussed below.

Alberta wants all sectors to be involved in greenhouse gas emissions intensity reductions within the province, but without losing competitive advantage to the USA, Alberta's largest

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[108] *Ibid.*, at 12.

[109] In 2003, Alberta produced 0.230 billion barrels of conventional crude oil and its crude bitumen production (from oil sands) during the same period was 53% higher at 0.352 billion barrels. Alberta's remaining established reserves at 31 December 2003 were 1.6 billion barrels of conventional crude oil and 174 billion barrels of crude bitumen, reflecting the huge economic potential of Alberta's oil sands, Alberta Energy and Utilities Board [AEUB], *Alberta Reserves 2004 and Supply/Demand Outlook 2004-2013* (AEUB: Calgary, 2004) AEUB online: <http://www.eub.gov.ab.ca/bbs/products/STs/st98-2004.pdf> at 2.

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trading partner.[110] Alberta's Plan focuses on technology and on energy conservation and efficiency.[111] Alberta recognizes the need to measure and manage progress under its plan "in a timely and effective manner."[112]

Alberta has stated that it plans to work collaboratively with the federal and other provincial governments and with stakeholders in achieving its goal to decrease its emissions intensity.[113] This may be possible with respect to initiatives to increase energy efficiency, develop technology or reduce emissions in certain sectors. However, it is difficult to see how the Alberta and federal governments can collaborate well when the Government of Canada has pledged internationally to decrease emissions substantially while Alberta plans to increase them.

2. Negotiated Agreements with Key Emissions Sectors

The Alberta Plan includes negotiated emissions management agreements with the electricity, oil and gas and nine other sectors, beginning in 2002.[114] To provide a "level playing field," these agreements will be supported by regulatory legislation.[115] After receiving an influential report from the Clean Air Strategic Alliance [CASA][116] on improvements to gas

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[110] Alberta Plan, *supra* note 10, at 7, 8.

[111] *Ibid.*, at 8.

[112] *Ibid.*, at 7.

[113] *Ibid.*, at 7.

[114] *Ibid.*, at 2.

[115] *Ibid.*, at 15. See also the *Climate Change and Emissions Management Act*, S.A. 2003, c. C-16.7 [CCEM Act] (formerly, Bill 37), preamble, ss1(c) to (e),(g),6,15 to 17,18(1)(f) to (j),(s), (aa), 20 proclaimed in force 1 November 2004.

[116] According to the CASA Internet home page, "The Clean Air Strategic Alliance (CASA) is a non-profit consensus-based association of senior representatives from government, industry and non-government organizations (including health and environmental groups) who have committed to developing and applying a comprehensive air quality management system for Alberta," CASA online: <http://www.casahome.org/>.

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flaring and venting[117] in the province, Alberta involved CASA in negotiations with electricity stakeholders. CASA prepared its report, "An Emissions Management Framework for the Alberta Electricity Sector Report to Stakeholders,"[118] covering all industrial emissions, including greenhouse gases. The Alberta Government has accepted the report's recommendations. The CASA electricity project team "agreed to base its greenhouse gas recommendations on intensity, recognizing that this may need to be revisited."[119] However, the project team has not yet been able to come to agreement on a "thermal generation greenhouse gas intensity target."[120] The report made a number of recommendations respecting greenhouse gases, including: clear rules for offset credits; a recommendation supporting the Alberta Government requirement that all new coal-fired generation units (and existing coal-fired units after the end of their design life) offset their greenhouse gas emissions to the level of a combined cycle natural gas turbine [NGCC]; that credits be given for early shut-down of coal-fired generation plants; and that emission credits be given for renewable and alternate energy generation.[121]

The Alberta Government recognizes the need to coordinate sectoral agreements among itself, industry and the federal government.[122] No sectoral agreements had been completed as of

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[117] Clean Air Strategic Alliance, "Gas Flaring and Venting in Alberta: Report and Recommendations for the Upstream Petroleum Industry by the Flaring/Venting Project Team," (June 2002) CASA online: <http://www.eub.gov.ab.ca/bbs/public/sourgas/CasaFinalReport2002.pdf>.

[118] Clean Air Strategic Alliance Electricity Project Team, "An Emissions Management Framework for the Alberta Electricity Sector: Report to Stakeholders," (Edmonton: Clean Air Strategic Alliance, 2003) CASA online: <http://casahome.org/uploads/Emissions_Mgmt_Framework.pdf>.

[119] *Ibid.*, at 57.

[120] *Ibid.*, at 58.

[121] *Ibid.*, at 58 - 60.

[122] Alberta Plan, *supra* note 10, at 8.

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March 2004.[123]

3. Emissions Trading

Under the Alberta Plan, the government, will establish a greenhouse gas offset registry compatible with Canadian, North American and international systems.[124] Alberta plans to use the Climate Change and Emissions Management Fund [CCEM Fund] to limit the cost to industry of emissions credits.[125] However, the CCEM Fund, established under section 10 of the *Climate Change and Emissions Management Act* [CCEM Act],[126] provides that it is to be used "only for purposes related to reducing emissions of specified gases or improving Alberta's ability to adapt to climate change." Emission units or credits are purchased for the purpose of offsetting,[127] not reducing emissions. Arguably, the province's stated purpose in the Alberta Plan is *ultra vires* the CCEM Act.

4. Government of Alberta Actions

The Alberta Government plans to reduce greenhouse gas emissions from its own activities by 26% below 1990 levels by 2005, through: completion of energy retrofits in 190 government facilities; using combined heat and power [CHP] units at certain research facilities; use of hybrid vehicles; constructing new buildings to exceed the Model National Energy Code for Buildings; installing solar panels on the Alberta Legislature building; and purchasing at least 10% of its electricity from renewable or alternate power sources.[128] The downsizing of the public

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[123] Alberta, Government of Alberta, "Albertans & Climate Change: Taking Action, Actions to Date," March 2004, at 7, Alberta online: <http://www3.gov.ab.ca/env/climate/keyactions/key_actions.pdf>.

[124] Alberta Plan, *supra* note 10 at 20.

[125] *Ibid.*

[126] CCEM Act, *supra* note 115, (s. 10 not yet proclaimed in force).

[127] For a definition of the term "offset", see *supra* note 26.

[128] Alberta Plan, *supra* note 10 at 21.

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service during the1990s and the privatization of certain government operations, such as highway maintenance, have contributed to Alberta's success in this area.

5. Technology and Research

Alberta plans to use its agent, the Alberta Energy Research Institute [AERI], an unincorporated board established under section 23(4) of the *Alberta Science and Research Authority Act,*[129] to fund and promote climate change research, including: research respecting alternate and renewable energy sources, cleaner coal technology, new oil sands technology, and CO_2 capture and transport technology.[130] Alberta also plans to finance research through Climate Change Central, the Petroleum Technology Alliance of Canada and the Canadian Environmental Technology Advanced Corporation.[131]

6. Underground CO_2 Storage

Alberta plans pilot projects using CO_2 for enhanced oil recovery [EOR] and enhanced coal bed methane recovery [ECBM], and to develop protocols for CO_2 storage in underground geologic formations.[132] It also plans to develop markets for CO_2 and to test zero-emission coal technology.[133]

7. Energy Conservation and Efficiency

The Alberta Plan includes support for Climate Change Central,[134] its Energy Solutions

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[129] *Alberta Science and Research Authority Act*, R.S.A. 2000, c. A-33.

[130] Alberta Plan, *supra* note 10 at 22, 23.

[131] *Ibid.*, at 24.

[132] *Ibid.*, at 3.

[133] *Ibid.*, at 26.

[134] Climate Change Central is a not-for-profit private corporation established on the initiative of the Government of Alberta in 2000 to involve public and private stakeholders in promoting climate change solutions for Alberta. See Nigel D. Bankes & Alastair R. Lucas, "Kyoto, Constitutional Law and Alberta's Proposals," (2004) 42 Alta. L. Rev. 355 at 367, and Climate Change Central online:

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Alberta office, and energy conservation and efficiency programs involving: retrofits of municipal buildings and street lights, energy efficiency labelling, the anti-idling campaign, household appliance replacement and reducing barriers to renewable and alternate micro-power generation.[135] Alberta will cooperate with Canada in delivering the EnerGuide Audit and Rebate program, and Energy Solutions Alberta will deliver in Alberta, energy conservation and efficiency programs of the Natural Resources Canada's Office of Energy Efficiency.[136] These are voluntary programs that may not lead to significant greenhouse gas emissions reductions.

8. Renewable and Alternative Energy Sources

Alberta plans to increase province-wide generation capacity from medium and large renewable and alternate energy sources by 3.5 per cent (including a total of 560 Megawatts of new capacity) by 2008,[137] coincidently, the beginning of the *Kyoto Protocol* commitment period. It is unclear how the province will achieve this without providing subsidies for these frequently more expensive sources of electricity. Based on the CASA framework,[138] the province plans to decrease the average emissions intensity of electrical generation in the province and will require retailers to disclose emissions intensity to consumers.[139] Alberta will also promote the development of a green corridor supporting alternate fuel vehicles between Calgary and Banff.[140]

9. Forest and Agricultural Sinks

Under the Alberta Plan, the government will establish rules governing ownership of

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<http://www.climatechangecentral.com/default.asp?V_DOC_ID=835>.

[135] Alberta Plan, *supra* note 10, at 3.

[136] *Ibid.*, at 30.

[137] *Ibid.*, at 3, 34.

[138] CASA EPT Report, *supra* note 118.

[139] Alberta Plan, *supra* note 10, at 3, 34.

[140] *Ibid.*, at 34.

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forest and agricultural soil sinks, and a land use registry to record removals of CO_2 through sinks, together with protocols to measure, verify and trade sink offsets.[141] The CCEM Act establishes a "sink right" as a property right[142] and provides for Lieutenant Governor in Council regulations "governing the allocation of physical and legal risks associated with emission offsets, credits and sink rights."[143] These are essential elements of an emissions trading scheme.[144] Provincial programs will also support current reduced summer fallow, zero till and reforestation practices.[145]

10. Climate Change Adaptation

Alberta has no plan to manage climate change adaptation, other than to study associated issues "based on sound science," together with other Canadian governments and organizations such as the Prairie Adaptation Research Collaborative, the University of Lethbridge's Water Institute for Semi-Arid Eco-Systems, and BIOCAP Canada Foundation.[146] It is understood that Alberta has plans in place to manage currently known climate change issues such as reduced stream flows[147] caused by glacial depletion, increases in vector-borne diseases such as the West Nile virus,[148] and threatening infestations of the mountain pine beetle,[149] but it is beyond the

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[141] *Ibid.*, at 4.

[142] CCEM Act, *supra* note 115, s. 9 (not yet proclaimed in force).

[143] *Ibid.*, s. 18(1)(l) (not yet proclaimed in force).

[144] See Bankes & Lucas, *supra* note 134, at 371.

[145] Alberta Plan, *supra*, note 10, at 34, 35.

[146] *Ibid.*, at 4, 38, 39.

[147] See Government of Alberta, "Water for life: Alberta's strategy for sustainability," online: Government of Alberta <http://www.waterforlife.gov.ab.ca/html/infobook/info2.html>.

[148] See Government of Alberta, "Alberta prepared for West Nile virus," 13 May 2003, online: Government of Alberta <http://www.gov.ab.ca/home/index.cfm?Page=453>.

[149] See Government of Alberta, "Mountain pine beetle control plan - February 2003," online: Alberta Sustainable Resource Development

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scope of this document to evaluate the adequacy of these plans.

11. *Climate Change and Emissions Management Act* Provisions

Although enacted in 2003, the only provisions of the CCEM Act in force as of 1 January 2005, are those concerning industrial greenhouse gas emissions reporting, which came into force on 1 November 2004.[150] The reporting details are in the *Specified Gas Reporting Regulation*[151] and the *Specified Gas Reporting Standard* issued by the Alberta Department of Environment,[152] which is incorporated by reference into the SGR Regulation. The SGR Regulation and SGR Standard require those responsible for a facility that emits more than 100,000 tonnes of CO_2e per year, respecting CO_2, methane or nitrous oxide, to report the emissions to the Director in the prescribed form.[153] At the request of the reporting party, the Director may keep certain information in the report confidential for a five year period.[154] Otherwise, the Minister may publish the information.

Under unproclaimed provisions of the CCEM Act, the Lieutenant Governor in Council may make regulations establishing greenhouse gas emission targets (relative to GDP) for Alberta.[155] Section 4 of the CCEM Act provides, with the approval of the Lieutenant Governor in Council, that the Minister of Environment may enter into sectoral agreements with representatives of various sectors of the Alberta economy.[156] Among other things, the sectoral

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<http://www3.gov.ab.ca/srd/forests/health/mpb_2003_control.html>.

[150] CCEM Act, *supra* note 115.

[151] *Specified Gas Reporting Regulation* [SGR Regulation], Alta. Reg. 251/2004.

[152] *Specified Gas Reporting Standard*, [SGR Standard] Alberta Environment, online: <http://www3.gov.ab.ca/env/air/pubs/ghg_specified_gas_reporting_standard.pdf>.

[153] SGR Regulation, *supra* note 151, sections 2, 3; SGR Standard, *ibid.*, at 2.

[154] *Ibid.*

[155] CCEM Act, *supra* note 115, section 3.

[156] *Ibid.*, section 4.

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agreements may provide for: minimum energy efficiency levels, maximum emission levels, emission targets and baselines, reporting requirements, reforms of sectoral infrastructure, implementation of technological changes, options for meeting emissions targets, enforcement provisions, and payments into the CCEM Fund.[157] Under section 5, the Lieutenant Governor in Council is authorized to make regulations respecting emission offsets, credits and sink property rights.[158] The CCEM Act also includes provisions for offences and compliance orders, and enforcement through prosecutions or administrative penalties.[159] Under section 8 of the CCEM Act and with the approval of the Lieutenant Governor in Council, the Minister of Environment may enter into agreements with the Government of Canada or of another province or governmental agency "for the purposes of undertaking co-operative, complementary or compatible actions to reduce [greenhouse] gas emissions."[160] The Minister is prohibited from entering into intergovernmental agreements unless the Minister is satisfied that the agreement is consistent with Alberta greenhouse gas emission targets set under section 3(1).[161] Assuming Alberta's legislated emission targets will be consistent with the Alberta Plan, section 8(2) of the CCEM Act may effectively block Alberta cooperation with the Government of Canada in meeting Canada's *Kyoto Protocol* commitment.

D. Federal-Provincial Coordination

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[157] *Ibid.*

[158] *Ibid.*, sections 5, 9.

[159] *Ibid.*, sections 11-16, 18(1)(s), (t), (w), (x).

[160] *Ibid.*, section 8(1).

[161] *Ibid.*, section 8(2).

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The CCPC[162] and the Alberta Plan,[163] respectively, acknowledge the need for all governments "to contribute to the success of a national plan,"[164] "working collaboratively - in strategic partnerships with other governments and stakeholders."[165] Due to shared federal-provincial responsibilities over the environment under the *Constitution*, intergovernmental cooperation and coordination may frequently be prerequisite to achieving success on issues extending beyond the boundaries of a single province.

Typically, intergovernmental cooperation on environmental matters occurs in Canada through the Canadian Council of Ministers of the Environment [CCME], which consists of the environment ministers of Canada and each of its provinces and territories.[166] The Canada-Wide Accord on Environmental Harmonization, although not itself legally enforceable,[167] has been an important tool in coordinating intergovernmental responses in Canada to environmental issues.[168] Unfortunately, the CCME's work on climate change has been limited to examining evidence of climate change and its impacts[169] rather than on coordinating strategies for *Kyoto Protocol* compliance.

Intergovernmental climate change coordination in Canada has taken place through the

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[162] CCPC, *supra* note 11, at 9, 10, 48, 49.

[163] Alberta Plan, *supra* note 10, at 4, 7, 20, 30, 31, 38, 39; CCEM Act, *supra* note 115, section 8.

[164] CCPC, *supra* note 11, at 10.

[165] Alberta Plan, *supra* note 10, at 7.

[166] See Chapter 4, *supra*, at 97-99; and Canadian Council of Ministers of the Environment [CCME], online: <http://www.ccme.ca/about/>.

[167] Bankes & Lucas, *supra* note 134, at 395.

[168] CCME, CCME Harmonization, CCME, online: <http://www.ccme.ca/initiatives/environment.html?category_id=25>.

[169] CCME, "Climate, Nature People: Indicators of Canada's Changing Climate," CCME online: http://www.ccme.ca/assets/pdf/cc_ind_full_doc_e.pdf>.

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National Climate Change Process [NCCP], established in 1998 by the Joint Ministers of Energy and Environment [JMM], under the direction of Canadian first ministers.[170] The JMM through the NCCP have undertaken to: examine the costs and benefits of implementing the *Kyoto Protocol*; prepare for *Kyoto Protocol* implementation; develop immediate responses to climate change to provide early emissions reductions; and to start developing actions for sustained emissions reductions.[171]

Through the NCCP process, the JMM approved "Canada's National Implementation Strategy on Climate Change" in October 2000.[172] In the Strategy, the NCCP identified five climate change risk factors to be addressed including:

- environmental, economic, health and social impacts of climate change;
- impacts on Canada of actions by Canada's major trading partners;
- design of major economic instruments such as a domestic emissions trading system;
- pace of development and deployment of new technologies; and
- effectiveness of Canadian mitigation activities in meeting an emissions reduction target.[173]

The NCCP business plans were intended to be updated annually,[174] but there has not been an update since the NCCP Plan 2002 in May 2002. The NCCP Plan 2002 lists actions underway in Canadian federal, provincial and territorial jurisdictions under "five objectives":[175]

1) Reduce GHG emissions.

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[170] NCCP, "Canada's National Climate Change Business Plan 2002," [NCCP Plan 2002] (May 2002), at 2, NCCP online: <http://www.nccp.ca/NCCP/pdf/Bus_Plan2002_W_Cover.pdf>.

[171] *Ibid.*

[172] NCCP Plan 2002, *ibid.*, at 3. See NCCP, "Canada's National Implementation Strategy on Climate Change," (October 2000) NCCP online: <http://www.nccp.ca/NCCP/pdf/media/JMM-fed-en.pdf>.

[173] NCCP Plan 2002, *ibid.*, at 3.

[174] NCCP Plan 2002, *ibid.*, at 5.

[175] NCCP Plan 2002, *ibid.*, at 6.

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2) Understand the impacts of climate change and develop adaptation strategies and actions.

3) Increase Canadians understanding of the importance of climate change and encourage individuals and businesses to take action.

4) Position Canada to make decisions at the right time with the right information.

5) Increase opportunities through technology.

Most of the several dozen projects listed in the NCCP Plan 2002 that were proposed or underway in Alberta (or in which Alberta was participating), were relatively small climate change educational, research or technological development projects, each of which would be expected to contribute to climate change education or mitigation, but which, in sum would be clearly inadequate for either Alberta or Canada to meet its greenhouse gas emissions target.[176]

It is not clear from the NCCP Internet site what has occurred since the JMM considered the federal government plan to ratify the *Kyoto Protocol* and the draft CCPC in October 2002. At the 28 October 2002 JMM meeting, the provinces and territories (except the Northwest Territories) split from the federal government, indicating that "[t]he federal framework on climate change, announced on October 28, does not as yet represent an adequate Canadian approach to reducing greenhouse gases in Canada."[177] The provinces and territories outlined twelve principles they would like to see in a national climate change plan:

1. All Canadians must have an opportunity for full and informed input into the development of the plan.

2. The plan must ensure that no region or jurisdiction shall be asked to bear an unreasonable share of the burden and no industry, sector or region shall be treated unfairly. The costs and impacts on individuals, businesses and industries must be clear, reasonable, achievable, and economically sustainable. The plan must incorporate appropriate federally funded mitigation of the adverse impacts of climate change initiatives.

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[176] NCCP Plan 2002, *ibid.*

[177] JMM, News Release, 830-767/004, "Provincial and Territorial Statement on Climate Change Policy," 28 October, 2002, online: http://www.scics.gc.ca/cinfo02/830767004_e.html.

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3. The plan must respect Provincial and Territorial jurisdiction.

4. The plan must include recognition of real emission reductions that have been achieved since 1990 or will be achieved thereafter.

5. The plan must provide for bilateral or multilateral agreements between Provinces and Territories, and with the federal government;

6. The plan must ensure that no Province or Territory bears the financial risk of federal climate change commitments.

7. The plan must recognize that benefits from assets such as forest and agricultural sinks must accrue to the Province and Territory which owns the assets.

8. The plan must support innovation and new technology.

9. The plan must maintain the economic competitiveness of Canadian business and industry.

10. Canada must continue to demand recognition of clean energy exports.

11. The plan must include incentives for all citizens, communities, businesses and jurisdictions to make the shift to an economy based on renewable and other clean energy, lower emissions and sustainable practices across sectors.

12. The implementation of any climate change plan must include an incentive and allocation system that supports lower carbon emission sources of energy such as hydroelectricity, wind power generation, ethanol, and renewable and other clean sources of energy.[178]

Then federal Ministers Anderson and Dhaliwal immediately welcomed the provincial and territorial response to the draft federal plan,[179] however, the Government of Canada has since conceded:

> Since ratification of the *Kyoto Protocol*, many aspects of the NCCP have been in abeyance. The focus has been on rebuilding federal-provincial-territorial cooperation on

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[178] *Ibid.*

[179] Government of Canada News Release, "Anderson and Dhaliwal Welcome Constructive Provincial / Territorial Input into Draft Climate Change Plan," 28 October 2002, Government of Canada online: <http://www.climatechange.gc.ca/english/newsroom/2002/20021028_draftplan.asp>.

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climate change, primarily through bilateral relationships.[180]

It is unclear whether the NCCP process will resume. This does not bode well for a concerted federal-provincial approach to climate change and the implementation of the *Kyoto Protocol* in Canada. Canada clearly needs a major federal-provincial mechanism to coordinate national responses to climate change risks and international environmental law duties.

Once federal-provincial agreement can be achieved on greenhouse gas emission reduction, sink enhancement and emissions trading policies, these policies can be implemented through available interjurisdictional mechanisms including a CCME memorandum of understanding, perhaps an interjurisdictional agreement under section 9 of CEPA, 1999,[181] plus federal and provincial complementary or mirror legislation.[182]

E. Federal Budget Developments - February 2005

On 23 February 2005, the Government of Canada introduced its 2005-06 budget, including new expenditures to address climate change over the next five years, involving:[183]

- $1 billion for an innovative Clean Fund to further stimulate cost-effective action to reduce greenhouse gas emissions in Canada.
- $225 million to expand the successful EnerGuide for Houses Retrofit Incentive program for Canadians.
- $200 million to support the development of a Sustainable Energy Science and Technology Strategy.
- $200 million over five years and a total of $920 million over 15 years to further stimulate the use of wind power to generate energy. This delivers on the Government of Canada's commitment to quadruple the Wind Power Production

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[180] Government of Canada, "Report on 2002-2003 CCAF Activities and Results," Government of Canada online: <http://www.climatechange.gc.ca/english/publications/ccaf_200203/building.asp>.

[181] *Supra* note 30.

[182] Bankes & Lucas, *supra* note 134, at 395, 396.

[183] Canada, *The Budget Plan 2005* (Ottawa: Department of Finance, 2005) online: Government of Canada <http://www.fin.gc.ca/budget05/pdf/bp2005e.pdf>.

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Incentive.

- $97 million over five years and a total of $886 million over 15 years to stimulate the development and use of forms of renewable energy other than wind, such as small hydro, biomass and landfill gas.
- An estimated $295 million in enhanced tax incentives through accelerated capital cost allowance (CCA) to encourage investment in efficient and renewable energy generation and establishing that new accelerated CCA will only be considered for investments in green technology.

The proposals include removing all references to "toxic" in CEPA, 1999.[184] Due to their recent introduction and an absence of available detail, the proposals will not be evaluated in this thesis.

[184] This may allow broader regulation of CO_2 and other greenhouse gases. See Bill Curry, "Ottawa's Kyoto plan under fire on all sides," *Globe and Mail* (29 March 2005) A1.

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Chapter 6

Evaluation of Emission Reduction Strategies of Canada and Alberta

A. Introduction

In chapter 5, the plans of the Governments of Canada and Alberta, respectively, to mitigate climate change relevant to Canadian commitments under the *Kyoto Protocol* were discussed. In this chapter, criteria are established for the purpose of evaluating the federal and Alberta plans, and the plans are assessed in light of the selected criteria. Suggestions for improvements are made and five elements of an effective greenhouse gas emissions reduction strategy are presented and discussed.

B. Evaluation Criteria for Government Greenhouse Gas Reduction Strategies

Canada played a prominent role at the United Nations Conference on Environment and Development [UNCED] held in Rio de Janeiro in June 1992. Canadian Maurice Strong was Secretary-General of the Preparatory Committee, which laid the groundwork for UNCED and Prime Minister Brian Mulroney played a leadership role at the international level, respecting the conference.[1] Together with 175 other nations, 103 of which were represented by their heads of state, Canada signed the *United Nations Framework Convention on Climate change* [FCCC][2] and agreed to the Rio Declaration on Environment and Development[3] [Rio Declaration], a major

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[1] Alanna Mitchell, "'Dismal decade' for environment," Globe and Mail (1 July 2002) p. A1.

[2] *United Nations Framework Convention on Climate Change*, 9 May 1992, 31 I.L.M. 849 (1992) (entered into force 21 March 1994) [FCCC].

[3] (1992) 31 I.L.M. 874, at 876 - 880. The full text of the Rio Declaration and its 27 principles are reproduced at the end of this document as Appendix I.

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framework treaty on biodiversity and two other important international environmental law documents on forestry and development.[4]

The Rio Declaration, lists 27 broadly accepted principles of international environmental law, at least two of which evidence what have become or are becoming principles of customary international law binding on all nations.[5] Principles 1 - 12, 14 - 17 and 27, grouped under 7 categories set out below, have been selected for the purposes of this chapter as bases for selecting criteria for evaluating greenhouse gas emission reduction, sink enhancement and emission trading strategies announced by the Governments of Canada and Alberta. These Rio Declaration principles have been selected as the bases for evaluation criteria for a number of important reasons: a) they are broadly accepted principles of international environmental law and sustainable development;[6] b) Canada has formally agreed to the Rio Declaration;[7] c) these Rio Declaration principles are reflected in the FCCC and were adopted at the time the FCCC was

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[4] Also agreed to at UNCED in Rio were: *Convention on Biological Diversity*, 5 June 1992, 31 I.L.M. 818 (entered into force Dec. 29, 1993) [Biodiversity Convention]; United Nations Conference on Environment and Development: Statement of Principles for a Global Consensus of the Management, Conservation and Sustainable Development of All Types of Forests, (1992) 31 I.L.M. 881 [Rio Forest Principles]; United Nations Conference on Environment and Development, U.N. Programme of Action for Sustainable Development, Agenda Item 21 [Agenda 21] (1992), U.N. Doc. A/CONF.151/4, online: <http://www.unep.org/Documents/Default.asp?DocumentID=52>.

[5] For example Principle 2 (right to development, subject to *sic utere* ("good neighbour" principle) reflects what is considered a principle of customary international law, RoseMary Reed, "Rising Seas and Disappearing Islands: Can Island Inhabitants Seek Redress under the Alien Tort Claims Act?" (2002) 1 Pac. Rim L. & Pol'y J. 399 at 405. Some assert that the precautionary principal, reflected in Rio Principle 15 may have become a principle of customary international law, Russell Unger, Brandishing the Precautionary Principle Through the Alien Tort Claims Act," (2001) 9 N.Y.U. Envtl. L.J. 638 at 668. See discussions on the precautionary principle in Chapter 3, *supra* at 33-35.

[6] Stepan Wood, "Canada's 'Forgotten Forests': Or, How Ottawa is Failing Local Communities and the World in Peri-Urban Forest Protection" (2004) 14 J. Env. L. & Prac. 217 at 230.

[7] *Ibid.*, at 230, 231.

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agreed to, by the same countries that agreed to the FCCC;[8] d) climate change is a significant global international environmental threat requiring global cooperation[9] and consistent, coordinated domestic action;[10] e) Canada[11] and Alberta[12] have adopted and legislated domestic policies of sustainable development, reflecting several Rio Declaration principles; f) the Rio Declaration does not ignore economic development but reflects a broadly accepted compromise between environmental and development interests;[13] and g) the Rio Declaration balances current needs with the needs of future generations, which are expected to bear the brunt of anthropogenic climate impacts.[14]

The categories of evaluation criteria selected and the relevant Rio Declaration principle numbers are briefly described as follows: 1) a right of development, subject to the *sic utere* or "good neighbour" principle (Rio Principle 2); 2) sustainable development, reflecting

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[8] See Chapter 3, at 32.

[9] Paul G. Harris, "Common but Differentiated Responsibility: the *Kyoto Protocol* and United States Policy" (1999) 7 N.Y.U. Envtl. L.J. 27 at 33

[10] Lisa McNeilly, "Key Issues on Global Climate Change and the *Kyoto Protocol*," (2000) SF25 ALI-ABA 85 at 88.

[11] See ss. 21.1-24 of the *Auditor General Act*, R.S.C. 1985, c. A-17, as amended by S.C. 1995, c. 43; *Canadian Environmental Protection Act, 1999* [CEPA, 1999], S.C. 1999, c. 33, Declaration, Preamble and s. 54(2), *Canadian Environmental Assessment Act* [CEAA], S.C. 1992, c. 37, Preamble and s. 4(1)(b); *National Round Table on the Environment and the Economy Act*, S.C. 1993, c. 31, ss. 4, 5; *Department of Natural Resources Act*, S.C. 1994, c. 41, s. 6(a); *Department of Industry Act*, S.C. 1995, c. 1, s. 5(a); *Agreement on Internal Trade Implementation Act*, S.C. 1996, c. 17, Preamble; *North American Free Trade Agreement Implementation Act*, S.C. 1993, c. 44, Preamble; and *Standards Council of Canada Act*, R.S.C. 1985, c. S-16, s. 4(1).

[12] See *Environmental Protection and Enhancement Act* [EPEA], RSA 2000, c. E-12, ss. 2(c) and 40(a). The preamble to the *Climate Change and Emissions Management Act* [CCEM Act], S.A. 2003, cC-16.7 states: "WHEREAS the Government of Alberta is committed to providing certainty to all sectors of the Alberta economy in pursuing sustainable development objectives through the establishment of clear emission reduction targets for carbon dioxide, methane and other specified gases and related objectives, frameworks, plans and measures;"

[13] For example, see Rio Declaration, *supra* note 3, Principle 2.

[14] For example, see Rio Declaration, *ibid.*, Principle 3.

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intergenerational equity (Rio principles 1, 3, 4, 8, 27); 3) the precautionary principle (Rio Principle 15); 4) effective environmental regulation and planning, including use of environmental impact assessments (Rio Principles 11, 14, 17); 5) public participation in environmental policy setting and implementation, including the participation of indigenous peoples (Rio Principles 10, 22); 6) the polluter pays principle (Rio Principles 7, 13, 16); and 7) financial support and technology transfer by developed countries to assist developing countries in their economic and environmental development (Rio Principles 6, 9, 12).

The Rio Declaration was designed to engender "cooperation among States, key sectors *of societies and people*"*and to foster international agreements* to "protect the integrity of the global environmental and developmental system."[15] Therefore, most Rio Declaration principles are easily adapted and clearly relevant to policies, programs and legislation of a Canadian province respecting an area of global environmental concern such as climate change.

The selected evaluation categories together with associated evaluation criteria based on Rio Declaration principles are set out below.

1. Right of Development, subject to *Sic Utere*: Criterion 1) **Each jurisdiction has the right to exploit its resources, subject to the *sic utere* or "good neighbour" principle** (i.e., greenhouse gas emissions within a jurisdiction should not contribute to damage in another jurisdiction) (Rio Principle 2).

This principle is listed first due to its fundamental importance and principal impetus to international climate change negotiations, and to domestic programs and measures respecting greenhouse gas emissions. Each jurisdiction has the right to develop or exploit its own resources, including non-renewable fossil fuel resources, "pursuant to [its] own environmental and developmental policies," subject to international law obligations, expressly including the

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[15] Rio Declaration, *ibid.* preamble.

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principle described by the Latin maxim, *sic utere tuo, ut alienum non laedas* ["good neighbour" principle]. The good neighbour principle is more fully described above in Chapter 3,[16] and refers to a customary international law "obligation not to use your property in such a way as to damage your neighbour's."[17] This principle was applied in the *Trail Smelter Arbitration* and subsequent cases.[18] Criterion 1 based on Rio Principle 2 will be used to evaluate policies, measures and legislation of the Governments of Canada and Alberta to determine whether they limit greenhouse gas emissions to the point that those emissions will not contribute to climate-related damage beyond jurisdictional boundaries.

2. Sustainable Development Reflecting Intergenerational Equity: Criterion 2) **Development within a jurisdiction must be sustainable, in that it must not contribute to "dangerous anthropogenic interference with the climate system" for current or future generations** (Rio Principles 1, 3, 4, FCCC Article 2); Criterion 3) **Unsustainable patterns of production and consumption that contribute to increased global greenhouse gas concentrations should be reduced or eliminated** (Rio Principle 8); Criterion 4) **Canadian federal and provincial governments must "cooperate in good faith and in a spirit of partnership" to establish and maintain policies and measures to promote sustainable development and control greenhouse gas concentrations** (Rio Principle 27).

Sustainable development is commonly defined as "development that meets the needs of

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[16] See Chapter 3, *supra* at pages 30-31.

[17] Francois A. Mathys, "International Environmental Law: A Canadian Perspective," 3 Pace Y.B. Int'l L. 91 [Mathys], at 92. See also Patricia W. Birnie & Alan E. Boyle, *International Law and the Environment*, (Oxford: Oxford University Press, 2002) [Birnie & Boyle], at 104.

[18] *Trail Smelter Arbitration* (*U.S.A.* v. *Canada*) (1931-1941), 3 R.I.A.A. 1905 at 1965; *Corfu Channel case (Merits)*, [1949] I.C.J. Rep. 4; *Lac Lanoux Arbitration (France v. Spain)* (1957), 12 R.I.A.A. 281.

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the present without compromising the ability of future generations to meet their own needs."[19] Sustainable development incorporates the concept of intergenerational equity, which, according to Duncan French, "is the notion that the international community is under a moral, even possibly a legal, obligation to protect and preserve the environment and its natural resources for present and future generations."[20] Principle 3 of the Rio Declaration[21] adequately describes the concepts of intergenerational equity and sustainable development for the purposes of this paper. Rio Principles 4 and 8 describe how sustainable development may be achieved, i.e., through integrating development with environmental protection,[22] and by reducing and eliminating "unsustainable patterns of production and consumption."[23]

3. Precautionary Principle: Criterion 5) **"Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."** (Rio Principle 15)

As discussed in Chapter 3, above, the precautionary principle underlies the need to act to mitigate climate change, and Rio Principle 15 gives us a useful summary of the concept.[24] This

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[19] World Commission on Environment and Development, *Our Common Future* (Oxford: Oxford University Press, 1987) [Brundtland Commission Report], at 43.

[20] Duncan A. French, "International Environmental Law and the Achievement of Intragenerational Equity" (2001) 31 Envtl. L. Rep. 10469 at 10477.

[21] Rio Declaration, *supra* note 3.

[22] *Ibid.*, principle 4.

[23] *Ibid.*, principle 8. As French points out, *supra* note 29 at 10482, (footnote 148), "the requirement to 'eliminate unsustainable patterns of production and consumption' is directed primarily at developed states, [and] the requirement to 'promote appropriate demographic policies' is directed primarily at developing states." As Canadian policies, measures and legislation are being discussed here, when using Rio principle 8 as an evaluation criterion, this paper will focus on how these relate to unsustainable production and consumption.

[24] See *supra* Chapter 3, at 33-35; Rio Declaration, *supra* note 3.

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principle provides a useful evaluation criterion, particularly where a government does not take effective action to mitigate anthropogenic climate change, or uses scientific uncertainty as a reason to avoid taking action.

4. Effective Environmental Regulation and Planning, Including Use of Environmental Impact Assessments: Criterion 6) **Each jurisdiction shall enact effective greenhouse gas mitigation legislation, tailored to its own environmental and developmental circumstances** (Rio Principle 11); Criterion 7) **Jurisdictions shall cooperate to discourage and prevent the relocation of harmful environmental activities to another jurisdiction [leakage]** (Rio Principle 14); Criterion 8) **Each jurisdiction shall ensure that an adequate environmental impact assessment is considered by a competent decision-making authority before the authority approves a proposed activity likely to produce substantial greenhouse gas emissions** (Rio Principle 17).

Criterion 6 is probably the most important or pivotal of all 12 evaluation criteria. Without effective greenhouse gas mitigation legislation meeting the requirements of criterion 6, criteria 1 through 5 above are unlikely to be achieved. Similarly, Canada cannot hope to achieve its commitments under the *Kyoto Protocol* without effective greenhouse gas mitigation legislation. Further, criteria 7 through 12, are useful in evaluating the effectiveness of Federal and provincial climate change legislation referred to under criterion 6.

Respecting criterion 7, no global environmental advantage is achieved if domestic greenhouse gas mitigation legislation merely causes intensive greenhouse gas emitters to move to another jurisdiction not bound by emission reduction commitments under the *Kyoto Protocol*, such as the United States or third world countries. In fact, extensive "leakage" could discourage Canada and other nations from agreeing to further emission reduction commitments after 2012.

Effective environmental impact assessments [EIA] (criterion 8) have been described with

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respect to another Annex I country as its "flagship regulatory tool" that can provide a "'bottom-up' means of industrial regulation that can be efficiently implemented to ensure compliance with emissions targets under the *Kyoto Protocol*."[25] Cameron states:

> EIA is one tool identified by the world community as central to the incorporation of environmental implications into planning and decision making, and to the advancement and formulation of solutions at a level most effective for their implementation.[26]

5. Public Participation in Environmental Policy Setting and Implementation, Including Participation of Indigenous Peoples: Criterion 9) **Each jurisdiction shall ensure that its citizens have access to relevant government information, an opportunity to provide input into policies and measures, and access to judicial and administrative proceedings and remedies, pertaining to climate change, anthropogenic greenhouse gas emissions, carbon sinks and emissions trading within the jurisdiction** (Rio Principle 10); Criterion 10) **Each jurisdiction shall have due regard to the impact of climate change on the culture and livelihood of indigenous peoples and communities, and provide them with an effective role in determining policies and measures to mitigate the effects of and adapt to climate change** (Rio Principle 22)

Public access to relevant anthropogenic climate change and greenhouse gas emissions information, and public participation at the policy formulation and implementation stages help "create a legal or political environment of incentives or disincentives which will tend to generate behavioral adherence."[27] The ways of life of Canada's aboriginal peoples, particularly those in

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[25] Fraser K. Cameron, "The Greenhouse Effect: Proposed Reforms for the Australian Environmental Regulatory Regime" (2000) 25 Colum. J. Envtl. L. 347 at 348.

[26] *Ibid.*, at 357.

[27] John Moffet, "Legislative Options for Implementing the Precautionary Principle" (1997) 7 J. Env. L. & Prac. 157 at 168, citing J. Cameron & W. Wade-Gery, "Addressing Uncertainty: Law, Policy and the Development of the Precautionary Principle," CSERGE Working Paper GEC -- 92- 93 (1992) at 41.

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the far north, are expected to be severely impacted by climate change.[28] The involvement of these peoples in climate change mitigation and adaptation strategies is especially important.

6. Polluter Pays: Criterion 11) **Each jurisdiction shall ensure that it and significant emitters of greenhouse gases resident within its jurisdiction are responsible for covering the costs likely to be incurred by current and future generations that are reasonably attributable to their emissions** (Rio Principles 7, 13, 16).

As the principal parties responsible for increased levels of greenhouse gases in the atmosphere, and with access to more financial resources, Annex I parties in fairness should be required to bear the costs of consequent greenhouse gas emission reductions.[29] According to Rio Declaration, principle 16: "the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment."[30] The true value of an activity can be better weighed if the impact of its full cost is considered before it is undertaken, and paid by those responsible. Subsidies should be removed from activities that lead to increased costs for future generations.[31]

7. Financial Support and Technology Transfer by Developed Countries, to Assist Developing Countries in their Economic and Environmental Development: Criterion 12) **Canada shall assist developing countries, and more particularly least developed countries and small island states, to mitigate and adapt to climate change impacts by providing financial aid and by sharing knowledge and technology** (Rio Principles

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[28] ACIA, *Impacts of a Warming Arctic: Arctic Climate Impact Assessment* (Cambridge: Cambridge University Press, 2004), at 16, 92-97, online: <http://www.acia.uaf.edu>.

[29] Rio Declaration, *supra* note 3, Principle 7; Harris, *supra* note 18, at 28.

[30] *Ibid.*, Principle 16; J. Remy Nash, "Too Much Market? Conflict Between Tradable Pollution Allowances and the 'Polluter Pays' Principle," (2000) 24 Harv. Envtl. L. Rev. 465 at 468.

[31] *Ibid.*, at 468.

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6, 9, 12)

This criterion applies more particularly to Canada than Alberta, but Alberta Crown agents and post-secondary institutions have been involved with information and technology sharing with developing countries. Annex I parties to the FCCC recognize their responsibility to provide financial support, technology and know-how to less developed nations to assist them with greenhouse gas inventories and climate change mitigation and adaptation.[32]

C. Evaluation of Government Plans Using the Twelve Criteria

The evaluation of the Climate Change Plan for Canada,[33] the Alberta Government Plan,[34] and federal-provincial coordination on climate change issues, follows.

1. Each jurisdiction has the right to exploit its resources, subject to the *sic utere* or "good neighbour" principle (Rio Principle 2)

There can be little doubt that under customary international law, Alberta and Canada have the right to exploit their natural and other resources, but that right is subject to the *sic utere* or "good neighbour" principle.[35] Each jurisdiction has a duty under international law to restrain greenhouse gas emissions that will damage the property of other states.

It is difficult to state with assurance what level of greenhouse gas emissions are

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[32] FCCC, *supra* note 2, Art. 4 at 855-859 and Art. 11 at 864-865; *Conference of the Parties to the Framework Convention on Climate Change: Kyoto Protocol*, 10 December 1997, 37 I.L.M. 22 (entered into force 16 February 2005), Art. 10 at 37 and Art. 11 at 37-38.

[33] Canada, Government of Canada, "Climate Change Plan for Canada"(2002) [CCPC or the federal plan] online: <http://www.climatechange.gc.ca/plan_for_canada/plan/pdf/full_version.pdf

[34] Alberta, Government of Alberta, "Albertans & Climate Change: Taking Action" (2002) [Alberta Plan] online: <http://www3.gov.ab.ca/env/climate/actionplan/docs/takingaction.pdf>.

[35] Reed, *supra* note 5 at 405.

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acceptable because it is not clear what level will "prevent dangerous anthropogenic interference with the climate system."[36] It is generally accepted, however, that emissions levels permitted under the *Kyoto Protocol* are too high to prevent damage caused or exacerbated by anthropogenic global warming.[37] Therefore, if the CCPC or the Alberta Plan do not effectively provide for lower domestic greenhouse gas emissions than permitted under the *Kyoto Protocol*, they do not meet the standard set by criterion 1 and reflected in Principle 2 of the Rio Declaration.[38]

The Alberta Plan is clearly offside this criterion as it provides for increases in emissions within the province. The goal of the CCPC is to limit Canadian greenhouse gas emissions to levels 6 per cent below 1990 levels. However, the CCPC is inadequate in that it fails to plan for at least 60 MT in emissions reductions necessary to bring them down to the level of Kyoto compliance. Further, the reliance in the CCPC on what have been relatively ineffective, negotiated and voluntary measures, would also appear to disqualify the CCPC under this criterion.

To fully qualify under criterion 1, the Alberta Plan and the CCPC must provide for significantly greater emissions reductions than planned. Greenhouse gas emissions reductions have a collateral benefit of reducing other harmful emissions from fossil fuel combustion, leading to improved human, animal and environmental health.[39] Alternatively, the plans could provide for equivalent emissions reductions elsewhere on the planet, through projects such as

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[36] FCCC, *supra* note 2, Art. 2, at 854.

[37] Prue Taylor, "Heads in the Sand as the Tide Rises: Environmental Ethics and the Law on Climate Change" (2001) 19 UCLAJELP 247 at 248.

[38] *Supra* note 3. See also *infra*, criterion 2, at 151-153.

[39] Roberta Mann, "Waiting to Exhale?: Global Warming and Tax Policy," (2002) 51 Am. U. L. Rev. 1135 at 1220.

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those under the JI and CDM flexibility mechanisms discussed above.[40] Although emissions trading is available under the *Kyoto Protocol*, it does not qualify under criterion 1 if the emissions units purchased are "hot air" from an EIT country because the trade would not reflect current emissions reductions elsewhere.[41]

Alberta and Canada could qualify under this criterion if they significantly reduce emissions from the combustion of fossil fuels. Alberta would need to find a way to produce energy and generate electricity without emitting large amounts of CO_2 and other greenhouse gases into the atmosphere. For example, CO_2 capture and injection, otherwise developing clean coal technologies or less energy-intensive oil sands and heavy oil extraction processes would also help.[42]

Ultimately, the replacement of fossil fuels with other cleaner energy sources such as wind energy, solar energy or hydrogen (if produced in an environmentally friendly way) may produce the best solution. If alternate energy sources were more cost effective, there would be less need or demand for coal, petroleum or oil sands. However, it is recognized that Alberta may be trading economic prosperity for clean air and anthropogenic climate change mitigation. Such a change would produce a benefit for Alberta and the world generally, but would impose a burden on Alberta's fossil fuel-reliant economy.[43]

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[40] See Chapter 3, *supra* at 63-68.

[41] *Ibid.*, at 49.

[42] For example, Alberta has been experimenting with the VAPEX process of heavy oil extraction, through the injection of solvents into horizontally drilled wells, obviating the need for surface mining. See Alberta Plan, *supra* note 34, at 24. The energy-intensive SAGD oil sands process may be made more efficient by using the steam generated by the process to co-generate electricity. See NCCP, "Canada's National Climate Change Business Plan 2002," [NCCP Plan 2002] (May 2002), at 78, NCCP online: <http://www.nccp.ca/NCCP/pdf/Bus_Plan2002_W_Cover.pdf>.

[43] Alberta Plan, *ibid.*, at 5 and *Climate Change and Emissions Management Act*, S.A. 2003, c. C-16.7 [CCEM Act] (formerly, Bill 37) (preamble, ss1(c) to (e),(g),6,15 to 17,18(1)(f) to

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2. Development within a jurisdiction must be sustainable, in that it must not contribute to "dangerous anthropogenic interference with the climate system" for current or future generations (Rio Principles 1, 3, 4, FCCC Article 2)

The comments above under criterion 1 apply equally to criterion 2. However, there are additional aspects to sustainable development that should be mentioned here. For resource development to be sustainable, it must not compromise the ability of current and future generations to meet their needs.[44]

For example, the Alberta Plan includes the use of reforestation provisions of forestry management agreements to require forest product companies to reforest after harvesting.[45] However, current reforestation practices, even if they are effective in restoring important carbon sinks, have been criticized as being harmful to biodiversity.[46] If biodiversity cannot be maintained through existing reforestation practices, the practices cannot by definition be sustainable because future generations will not be able to enjoy the benefits of a biologically diverse forest.[47]

It is important for Alberta and Canada to consider the significant collateral aspects of their proposed courses of action before embarking upon them. Improved energy efficiency, or the replacement of fossil fuels with alternate energy sources, are generally more effective than forest sinks obtained through reforestation projects. This is because a tonne of CO_2 not emitted through fossil fuel combustion also means fewer emissions of sulphur dioxide, nitrogen oxides, mercury,

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(j),(s), (aa), 20 proclaimed in force 1 November 2004), preamble.

[44] Brundtland Commission Report, *supra* note 19, at 43.

[45] Alberta Plan, *supra* note 34, at 35.

[46] Meinhard Doelle, "Linking the *Kyoto Protocol* and Other Multilateral Environmental Agreements: From Fragmentation to Integration?," (2004) 14 J. Env. L. & Prac. 75 at 91.

[47] Mark A.Drumbl, "Poverty, Wealth, and Obligation in International Environmental Law" (2002) 76 Tul. L. Rev. 843 at 845, at 920.

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particulate matter, and other pollutants.[48] Measures to improve energy efficiency or to replace fossil fuels with alternate energy sources should be given preference in climate change mitigation plans such as the CCPC and the Alberta Plan. Similarly, although the CCPC includes a plan to promote "low-impact, large-scale hydro projects,"[49] flooding large tracts of vegetation for a reservoir disrupts ecosystems, degrades biodiversity and greatly increases greenhouse gas emissions through the decomposition of submerged vegetation.[50]

3. Unsustainable patterns of production and consumption that contribute to increased global greenhouse gas concentrations should be reduced or eliminated (Rio Principle 8)

Criterion 3 is closely related to criteria 1 and 2. Alberta's Plan to expand its oil sands developments is producing economic benefits to the province.[51] Although I have no data to confirm my assumption, I assume that Alberta also obtains significant collateral economic benefits from having the oil sands industry present and expanding in the province. For economic development reasons, Alberta plans to exploit these resources for many years. In fact, Alberta's health care and education systems may come to rely on revenue from these sources. However,

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[48] See McInstry, *infra* note 76.

[49] Alberta Plan, *supra* note 34, at 34.

[50] Vincent St. Louis, et al., "Reservoir Surfaces as Sources of Greenhouse Gases to the Atmosphere: A Global Estimate," *BioScience*, Vol. 50, No. 9, September 2000 at 766.

[51] The petroleum industry spent $23.9 billion in capital investments in oil sands between 1996 and 2002, Amy Taylor, Matthew Bramley & Mark Winfield, "Government Spending on Canada's Oil and Gas Industry: Undermining Canada's Kyoto Commitment," [Taylor, Bramley and Winfield], at 38, 39 online: Pembina Institute <http://www.pembina.org/pdf/publications/GovtSpendingOnOilAndGasFullReport.pdf>. Oil sands royalties in Alberta are reduced in the early years of a project to no less than of 1% of production to allow producers to recover their capital costs, but will rise to 25% of net project revenues once these costs have been recovered, Taylor, Bramley & Winfield at 40, 41. Alberta oil sands royalties for the fiscal year ended 31 March 2004 were $197 million, Government of Alberta, "Alberta Ministry of Energy 2003-2004 Annual Report,"Ministry of Energy Financial Statements, Schedule 1, at 73, online: Alberta Energy <http://www.energy.gov.ab.ca/cmn/docs/2004AnnualReport.pdf>, down from $696 million in 2001, Taylor, Bramley & Winfield, at 43.

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these operations are not sustainable from a greenhouse gas emissions mitigation perspective or from the perspective of ecosystem disruption and the emission of other harmful substances.

The short-term economic value of oil sands developments to Alberta may be questioned for several reasons. First, Alberta received less than $200 million in revenues from oil sands royalties in the 2003-04 fiscal year.[52] This is a relatively small sum considering that oil sands production exceeded production from conventional sources, but revenues from rapidly diminishing conventional oil were close to $1 billion, and revenues from natural gas were over $5 billion for the same period.[53] However, once oil sands producers recover their capital costs,[54] oil sands royalty revenues will significantly increase. Second, if the market value of synthetic crude oil were to decrease below the cost of recovery, processing and distribution, either production would cease or the Alberta Government would be forced to reduce royalty rates, diminishing the value of the resource to the Province. Third, the oil sands industry is highly subsidized by the federal and Alberta governments. The federal government alone contributed almost $1.2 billion in subsidies between 1996 and 2002.[55] Alberta Government subsidies primarily take the form of royalty holidays for the purpose of recovering capital investments.[56] The Governments of Alberta and Canada should carefully evaluate, through economic and environmental assessments, whether the economic benefit of oils sands developments are worth

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[52] *Ibid.*

[53] Alberta Energy 2003-2004 Annual Report, *ibid.*, at 73.

[54] Oil sands royalties are typically set at 1% of gross revenue until the producer's capital costs are recovered. After capital costs are recovered, Alberta's royalty share will be the greater of 1% gross revenue or 25% net revenue, Taylor, Bramley & Winfield, *supra* note 51, at 40, 41. See also *Oil Sands Royalty Regulation, 1997*, Alta. Reg. 185/97.

[55] *Ibid.*, at 45. If this seems excessive, one source indicates that Canadian tax incentives to fossil fuel industries total $6 billion per year, Richard L. Ottinger & Rebecca Williams, "Renewable Energy Sources for Development" (2002) 32 Envtl. L. 331 at 345.

[56] Taylor, Bramley & Winfield, *ibid.*, at 40-44.

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the environmental costs to current and future generations of Albertans, Canadians and others due to greenhouse gas and other emissions. There is nothing specific in the CCEM Act that requires this type of assessment.[57]

In any event, Canadian compliance with the *Kyoto Protocol* should not prevent petroleum companies including oil sands operators from earning profits. BP p.l.c. announced in 2002 that it had already achieved its goal to reduce its greenhouse gas emissions from global operations by 10% below 1990 levels by 2010.[58] Suncor Energy Inc. has pledged to reduce its per barrel greenhouse gas emissions and to participate in renewable energy projects and emissions trading, while reducing its operating costs, protecting its profitability.[59] Morgan Stanley continues to promote investment in oil sands, projecting that Kyoto compliance will probably only add between 4 and 11 cents to the cost of producing a barrel of synthetic crude oil.[60]

4. Canadian federal and provincial governments must "cooperate in good faith and in a spirit of partnership" to establish and maintain policies and measures to promote sustainable development and control greenhouse gas concentrations (Rio Principle 27)

As has been described above, neither the CCME nor the NCCP process have been particularly effective to date in creating cooperation among the federal, provincial and territorial governments in achieving greenhouse gas emissions reductions.[61] Also as described above, the Alberta Plan is at odds with Canada's *Kyoto Protocol* commitment and the Minister of Environment is prohibited by section 8 of the CCEM Act from entering into any agreement with

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[57] CCEM Act, *supra* note 43.

[58] Ian Urquhart, "Kyoto and the Absence of Leadership in Canada's Capitals," (2002) *Policy Options Politiques*, December 2002-January 2003, 23, at 24.

[59] *Ibid.*

[60] *Ibid.*, at 25.

[61] See discussion in chapter 5, *supra*, at 134-139.

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the Government of Canada or another province, that is inconsistent with the CCEM Act, legislation designed to help achieve the Alberta Plan.[62]

Significant interprovincial or international environmental problems, including problems associated with climate change, require significant intergovernmental environmental cooperation.[63] Canada and the provinces need to fundamentally improve the CCME and NCCP processes to provide for sustainable solutions to significant environmental problems. Intergovernmental cooperation allows the group to achieve goals that group members could not achieve independently, and it may save money by pooling resources, preventing overlap and reducing the scope for conflicting activities.[64]

5. "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (Rio Principle 15)

Neither the CCPC nor the Alberta Plan use scientific uncertainty as a reason to avoid action to reduce greenhouse gas emissions. The CCPC acknowledges the conclusion of the international scientific community, that anthropogenic greenhouse gas emissions are causing a climate problem.[65] Similarly, "[t]he Alberta government recognizes that global climate change is real and that the current level of scientific agreement on this issue warrants further action."[66]

6. Each jurisdiction shall enact effective greenhouse gas mitigation legislation, tailored to its own environmental and developmental circumstances (Rio Principle 11)

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[62] CCEM Act, *supra* note 43, at 42.

[63] Nigel D. Bankes & Alastair R. Lucas, "Kyoto, Constitutional Law and Alberta's Proposals," (2004) 42 Alta. L. Rev. 355, at 395-397

[64] See discussion, chapter 5, *supra* at 134-139.

[65] CCPC, *supra* note 33, at III.

[66] Alberta Plan, *supra* note 34, at 5.

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As one author pointed out: "[b]etter environmental results depend less on fine tuning theories of environmental federalism than on improving regulatory performance."[67]

Both the CCPC and the Alberta Plan rely on negotiated sector agreements.[68] Voluntary programs have been criticized due to their relative ineffectiveness.[69] The CCPC does not clearly provide for a regulatory regime, but contemplates an emission trading system,[70] which normally incorporates emissions caps and a trading regime. Arguably, the federal government has jurisdiction under the national concern branch of the POGG power,[71] or perhaps under the trade and commerce power,[72] to operate a national emissions trading scheme including emission caps, but to this point has not attempted to exercise that jurisdiction. Also as discussed above, there is little doubt that the federal Parliament can if it chooses, regulate emissions of harmful substances through its criminal law power.[73]

The Alberta Plan provides for negotiated emissions targets backed up by regulatory controls for the purpose of ensuring a "level playing field"[74] The CCEM Act provides for

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[67] Daniel C. Esty, "Toward Optimal Environmental Governance,"(1999) 74 N.Y.U. L. Rev. 1495 at 1495.

[68] The CCPC refers to the "[n]egotiation of voluntary agreements with air, rail, truck and marine sectors to improve fuel efficiency of goods transport," "voluntary agreements with manufacturers"of small gasoline and diesel-fuelled products, and emission reduction covenants for large industrial emitters, CCPC *supra* note 33, at 20, 22 and 30, respectively. Alberta plans to negotiate emission reduction agreements with key sectors that promote best practices and the use of best-in-class technologies, Alberta Plan, *supra* note 34, at 2, 14.

[69] Robert Hornung & Matthew Bramley, "Five Years of Failure: Federal and Provincial Government Inaction on Climate Change During a Peirod of Rising Industrial Emissions," (March 2000) at 7-11, Pembina Institute of Appropriate Development, online: <http://www.pembina.org/pdf/publications/fiveyears.pdf>.

[70] CCPC, *supra* note 33, at 15.

[71] See Chapter 4, *supra* at 90-92.

[72] *Ibid.*, at 93.

[73] *Ibid.*, at 92.

[74] Alberta Plan, *supra* note 34 at 17.

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legislated emissions targets and an emission offsets trading scheme,[75] plus an enforcement regime containing elements[76] similar to those provided under the *Environmental Protection and Enhancement Act*.[77] However, many of the elements of the Alberta enforcement regime are not yet in place because parts of the CCEM Act have not yet been proclaimed in force and most of the necessary regulations have yet to be promulgated.

Each greenhouse gas emissions reduction regime should be tailored to the needs of the particular jurisdiction.[78] "No single type of policy instrument is appropriate for all types of environmental problems,"[79] including global warming. However, as greenhouse gas emissions are normally accompanied by substantial emissions of other harmful substances,[80] substantial cost savings and environmental and health benefits can be achieved by coordinating complementary programs.

An effective regulatory regime for controlling greenhouse gas emissions and enhancing sinks would consist of a number of important elements, including: 1) the establishment of a complete and accurate emissions reporting system bolstered by effective monitoring and

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[75] CCEM Act, *supra* note 43, sections 3, 4, 5, 18(1)(b), (d), (l), (q), (aa).

[76] *Ibid.*, sections 11 - 16, 18(1)(s), (t), (v),

[77] EPEA *supra* note 12, Part 10.

[78] John Dernbach & Widener University Law School Seminar on Global Warming, "Moving the Climate Change Debate from Models to Proposed Legislation: Lessons from State Experience," 30 Envtl. L. Rep. 10933 at 10934.

[79] Nancy Olewiler, "The Case for Pollution Taxes," in Allan Greenbaum, Alex Wellington & Ryan Pushchak,, Eds., *Environmental Law in Social Context: A Canadian Perspective* (Concord: Captus Press, 2002) at 180.

[80] Other harmful substances often emitted with greenhouse gas during the combustion of fossil fuels include: sulphur dioxide, ground level ozone, nitrogen oxides, volatile organic compounds, particulates, and mercury. See Robert B McKinstry, Jr., "Laboratories for Local Solutions for Global Problems: State, Local and Private Leadership in Developing Strategies to Mitigate the Causes and Effects of Climate Change," (2004) 2 Penn St. Envtl. L. Rev. 15, at 42.

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verification, and involving all large scale greenhouse gas emitters;[81] 2) the establishment of a nationally-consistent, statutory domestic emissions and sink credit trading regime, including legislated emissions caps and effective emissions trading and enforcement provisions;[82] 3) the implementation of sector-wide emissions reduction and sink enhancement standards and measures (especially those producing increased energy efficiency and use of renewable and alternate energy sources) for small and medium size emitters belonging to sectors with significant greenhouse gas emissions, and where sector-wide standards and targets make sense;[83] 4) a clear, progressive and permanent phase-out of subsidies on fossil fuels[84] and regulatory barriers to alternate and renewable energy production; and 5) a gradually phased-in carbon tax that raises the cost of fossil fuels to a level that accurately reflects their true cost, including costs respecting human health, environmental degradation and reclamation activities.[85]

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[81] Jutta Brunnee, "A Fine Balance: Facilitation and Enforcement in the Design of a Compliance Regime for the *Kyoto Protocol*" (2000) 13 Tul. Envtl. L.J. 223, at 239. See Alberta Plan, *supra* note 34, at 2, 17, 18; CCEM Act, *supra* note 43, section 6; *Specified Gas Reporting Regulation* [SGR Regulation], Alta. Reg. 251/2004; CCPC, *supra* note 33, at 53.

[82] Domestic emissions trading under a "cap and trade" regime "offers significant opportunities for cost-effective reduction of greenhouse gases," Dernbach, *supra* note 74, at 10969. See CCPC, *supra* note 33, at 2, 3, 12, 17, 30; Alberta Plan, *supra* note 34, at 2, 18.

[83] Chris Rolfe, *Turning Down the Heat: Emissions Trading and Canadian Implementation of the Kyoto Protocol* (Vancouver: West Coast Environmental Law Research Foundation, 1998) at 102-117; Dernbach, *supra* note 78, at 10965; See CCPC, *supra* note 33, at 37, 38, 48; Alberta Plan, *supra* note 34, at 33, 34; CCEM Act, *supra* note 43, sections 7(1)(a), (d), (e), and 10(3)(c).

[84] Taylor, Bramley & Winfield, *supra* note 51, at 53-57. There is nothing in the CCPC or the Alberta Plan that clearly points to subsidy reductions for the fossil fuel industry.

[85] Rolfe, *supra* note 83, at 402, 403. Increases in carbon taxes are not identified in either the CCPC or the Alberta Plan. However, the Alberta Plan refers to the possible use of tax credits, *supra* note 34, at 36 and the CCPC, *supra* note 33, at 2, 17, refers to "tax measures" and "tax initiatives," either of which could include carbon tax increases, rebates or other incentives. Climate change related tax measures in the Government of Canada Budget 2005 include: an increase in the capital cost allowance for "energy efficient and renewable energy generation equipment," from 30% to 50% per year, and an "excise tax exemption for ethanol, methanol and bio-diesel used in blended fuels." Potential tax measures include a "revenue-neutral 'feebate'" presumably involving a tax on fuel inefficient vehicles to fund a rebate on fuel-efficient models,

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The first element requires effective reporting, monitoring and verification of greenhouse gas emissions for all large emitters.[86] This step is necessary to provide "an accurate emissions inventory . . . for determining the allocation of allowances" in an emissions trading scheme.[87] In Alberta's case, the CCEM Act provides for adequate enforcement of the reporting requirement,[88] and Lieutenant Governor in Council regulation-making power provides for "conducting sampling, analyses, tests, measurements, verification and monitoring for any purposes related to this Act."[89] The SGR Regulation requires emissions reporting, but does not include provisions respecting emission sampling, monitoring or independent verification of emission data.[90] Some jurisdictions, such as the United Kingdom require independent verification.[91] To reduce costs and maximize participation, voluntary systems, such as Ontario's Pilot Emission Reduction Trading Project [PERT], and the Greenhouse Gas Emission Reduction Trading Pilot [GERT], generally do not.[92] The federal VCR program requires verifiable emissions reductions but does not require independent, third party emissions verification.[93] Third party verification clearly

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Government of Canada, The Budget Plan 2005 online: Department of Finance Canada <http://www.fin.gc.ca/budget05/bp/bpc5e.htm#environment>.

[86] National Round Table on the Environment and the Economy, "The ABC's of Emissions Trading: An Awareness-Raising Initiative, November 2001 - March 2002, Final summary report,"at 3 online: NRTEE <http://www.nrtee-trnee.ca/emissionstrading/en/Summary_Report_e.pdf>.

[87] Gary C. Bryner, "Carbon Markets: Reducing Greenhouse Gas Emissions Through Emissions Trading" (2004) 17 Tul. Envtl. L.J. 267, at 290.

[88] CCEM Act, *supra* note 43, sections 11-16.

[89] *Ibid.*, section 18(1)(j).

[90] SGR Regulation, *supra* note 81.

[91] Bryner, *supra* note 87, at 294.

[92] *Ibid.*, at 294-295.

[93] *Ibid.*

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promotes system integrity, but increases compliance costs.[94] The CCPC refers to emissions trading, which, of necessity requires emissions reporting, but the CCPC does not specifically address emissions reporting.[95]

The second element of an effective greenhouse gas regulatory regime is an effective emissions trading scheme with achievable emission caps, set at a level necessary to achieve the necessary emission reduction goals.[96] Jonathan Wiener states:

> [I]ncentive-based instruments such as taxes and tradeable allowances should generally be chosen over technology requirements and fixed emissions standards because the incentive-based instruments are typically far more cost-effective and innovation-generating than their alternatives.[97]

Emissions trading does not generally work well for small and medium sized emitters,[98] who normally require different emissions reduction strategies. According to Bryner, after an accurate emissions inventory is established,[99] an effective emissions trading regime includes the following components:

> the selection of a baseline that fairly reflects economic ups and downs, breakdowns and other problems with maintenance and operation, investments in and performance of pollution control equipment, and other factors; sufficient authority and resources for effective monitoring and enforcement; continuous and accurate emissions monitoring; determinations that emissions reductions are surplus, quantifiable, permanent, and enforceable; allocation of extra allowances in the cap and trade system that allow policy makers to deal with distributional issues such as who would be responsible for making the reductions.[100]

Although the CCEM Act provides for the basic elements of an emissions trading

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[94] Bryner, *supra* note 87, at 294, 295.

[95] CCPC, *supra* note 33.

[96] Bryner, *supra* note 87, at 268.

[97] Jonathan Baert Wiener "Global Environmental Regulation: Instrument Choice in Legal Context," (1999) 108 Yale L.J. 677 at 682.

[98] NRTEE-ABCs, *supra* note 86, at 3.

[99] Bryner, *supra* note 87, at 290, 291.

[100] *Ibid.*, at 290, 291.

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system,[101] a federal domestic emissions trading system is preferred, if not necessary, particularly for the purposes of compliance with the *Kyoto Protocol*. A single national emissions cap and trade regime will be simpler to establish and operate than a patch-work of provincial systems with conflicting targets and rules. As noted above, Alberta plans to increase emissions during the 2008-2012 commitment period.[102] Therefore emissions reduction targets established under an Alberta cap and trade regime will almost certainly conflict with federal targets needed to achieve national Kyoto compliance.

The third element includes sector-wide measures for small and medium size emitters belonging to sectors with significant greenhouse gas emissions and where sector-wide standards or targets are effective in reducing emissions.[103] For example, it may not make sense to impose emission caps on small and medium-sized transportation companies, but both levels of government have the authority to set sector-wide emissions standards for new vehicles[104] and, presumably to require retrofits or regulate the maximum allowable emissions for older vehicles. Another useful example is the building construction sector. A province could impose upgraded building code standards on new home and commercial building construction and impose energy efficiency standards on new equipment or appliances used in new and existing buildings, for the purpose of maximizing energy efficiency and minimizing energy use.[105]

The Government of Canada includes in the small and medium emitter category under the CCPC, plans to reduce fugitive emissions in the oil and gas industry, and proposes to promote best practices and improved technology, and to establish voluntary emissions targets, to reduce

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[101] CCEM Act, *supra* note 43, sections 3, 5, 6 and 18(1)(p).

[102] See chapter 5, *supra* at 127.

[103] See *supra* note 83 and accompanying text.

[104] Rolfe, *supra* note 83, at 372, 373.

[105] Dernbach, *supra* note 78, at 10965.

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greenhouse gas emissions.[106] The CCPC does not target large emissions reductions under this element.

The Government of Alberta identifies nine sectors with which it will negotiate binding sector-wide agreements including sectors composed primarily of large emitters, which encompass the electricity, petroleum, mining and manufacturing sectors.[107] Identified sectors composed of large numbers of small and medium emitters that would be best regulated under the third element, above, include the transportation, forestry, municipal, commercial and agricultural sectors.[108]

A fourth element of an effective greenhouse gas regulatory regime is to remove the pervasive subsidies on fossil fuels,[109] so that taxpayers are not paying individuals, businesses and industries to emit greenhouse gases and accompanying polluting substances. Subsidies are inefficient because they create perverse incentives.[110]

> It is hard to see what could be less economically efficient than paying for both incentives to use and incentives to stop using fossil fuels.[111]

Canada and Alberta provide large subsidies to oil sands producers and other fossil fuel industries, involving: significant research and development funding;[112] diverse tax incentives;[113]

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[106] CCPC, *supra* note 33, at 37, 38.

[107] Alberta Plan, *supra* note 34, at 16.

[108] *Ibid.*

[109] Hornung & Bramley, *supra*, note 69, at 15.

[110] Wiener, *supra* note 97 at 681.

[111] Mann, *supra* note 39, at 1219-1220.

[112] Taylor, Bramley & Winfield, *supra* note 51, at 26.

[113] These include the Canadian exploration expense, Canadian development expense, accelerated capital cost allowance, earned depletion, resource allowance, scientific research and experimental development tax credit, Syncrude remission order, Canadian Oil and Gas Property Expense and the elimination of the federal capital tax. See Taylor, Bramley & Winfield, *ibid.*, at 28, 29 and 31.

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and royalty incentives, including significantly reduced oil sands royalties.[114] As far as I have been able to determine, policy decisions to implement these large subsidies have never been subject to the scrutiny of an environmental impact assessment.[115]

Neither Canada nor Alberta refer in their plans to removing subsidies on fossil fuels. It must be noted that both Canada and Alberta appear to benefit economically through their extensive promotion of oil sands projects. Presumably, the Alberta Government's intention is to increase oil sands production so that royalties from this source will replace rapidly falling conventional oil royalties.[116] However, to reduce rather than promote greenhouse gas emissions, the cost of fossil fuels to the consumer should reflect market royalty rates and the true costs associated with finding, removing, refining, and transporting the fuels, plus the costs incurred by others resulting from the fuel's use.[117] Alberta has indicated in its Plan that it does not intend to subsidize renewable and alternate energy projects.[118] Alberta and Canada should remove existing subsidies to the fossil fuel industries.

The second component of the fourth element of an effective greenhouse gas regulatory regime is the removal of regulatory barriers to renewable and alternate energy projects. For example, there are significant regulatory hurdles in Alberta to connecting privately owned micro-solar or wind energy generators to the power grid. Prohibitions on the use of reversible or "net"electricity meters and net billing, and other provisions that discourage the use of solar

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[114] These are provided for the purpose of enabling producers to more quickly recover their capital costs in large oil sands projects. See Taylor, Bramley & Winfield, *ibid.*, at 40-44.

[115] See Taylor, Bramley & Winfield, *ibid.*, at 32.

[116] Alberta Energy and Utilities Board [AEUB], *Alberta Reserves 2004 and Supply/Demand Outlook 2004-2013* (AEUB: Calgary, 2004) AEUB online: <http://www.eub.gov.ab.ca/bbs/products/STs/st98-2004.pdf> at 2.

[117] This is consistent with the polluter pays principle, reflected in Rio Declaration 16, *supra* note 3.

[118] Alberta Plan, *supra* note 34 at 33, 34.

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panels on residences and other buildings or the use of wind turbines on farms, thus inhibit greenhouse gas emissions reductions.[119] The CCPC does not deal with regulatory barriers to green energy, presumably because regulation in these areas tends to be a provincial responsibility. Through Climate Change Central, Alberta plans to consider the removal of barriers to renewable and alternative energy technologies, and to "[r]eview potential for net metering in Alberta (net metering would make it easier for homeowners or small businesses who generate their own electricity to sell surplus electricity back to the power grid)."[120] Unfortunately, Alberta has not yet committed to actually reduce barriers in this area.

The fifth component of an effective greenhouse gas regulatory regime is a carbon tax that reflects the actual costs to health and the environment resulting from recovery, processing and use of these fuels.[121] Taxes on greenhouse gas emissions can be more cost-effective than traditional command and control measures.[122]

> A tax or charge on the use of the environment as a waste depository forces people to treat pollution as another good. This allows the forces of supply and demand to lead to efficient use of the environment if the tax is set equal to the value of environmental damages resulting from production and consumption activities. Pricing the environment provides incentives for all who use it to change their behaviour and to use it more conservatively. This is true for consumers of the goods and services generating pollution as well as for the producers of those goods.[123]

Presumably, federal taxes on emissions would be levied on producers but passed on to

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[119] Clean Air Strategic Alliance Electricity Project Team, "An Emissions Management Framework for the Alberta Electricity Sector: Report to Stakeholders," (Edmonton: Clean Air Strategic Alliance, 2003) at 85-86, CASA online: <http://casahome.org/uploads/Emissions_Mgmt_Framework.pdf>.

[120] *Ibid.*, at 31.

[121] See Ottinger & Williams, *supra* note 54, at 347.

[122] Olewiler, *supra* note 79,

[123] *Ibid.*

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consumers.[124] The constitutional requirement that provinces levy only direct taxation[125] means that Alberta would most likely tax consumers directly as it currently does with its fuel tax.[126] The rate of the fuel tax should be sufficiently high that the "cost of doing nothing [is] untenable."[127] When fossil fuels are taxed to reflect total actual costs, the consumer has an incentive to decrease consumption, increase fuel efficiency or switch to renewable or alternate energy sources.[128] Such carbon taxes contribute significantly to environmental awareness among consumers.[129] Consumers can most effectively and efficiently determine how to minimize their tax.[130] According to Olewiler, "[i]f society wants to minimize the costs of meeting some environmental target, the tax is the preferred instrument."[131]

> Modeling studies have consistently found that use of economic incentives, such as environmental taxes or pollution trading systems, would achieve pollution control goals far more efficiently than existing command-and-control approaches, reducing compliance costs by up to 50% or more.[132]

The proceeds of a carbon tax could be applied to promote alternate and renewable energy sources,[133] to fund public health initiatives associated with climate change, or to support

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[124] *Ibid.*

[125] *Constitution Act, 1867* (U.K.), 30 & 31 Vict., c. 3, as amended, reprinted in R.S.C. 1985, App. II, No. 5 [*Constitution*], section 92(2).

[126] See the *Fuel Tax Act*, R.S.A. 2000, c.F-28, section 5.

[127] Olewiler, *supra* note 79, at 181.

[128] See Ottinger & Williams, *supra* note 54, at 347.

[129] Olewiler, *supra* note 79, at 181.

[130] *Ibid.*

[131] *Ibid.*

[132] Richard B. Stewart, "A New Generation of Environmental Regulation?," (2002) 29 Cap. U. L. Rev. 21 at 32.

[133] Mann, *supra* note 39, at 1161.

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environmental remediation projects made necessary by the combustion of the fuel in question.[134] To promote economic development, tax proceeds could be used to reduce or offset business taxes.[135] Alternatively, fuel tax revenues could be applied to climate change adaptation projects in least developed countries, or to the relocation of individuals from small island states who may be threatened with inundation from rising seas and storm surges, in support of criteria 11 and 12, below. Arguably, such tax initiatives are fair, but may be widely resisted and perhaps not politically palatable.[136]

Alberta has more room to raise its fuel taxes than other jurisdictions. The Alberta Finance Department reported in 2003, that Alberta's gasoline tax was 9.0 cents per litre.[137] Other Canadian provinces levy fuel taxes of from 11.5 (Manitoba) to 16.5 (Newfoundland and Labrador) cents per litre. The average rate is approximately 14.5 to 15 cents per litre. The Government of Canada also imposes a fuel tax. However, fuel taxes have been relatively low in Canada. Typically fuel taxes and other pollution taxes are higher, and produce more significant environmental benefits, in Europe.[138]

Although the CCPC and the Alberta Plan each include several significant initiatives, each plan lacks most of the key elements mentioned above, leaving them perhaps more costly and less effective than they might be in their power to reduce actual greenhouse gas emissions. The Alberta Plan has more specific and useful measures than are included in the CCPC, but the

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[134] Olewiler, *supra* note 79 at 182.

[135] *Ibid.*, at 180.

[136] Shi-Ling Hsu, "Reducing Emissions from the Electricity Generation Industry: Can We Finally Do It?," (2001) 14 Tul. Envtl. L.J. 427, footnote 93, at 444.

[137] Government of Alberta, "Major Provincial Tax Rates, 2003," (19 March 2003), Alberta Finance online. <http://www.finance.gov.ab.ca/publications/budget/budget2003/tax.html#7>.

[138] See Stewart, *supra* note 132 at 112; Mann, *supra* note 39 at 1210-1211.

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key drawback to the Alberta Plan is that Alberta actually intends to increase rather than decrease its greenhouse gas emissions.

7. Jurisdictions shall cooperate to discourage and prevent the relocation of harmful environmental activities to another jurisdiction (Rio Principle 14)

The Alberta Plan identifies a risk that Canada will be at a competitive disadvantage to its largest trading partner, the USA, from increased production costs caused by Canadian measures to meet its *Kyoto Protocol* commitment.[139] The USA has no intention to ratify the *Kyoto Protocol*[140] and the federal government in the USA is focussing its limited efforts on reductions in emissions intensity rather than absolute greenhouse gas emissions reductions.[141] There is a risk that business, manufacturing and industry may relocate to the USA or developing countries that have no *Kyoto Protocol* commitment. Numerous studies demonstrate that in the past, this risk has been very small.[142] However, past OECD actions to reduce greenhouse gas emissions have been modest in comparison to those that will be needed to achieve compliance during the first and subsequent commitment periods under the *Kyoto Protocol*,[143] and Zhang points out that "there is some evidence that some energy-intensive national and multinational firms (e.g., oil refining, aluminium, and cement) have chosen to shift investment and production to other countries, especially to developing countries."[144] Canada's ability to compete in USA markets is

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[139] Alberta Plan, *supra* note 34, at 12.

[140] Reed, *supra* note 5, at 402, 403.

[141] See Mann, *supra* note 39 at 1221; Laura Thoms, "A comparative Analysis of International Regimes on Ozone and Climate Change with Implications for Regime Design" (2003) 41 Colum. J. Transnat'l L. 795, footnote 156, at 822.

[142] Zhong Xiang Zhang& Andrea Baranzini, "What do we know about carbon taxes? An inquiry into their impacts on competitiveness and distribution of income," (2004) 32 Energy Pol. 507 at 512-513.

[143] *Ibid.*

[144] *Ibid.*, at 512.

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a continuing concern that must be considered but that is best resolved through the participation of the USA and developing countries in emissions reduction commitments under future commitment periods, under a modified *Kyoto Protocol*.

What may become a more pressing political concern to Alberta and Canada is the inequity of expecting other provincial jurisdictions to reduce their emissions by more than six per cent below 1990 levels, to compensate for Alberta's significant planned emissions increases.[145]

8. Each jurisdiction shall ensure that an adequate environmental impact assessment is considered by a competent decision-making authority before the authority approves a proposed activity likely to produce substantial greenhouse gas emissions (Rio Principle 17)

Neither Canada nor Alberta refer in their plans to environmental impact assessments [EIAs] with respect to projects likely to produce substantial greenhouse gas emissions. As mentioned in Chapter 3,[146] EIAs significantly enhance process transparency and promote public participation.[147] The *Canadian Environmental Assessment Act*[148] could be used to require EIAs of projects undertaken by federal authorities that have a significant impact on Canadian greenhouse gas emissions.[149] Alberta could similarly require EIAs under EPEA for projects generating significant greenhouse gas emissions.

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[145] See Matthew Bramley, "An Assessment of Alberta's Climate Change Action Plan,", Pembina Institute for Appropriate Development, September 2002, Table 2, at 8-9, online: http://www.pembina.org/pdf/publications/plan_critique020906.pdf>.

[146] See Chapter 3, *supra* at 37, 38.

[147] Richard L. Ottinger & Mindy Janye, "Global Climate Change *Kyoto Protocol* Implementation: Legal Frameworks for Implementing Clean Energy Solutions," 18 Pace Envtl. L. Rev. 19 at 49, 50.

[148] *Canadian Environmental Assessment Act* [CEAA], S.C. 1992, c. 37.

[149] Rolfe, *supra* note 79, at 382-383.

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9. Each jurisdiction shall ensure that its citizens have access to relevant government information, an opportunity to provide input into policies and measures, and access to judicial and administrative proceedings and remedies, pertaining to climate change, anthropogenic greenhouse gas emissions, carbon sinks and emissions trading within the jurisdiction (Rio Principle 10)

Residents of Alberta and citizens of Canada typically have access to information from the respective governments on a multitude of topics including climate change impacts, mitigation and adaptation. With respect to climate change, each government makes information available on its climate change Internet site.[150] Each government also publishes information on climate change and other environmental issues, and each government has access to information legislation[151] giving the public access to information that is not normally available.

Before preparing its CCPC, the Government of Canada consulted with ministerial representatives of each province and territory through the NCCP process.[152] Alberta engaged in stakeholder consultations before finalizing the Alberta Plan.[153]

Under FCCC processes, environmental non-governmental organizations [NGOs] are invited to participate in the Conferences of the Parties, not as voting members, but NGOs share and receive information with and from parties, thereby having an influence.[154] Alberta has closely involved CASA in making plans and setting standards involving natural gas venting and

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[150] See Government of Canada, "Taking Action on Climate Change," Government of Canada online: <http://www.climatechange.gc.ca/english/default.asp>; Government of Alberta, "Climate Change," Alberta Environment online: <http://www3.gov.ab.ca/env/climate/>.

[151] See *Access to Information Act*, R.S.C. 1985, c. A-1; *Freedom of Information and Protection of Privacy Act*, R.S.A. 2000, c. F-25.

[152] CCPC, *supra* note 33, at III.

[153] Alberta Plan, *supra* note 34, at 6.

[154] Peggy Rodgers Kalas, "Dispute Resolution under the *Kyoto Protocol*," (2000) 27 Ecology L.Q. 53 at 55, 81, 82.

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flaring,[155] and in regulating emissions in the Alberta electricity industry.[156] These are encouraging steps.

Despite these successes, each of the Governments of Canada and Alberta could significantly improve the reporting of costs of subsidies to large scale greenhouse gas emitters,[157] and on additional costs incurred from health and environmental damage caused by the emission of greenhouse gases and associated polluting substances.[158]

10. Each jurisdiction shall have due regard to the impact of climate change on the culture and livelihood of indigenous peoples and communities, and provide them with an effective role in determining policies and measures to mitigate the effects of and adapt to climate change (Rio Principle 22)

As documented in a recent report on arctic climate impacts, climate change has and will have significant impacts on Canada's aboriginal peoples, many of whom live in the north.[159] The involvement of aboriginal peoples in climate change mitigation and adaptation strategies is especially important since many groups rely on northern ecosystems that have already been materially impacted by climate change, for food, to earn a livelihood, or to maintain traditional cultural activities.[160]

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[155] Clean Air Strategic Alliance, "Gas Flaring and Venting in Alberta: Report and Recommendations for the Upstream Petroleum Industry by the Flaring/Venting Project Team," (June 2002) CASA online: <http://www.eub.gov.ab.ca/bbs/public/sourgas/CasaFinalReport2002.pdf>.

[156] CASA, *supra* note 119.

[157] Taylor, Bramley & Winfield, *supra* note 51 at 45, 46.

[158] Bramley, *supra* note 145, at 16.

[159] ACIA, *Impacts of a Warming Arctic: Arctic Climate Impact Assessment* (Cambridge: Cambridge University Press, 2004), at 16, 92-97, online: <http://www.acia.uaf.edu>. See also CCPC, *supra* note 33, at 48, 118-121.

[160] *Ibid.*

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The Government of Canada, in the CCPC, identifies several areas of concern for aboriginal communities and "commits to ongoing collaboration with Aboriginal and northern communities to build capacity to address their particular priorities."[161] However, it is not clear what input, if any, aboriginal peoples had into the preparation of the CCPC. Reference to collaboration with aboriginal peoples in the CCPC appears to be primarily prospective.[162] Perhaps the CCPC might have included specific measures targeting current climate change mitigation and adaptation needs of Canada's aboriginal peoples, if the peoples had been more closely involved in the planning process.

The Alberta Plan does not refer to any stakeholder participation by aboriginal peoples, or include any greenhouse gas mitigation or adaptation measures addressing aboriginal peoples. Neither plan successfully meets this criterion.

11. Each jurisdiction shall ensure that it and significant emitters of greenhouse gases resident within its jurisdiction are responsible for additional costs likely to be incurred by current and future generations that are reasonably attributable to these emissions (Rio Principles 7, 13, 16)

Neither the CCPC nor the Alberta Plan qualify under this criterion. Alberta's plan to increase greenhouse gas emissions and the inadequacies of the CCPC demonstrate that neither government is particularly concerned about taking responsibility for the costs to Canadians or to citizens of other countries who have been or will be impacted by climate change caused by developing country emissions.

12. Canada shall assist developing countries, and more particularly, least developed countries, to mitigate and adapt to climate change impacts by providing financial aid and

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[161] CCPC, *supra* note 33, at 4.

[162] *Ibid.*, at 4, 14 & 27; but see *ibid.*, at 16.

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by sharing knowledge and technology (Rio Principles 6, 9, 12)

This criterion applies more to Canada than to Alberta, as it is primarily within Canada's constitutional mandate. Again, neither the CCPC nor the Alberta Plan qualify under this criterion. Neither plan addresses the climate change mitigation or adaptation needs of those outside their respective jurisdiction that are negatively impacted or will be negatively impacted by anthropogenic climate change. It must be noted, however, that Canada, together with the EU, Iceland, New Zealand, Norway, and Switzerland, have agreed to jointly contribute $410 million to the Special Climate Change Fund[163] and the Least Developed Countries Fund[164] for the purpose of mitigating climate change in developing countries.[165]

D. Conclusions

Canada made its first international commitment to reduce its national greenhouse gas emissions at Rio de Janeiro in 1992[166] and committed to greater emissions reductions under the *Kyoto Protocol* in 1997.[167] However, Canada's emissions have increased steadily since 1990. Neither Canada nor Alberta have been either willing or able to implement effective greenhouse gas emission reduction strategies.

Based on my research as supported by this and previous chapters, I believe the following conclusions are warranted:

1. Neither the CCPC nor the Alberta Plan are likely to lead to emissions reductions in

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[163] See *supra* Chapter 3, at 74.

[164] *Ibid.*

[165] Sarah R Hamilton, "Developments in Climate Change," (2003) Colo. J. Int'l Envtl. L. & Pol'y 37 at 41.

[166] FCCC, *supra* note 2.

[167] *Kyoto Protocol*, *supra* note 32, Article 3.

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Canada or Alberta of at least 6 per cent below 1990 levels during the *Kyoto Protocol* Commitment Period.

2. If the Alberta Plan is successful, greenhouse gas emissions in the province will increase substantially above 1990 levels, during the Kyoto commitment period.

3. Since Alberta emits about 30% of greenhouse gases in Canada, Alberta's plan to increase its greenhouse gas emissions during the *Kyoto Protocol* commitment period 2008 - 2012 may prevent Canada from achieving its *Kyoto Protocol* commitment.[168]

4. Canada will not likely achieve its *Kyoto Protocol* commitment unless it asserts regulatory control over greenhouse gas emissions in Canada, and implements effective legislative and other measures or strategies outlined in this chapter.

5. An effective regulatory regime for controlling greenhouse gas emissions and enhancing sinks would consist of a number of important elements, including:

   a. the establishment of a complete and accurate emissions reporting system bolstered by effective monitoring and verification, and involving all large scale greenhouse gas emitters;

   b. the establishment of a nationally-consistent, statutory domestic emissions and sink credit trading regime, including legislated emissions caps and effective emissions trading and enforcement provisions;

   c. the implementation of sector-wide emissions reduction and sink enhancement standards and measures (especially those producing increased energy efficiency and use of renewable and alternate energy sources) for small and medium size emitters belonging to sectors with significant greenhouse gas emissions, and where sector-wide standards and targets make sense;

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[168] See discussion, *supra* chapter 5, at pages 124-127, 134.

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d. a clear, progressive and permanent phase-out of subsidies on fossil fuels and regulatory barriers to alternate and renewable energy production; and

e. a gradually phased-in carbon tax that raises the cost of fossil fuels to a level that accurately reflects their true cost, including costs respecting human health, environmental degradation and reclamation activities.[169]

[169] See discussion, *supra* at 166-168.

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Chapter 7

Conclusions

Although the Earth's climate has fluctuated naturally, sometimes rapidly throughout its existence, the widespread anthropogenic combustion of, fugitive emission of, and dependence upon fossil fuels, particularly by developed countries such as Canada, has produced and will continue to produce a discernable and growing global warming.

Accumulating anthropogenic greenhouse gas emissions are expected to increase the frequency and severity of extreme weather events, alter plant growing conditions, melt permafrost and polar ice caps, raise ocean levels, flood low-lying coastal areas, turn vast regions into desserts, increase the distribution of tropical diseases and perhaps disrupt the flow of ocean currents, which provide important moderating effects in western Europe and elsewhere. Developing countries, and particularly small island states, will bear a disproportionate share of these burdens of global warming.

The biome can only be adequately protected from climate change by prompt, concerted, graduated reductions in global use and reliance on fossil fuels. The principles of international law, and in particular the principles of the *Rio Declaration on Environment and Development*, are useful in guiding measures to address international environmental problems such as global climate change.

The *Kyoto Protocol* is an important first step in addressing the global problem of climate change. However, the *Kyoto Protocol* in its current form will be ineffective in resolving the global climate change problem for several reasons. First and foremost, the emission reduction

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commitments by Annex B parties under Article 3 and Annex B of the *Kyoto Protocol* are clearly inadequate. Second, the failure of the USA, by far the worlds most prolific emitter of greenhouse gases, to ratify the *Kyoto Protocol* is a serious blow to the Protocol's effectiveness and to international efforts to reduce anthropogenic greenhouse gas emissions. The USA must become an integral part of a global greenhouse gas emissions reduction strategy. Third, the *Kyoto Protocol* fails to address the rapidly increasing emissions of developing countries. Finally, large amounts of "hot air" (emission credits) are available for sale by EIT countries to any Annex B country that prefers to avoid emission reductions at home, undermining the integrity of the *Kyoto Protocol* emissions reduction processes.

International efforts to mitigate and adapt to global climate change depend upon substantial and enduring greenhouse gas emissions reductions from all Annex I countries, especially including the USA. Developing countries need to participate, but their ability to contribute to global emissions reductions will depend upon favourable developed country technological and financial support. It will be difficult to engage developed and developing countries in serious negotiations for second and subsequent commitment periods under the *Kyoto Protocol*, unless Annex I countries demonstrate significant progress in meeting their targets during the first commitment period. However, these negotiations need to begin in earnest before 2008. To minimize the scale and slow the speed of global warming, emissions reductions of from 50 - 60 percent below 1990 levels will eventually be required. Such reductions will be difficult to achieve and will require concerted and consistent long-term international cooperation.

The *Constitution Act, 1867* provides adequate scope to Canada and its provinces to make domestic laws implementing effective domestic greenhouse gas emission reduction, sink enhancement and emissions trading strategies. There is ample scope and a clear need for federal-provincial-territorial cooperation in policies and legislation in these areas, to ensure

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meaningful greenhouse gas emissions reductions and national compliance with Canada's *Kyoto Protocol* commitments. Again, the principles of the Rio Declaration are useful "guide-posts" in directing Canadian domestic legislation and other measures.

Unfortunately, the analysis in the preceding chapter of the Climate Change Plan for Canada and the Alberta Plan demonstrate that neither plan is likely to lead to emissions reductions in Canada or Alberta of at least 6 per cent below 1990 levels during the *Kyoto Protocol* Commitment Period. In fact, if the Alberta Plan is successful, greenhouse gas emissions in the province will increase substantially above 1990 levels, during the Kyoto commitment period. The Alberta Plan and associated legislation may by itself prevent Canada from achieving its *Kyoto Protocol* commitment. In addition, the Climate Change Plan for Canada is seriously lacking in detail, and effective legislation and other measures necessary to implement a workable plan are conspicuously absent.

Canada should be able to achieve its *Kyoto Protocol* commitment if the governments of Canada and the Canadian provinces and territories assert regulatory control over greenhouse gas emissions within their respective jurisdictions, and implement effective, coordinated legislative and other measures or strategies outlined in Chapter 6, incorporating the following key elements:

f. the establishment of a complete and accurate emissions reporting system bolstered by effective monitoring and verification, and involving all large scale greenhouse gas emitters;

g. the establishment of a nationally-consistent, statutory domestic emissions trading regime, including legislated emissions caps and effective emissions trading and enforcement provisions;

h. the implementation of sector-wide emissions reduction measures (especially those producing increased energy efficiency and use of renewable and alternate

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energy sources) for small and medium size emitters belonging to sectors with significant greenhouse gas emissions, and where sector-wide standards or targets make sense;

i. a clear, progressive and permanent phase-out of subsidies on fossil fuels; and

j. a gradually phased-in carbon tax that raises the cost of fossil fuels to a level that accurately reflects their true cost, including costs respecting human health, environmental degradation and reclamation activities.

Although emissions reductions leading to a stabilization of global greenhouse gas concentrations will take many years or decades, local, interprovincial and international benefits from reducing other harmful emissions associated with greenhouse gas emissions, will be immediate and can be long-lasting. Through coordinated, effective emissions reductions in Alberta and throughout Canada, Canadian residents will see significant improvements to health and environmental quality, will conserve fossil fuel resources for future domestic and international energy needs and will make substantial savings in energy costs.

However, the greatest benefit from Canadian Kyoto compliance may be a changed attitude among Canadians that sustainable development is not a desirable option, but a necessity; and that the environmental deficit we pass on to our children, grandchildren and great-grandchildren must be substantially diminished. This may be achieved as current Canadians show their pioneering spirit by preparing the land, and the air, for those who come after.

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APPENDIX I

United Nations Conference on Environment and Development

Rio de Janeiro 3-14 June 1992

A/CONF.151/5/Rev.1 13 June 1992

The Rio Declaration on Environment and Development[170]

Preamble

The United Nations Conference on Environment and Development,

Having met at Rio de Janeiro from 3 to 14 June 1992,

Reaffirming the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, and seeking to build upon it,

With the goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people,

Working towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system,

Recognizing the integral and interdependent nature of the Earth, our home,

Proclaims that:

Principle 1

Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

Principle 2

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

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[170] (1992) 31 I.L.M. 874, at 876 - 880.

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Principle 3

The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Principle 4

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 5

All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.

Principle 6

The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.

Principle 7

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

Principle 8

To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

Principle 9

States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.

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Principle 10

Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

Principle 11

States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. Standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.

Principle 12

States should cooperate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.

Principle 13

States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

Principle 14

States should effectively cooperate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.

Principle 15

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing

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cost-effective measures to prevent environmental degradation.

Principle 16

National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

Principle 17

Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

Principle 18

States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.

Principle 19

States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.

Principle 20

Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

Principle 21

The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.

Principle 22

Indigenous people and their communities, and other local communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.

Principle 23

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The environment and natural resources of people under oppression, domination and occupation shall be protected.

Principle 24

Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.

Principle 25

Peace, development and environmental protection are interdependent and indivisible.

Principle 26

States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.

Principle 27

States and people shall cooperate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.

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APPENDIX II

Twelve Criteria for Evaluating Climate Change Mitigation Policies and Measures of the Governments of Canada and Alberta

1) Each jurisdiction has the right to exploit its resources, subject to *the sic utere* principle (i.e., resource use within a jurisdiction should not contribute to property damage in another jurisdiction) (Rio Principle 2);

2) Development within a jurisdiction must be sustainable, in that it must not contribute to "dangerous anthropogenic interference with the climate system" for current or future generations (Rio Principles 1, 3, 4, FCCC Article 2);

3) Unsustainable patterns of production and consumption that contribute to increased global greenhouse gas concentrations should be reduced or eliminated (Rio Principle 8);

4) Canadian federal and provincial governments must "cooperate in good faith and in a spirit of partnership" to establish and maintain policies and measures to promote sustainable development and control greenhouse gas concentrations (Rio Principle 27);

5) "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (Rio Principle 15);

6) Each jurisdiction shall enact effective greenhouse gas mitigation legislation, tailored to its own environmental and developmental circumstances (Rio Principle 11);

7) Jurisdictions shall cooperate to discourage and prevent the relocation of harmful environmental activities to another jurisdiction (Rio Principle 14);

8) Each jurisdiction shall ensure that an adequate environmental impact assessment is considered by a competent decision-making authority before the authority approves a proposed activity likely to produce substantial greenhouse gas emissions (Rio Principle 17);

9) Each jurisdiction shall ensure that its citizens have access to relevant government information, an opportunity to provide input into policies and measures, and access to judicial and administrative proceedings and remedies, pertaining to climate change, anthropogenic greenhouse gas emissions, carbon sinks and emissions trading within the jurisdiction (Rio Principle 10);

10) Each jurisdiction shall have due regard to the impact of climate change on the culture and livelihood of indigenous peoples and communities, and provide them with an effective role in determining policies and measures to mitigate the effects of and adapt to climate change (Rio Principle 22);

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11) Each jurisdiction shall ensure that it and significant emitters of greenhouse gases resident within its jurisdiction are responsible for additional costs likely to be incurred by current and future generations that are reasonably attributable to these emissions (Rio Principles 7, 13, 16);

12) Canada shall assist developing countries, and more particularly least developed countries and small island states, to mitigate and adapt to climate change impacts by providing financial aid and by sharing knowledge and technology (Rio Principles 6, 9, 12).

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