CLIMATE CHANGE CHARADES: FALSE ENVIRONMENTAL PRETENCES OF STATIST ENERGY GOVERNANCE

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Abstract

Climate change is a poor justification for energy statism, which consists of centralized government administration of energy supplies, sources, prices, generating facilities, production and conservation. Statist energy governance produces climate change charades: government actions taken in the name of climate change that bear little relationship to the nature of the problem. Such actions include incremental, unilateral steps to reduce domestic carbon emissions to arbitrary levels, and attempts to choose winners and losers in future technology, using public money to subsidize ineffective investments. These proffered solutions are counter-productive. Governments abdicate their responsibility to govern energy in a manner that is consistent with domestic legal norms and competitive markets, and make the development of environmental solutions less likely rather than more so.

Résumé

Le changement climatique constitue une mauvaise justification pour le dirigisme de l'économie énergétique, ce qui est l'administration gouvernementale centralisée des fournitures, des sources, des prix, des installations de génération, de la production et de la conservation de l'énergie. La gouvernance dirigiste de l'énergie résulte en charades : les actions gouvernementales entreprises au nom du changement climatique qui n'ont pas beaucoup à voir avec la nature du problème. De telles actions incluent les démarches unilatérales et incrémentales dans la réduction des émissions de carbone domestiques à des niveaux arbitraires, qui tentent

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d'ailleurs de choisir les gagnants et les perdants dans la technologie du futur en utilisant les fonds publics pour subventionner les investissements inefficaces. Ces solutions suggérées sont contre-productives. Les gouvernements abdiquent leur responsabilité de diriger l'énergie d'une manière qui est en accord avec les normes juridiques domestiques et les marchés concurrentiels, et rendent moins probable le développement de solutions environnementales au lieu de l'accélérer.

1. Introduction: domestic energy governance

Energy is an essential commodity, but it is just a commodity nonetheless. In the absence of extraordinary factors, the ideal conditions for the production, sale and use of energy are the same as for other goods: an open, competitive marketplace in which price reflects costs; rules that preserve the integrity of ecosystems; and decision-making mechanisms that observe the requirements of the rule of law.

Energy is not generally governed this way in Canada.[1] Instead, aspects of domestic energy regulation[2] could be described as steadfastly statist in nature. Statism is centralized state administration and control of economic and social conditions, in which agencies of government attempt to identify desirable outcomes and manipulate policies and institutions to produce them. In the energy sector, statism is manifested in government control of energy prices or price caps; control of the mix of energy sources; state ownership of generating facilities; state supervision of private energy generators; subsidies and investments in particular energy technologies; centralized "plans" for energy production and conservation; contracts between government and private companies for energy streams from, or operation of, particular facilities; and a structure that allows decision-making to be dominated by political considerations.[3] Statism is not synonymous with regulation; the

[1] Statist energy governance can be found in many countries and is not unique to Canada.

[2] Energy statism is not universal in Canada. The governance of some forms of energy in some provinces is more intensely statist, such as electricity in Ontario, and the governance of others is not, such as the oil industry in Alberta.

[3] For example, in September 2007, the Ontario Power Authority ("OPA") released its 20-year electricity plan, the "Integrated Power System Plan", in which it set out targets for electricity production from specified power sources, described the goal of achieving a particular mix of energy sources, and announced spending and investment priorities for $60 billion in public money. Online: Ontario Power Authority <http://www.powerauthority.on.ca/Page.asp?PageID=1224&SiteNodeID=320>.
The mandate of the OPA is to ensure an adequate, long-term supply of electricity for Ontario, and to do so the OPA "creates and implements conservation and demand management

presence of regulation is not necessarily indicative of a statist approach to governance. Indeed, some form of regulation is necessary for "free" markets to exist. Without regulations or rules, market transactions would be threatened by the imposition of force, the refusal to fulfill contract obligations, or other actions inconsistent with economic competition. In contrast, statist approaches to governance replace or usurp markets as decision-making mechanisms. Statism tends to be instrumentalist in nature, identifying particular economic and social outcomes to be pursued by state agencies.[4]

Can a statist approach to energy be justified? One of the potential rationales is climate change.[5] The argument goes something like this: "Climate change is a problem of such magnitude that its resolution should take priority over governance concerns or the expectations of civil society. Government is justified in directly influencing energy production, sale and use in order to be able to prevent catastrophic alteration of the world's climate."

Climate change is indeed a significant problem. Scientists have documented numerous symptoms of a warming world.[6] A detailed review of

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programs, ensures adequate investment in new supply infrastructure, performs long-term electricity system planning, and facilitates the development of a more sustainable and competitive electricity system." Online: Ontario Power Authority <http://www.powerauthority.on.ca/Page.asp?PageID=122&ContentID=6222>.

[4] For an elaboration on the distinction between instrumentalism and governance that is consistent with the operation of markets and ecosystems, see B. Pardy, "The Hand is Invisible, Nature Knows Best, and Justice is Blind: Markets, Ecosystem, Legal Instrumentalism, and the Natural Law of Systems" (2009) Tulsa L. Rev. [Forthcoming].

[5] There may be other potential justifications not addressed in this article. For instance, like roads, there may be reasons for state ownership of electricity transmission lines. A statist approach to energy governance did not originate with climate change, nor is it limited to issues that relate to it. For example, the structure of electricity governance in Ontario has long been dominated by state institutions, and presently consists of multiple state agencies that together make up a centralized electricity authority, which is ultimately under the direction of Cabinet. The mandates of these agencies are muddled, as they combine incompatible and wide-ranging priorities, including reliability of supply, affordability for consumers, electricity conservation, economic efficiency, financial viability, and development of alternative energy sources. The *Electricity Restructuring Act, 2004*, S.O. 2004, c. 23, added yet more complexity to an already entangled institutional organization rather than reforming the system of energy production and supply.

[6] See S. Solomon et al., eds. *Climate Change 2007: The Physical Science Basis - Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (New York: Cambridge University Press, 2007), online: Intergovernmental Panel on Climate Change <http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>; James Hansen et al., "Climate Change and Trace Gases", (2007) 365 *Philosophical Transactions of the Royal*

the scientific literature is beyond the scope of this article, but for present purposes assume that there is a strong link between the changing climate and increased concentrations of greenhouse gases (GHGs) in the atmosphere. Even so, climate change is not a good reason for the nature and extent of the influence that governments presently exercise over energy matters in Canada. Such control fails to facilitate solutions to climate change and indeed may be detrimental to their achievement. When government hands take hold of energy in the name of environmental protection, they are just as likely to choke the economic and social dynamics that could lead to innovation and environmental salvation. The section below outlines the main obstacles to global GHG reduction. In the following section, government responses to these challenges are considered. The article concludes that government solutions to climate change bear little relationship to the nature of the problem. Statist responses are ultimately detrimental because they create obstacles to innovation that might otherwise occur, and govern energy in a manner that is inconsistent with domestic legal norms and competitive markets. When politicians, bureaucrats and regulators determine energy prices, supplies, sources and investments, energy decision-making can be dominated by political considerations instead of technological, environmental and economic factors.

2. Climate change: challenges and obstacles

In climate science, prediction and prescription are more difficult than diagnosis. However, the prevailing view appears to be that in order to avoid the worst effects of runaway climate change in the next decades and centuries, global emissions of GHGs must be reduced to a small fraction of present levels, in the range of 10 to 30 per cent, by the middle of the century.[7] This

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Society 1925 online: <http://pubs.giss.nasa.gov/docs/2007/2007_Hansen_etal_2.pdf> [Hansen].

[7] Some estimates are lower and some are higher. For the purposes of this article, a conclusion on the particular percentage reduction necessary to avoid the worst of climate change is not necessary. Instead, it is sufficient to acknowledge that whatever the specifics turn out to be, they will represent a significant shift from present practices and trends. Most scenarios for stabilizing atmospheric GHG concentrations considered in the Technical Summary of the Third Working Group to the Fourth IPCC Assessment Report required emissions to decline before 2015 and be reduced to less than 50% of present levels by 2050. See T. Barker et al., eds., *Climate Change 2007: Mitigation - Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change: Technical Summary* (New York: Cambridge University Press, 2007) at 38-41, online: <http://www.mnp.nl/ipcc/pages_media/FAR4docs/final%20pdfs%20of%20chapters%20WGI

target, as formidable as it sounds, would not prevent climate change or return concentrations of GHGs to pre-industrial levels. Instead, it would merely stabilize GHGs in the atmosphere at a level that avoids the most catastrophic consequences of an altered climate.

Five obstacles stand in the way of reaching this goal: industrialism, international development, the tragedy of the commons, the clash between the developed and developing world on defining environmental limits, and incremental accumulation.

(a) Industrialism

Despite much literature on the emergence of a post-industrial world, this development has yet to occur, at least when it comes to energy. One of the defining characteristics of industrial civilization is dependence on fossil fuels. This dependence is not merely a bad habit. Fossil fuels are the resource that has made the industrial form of civilization possible. Since the first steam engines, industrial society has run on abundant and cheap oil, coal and natural gas. These fuels power machines in factories, originally in Europe and now increasingly in Asia. They are the reason for roads that lead to subdivisions that contain detached homes heated and cooled with power from centralized sources that house residents who commute over great distances to work in buildings without windows that use electric lights. Abundant fossil fuels are the source of cheap air travel, fresh fruit in winter and fertilizers that fueled the "revolution" in agricultural productivity.[8] People live on fossil fuels – for food, transportation, manufacturing, architecture, recreation, heat, light and recycled air.

Although human beings have harnessed energy since the discovery of fire, a proportional relationship between economic activity and energy consumption is a characteristic of industrial life. Energy sources other than fossil fuels have been invented or discovered, and a couple of them make a minor contribution to total energy consumption.[9] But fossil fuels remain the

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II/IPCC%20WGIII_TS%20final.pdf> [Climate Change 2007: Mitigation]; More recent data suggests that these estimates may be overly optimistic. See Hansen, *supra* note 6.

[8] "When the guano deposits and other natural fertilizers were exhausted, commercial farming became almost entirely dependent on chemical fertilizers made from oil and gas. Fossil energy not only powers but feeds the modern world. We are literally eating oil." Ronald Wright, *A Short History of Progress* (Toronto: House of Anansi Press, 2004) at 115.

[9] Hydro power and nuclear energy each account for about 6 per cent of world energy consumption. Renewables such as wind, solar, geothermal and others together amount to around 1 per cent. The remainder, or around 87%, is provided by fossil fuels: oil, coal, and

dominant source of energy around the globe. If fossil fuels power factories, cars and homes, then they also fuel markets and prosperity.[10] In the twenty-first century, wealth is broadly proportional to carbon emissions.[11] There may be slight variation among individuals because of personal circumstances and habits, but in general a higher standard of living requires a higher consumption of fossil fuels. In the modern era, "developed" means having a large carbon footprint.[12]

An 80 per cent reduction in GHG emissions amounts to changing the premise of industrial society.[13] To what should industrialism be changed? Modern economic activity is dependent upon fossil fuel use, and therefore upon GHGs. As economies grow, so too will emissions, and industrial economies must grow to survive. Within an industrial paradigm, an expanding economy is incompatible with decreasing use of fossil fuels.

(b) International development

Developing countries are intent on developing. Their path is traditional industrialism in which economic activity depends on, and is proportional to, the use of fossil fuels. Indeed, the developing world tends to

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natural gas. *British Petroleum Statistical Review of World Energy* (June 2007) at 41, online: BP <http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2007/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_report_2007.pdf> [British Petroleum].

[10] In the introduction to his book *Heat*, the British environmental thinker George Monbiot describes being asked what the U.K. would look like if it were to achieve an 80 per cent cut in GHGs. Monbiot was stumped by the question, so directed it to the environmentalist Mayer Hillman, who answered, "A very poor third-world country." George Monbiot, *Heat: How to Stop the Planet from Burning* (London: Allen Lane, Penguin Press 2006) at xv.

[11] Carbon dioxide, methane and nitrous oxide are the three main GHGs, together accounting for around 99 per cent of annual GHG emissions, with carbon dioxide contributing over three quarters. Fossil fuel use accounts for approximately three-quarters of annual carbon dioxide emissions and a significant portion of methane emissions: *Climate Change 2007: Mitigation*, *supra* note 7 at 27, 28.

[12] *Ibid.* at 30-31.

[13] "The problem for even the best-intentioned environmental activism is that it imagines it must confront a problem external to itself. … You cannot defeat something that you imagine to be an external threat to you when it is in fact internal to you, when its life is your life." Curtis White, "The Idols of Environmentalism" *Harper's Magazine*, 315:1887 (August 2007) 13, 16.

use a larger proportion of dirtier fossil fuels, such as coal, in its energy mix.[14] If the industrial meaning of "developed" is having a large per capita carbon footprint, the endeavour to develop translates into aspiring to achieve a higher rate of GHG emissions.[15]

The present level of per capita emissions in the developing world is significantly lower than in the developed world.[16] The problem is population.[17] Even with a lower per capita footprint, China and India already live beyond their biocapacities.[18] On their present paths, their emissions[19]

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[14] "Coal continued to be the world's fastest-growing hydrocarbon in 2006. Global consumption rose by 4.5%, below last year's rapid (+5.7%) growth but well above the 10-year average. Consumption growth in China, the world's leading coal user, moderated from the strong growth seen in 2005 but remained above average. Chinese coal consumption grew by 8.7% and China accounted for more than 70% of the growth in global coal consumption. … China and India together have close to a quarter of the world's proven coal reserves." *British Petroleum*, *supra* note 9 at 32; "China and India account for almost four-fifths of the incremental demand for coal. It remains the second-largest primary fuel, its share in global demand increasing slightly." Online: World Energy <http://www.worldenergy.org/documents/weckornferry_report2007.pdf>;
Raw coal produced over three-quarters of China's primary energy production in 2005. See *China's National Climate Change Programme*, National Development and Reform Commission, People's Republic of China, July 2007 and S. Ferrey, "Why Electricity Matters, Developing Nations Matter, and Asia Matters Most of All" (2007) 15 N.Y.U. Envtl. L. J. 113.

[15] Although significant technological and efficiency gains in energy use have been made in the past three decades, their effect on global GHG emissions is significantly smaller than the combined effect of global per capita income growth and global population growth: *Climate Change 2007: Mitigation*, *supra* note 7 at 3.

[16] *Ibid.* at 31.

[17] There are 1.1 billion people in India and 1.4 billion in China. Eighty-two per cent of the world's population lives in the developing world. *World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2005 Revision*, United Nations Department of Economic and Social Affairs, Population Division (New York: United Nations, 2007), online: Department of Economic and Social Affairs <http://esa.un.org/unpp>.

[18] *Living Planet Report 2006*, World Wildlife Fund, (Gland, Switzerland, 2006) at 17, online: For a Living Planet <http://assets.panda.org/downloads/living_planet_report.pdf > [Living Planet Report].

[19] "Global energy-related carbon-dioxide (CO^2) emissions increase by 55% between 2004 and 2030, or 1.7% per year …. Developing countries account for over three-quarters of the increase in global CO2 emissions between 2004 and 2030 in this scenario. They overtake the OECD as the biggest emitter by soon after 2010. The share of developing countries in world emissions rises from 39% in 2004 to over one-half by 2030. This increase is faster than that of their share in energy demand, because their incremental energy use is more carbon-intensive than that of the OECD and transition economies. In general, the developing countries use proportionately more coal and less gas. China alone is responsible for about 39% of the rise in global emissions. China's emissions more than double between 2004 and 2030, driven by

and their populations will both continue to grow.[20] The inconvenient conclusion is that on a traditional industrial path, there are too many people on the planet for them all (or even very many of them) to have a "developed" standard of living.[21]

Developing countries – especially emerging economies with the largest and fastest growing level of GHG emissions such as China and India – have stated on numerous occasions that their priority is development, not reductions in emissions.[22] They may take steps to increase their energy efficiency, but ambitious targets for economic growth suggest their annual emissions will continue to increase at a significant rate.[23] China either is or

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strong economic growth and heavy reliance on coal in power generation and industry. China overtakes the United States as the world's biggest emitter before 2010. Other Asian countries, notably India, also contribute heavily to the increase in global emissions. The per-capita emissions of non-OECD countries nonetheless remain well below those of the OECD." International Energy Agency, *World Energy Outlook 2006*, at 42, online: World Energy Outlook <http://www.worldenergyoutlook.org/summaries2006/English.pdf> [World Energy Outlook 2006].

[20] The global population is expected to exceed nine billion by mid-century. Virtually all population growth will occur in the developing world, the birth rate in the developed world having declined to below replacement rate. The rate of population growth around the world, including in the developing world, is declining and in the very long term may eventually fall below replacement rate: *World Population Prospects: The 2006 Revision, Executive Summary*, United Nations Department of Economic and Social Affairs, Population Division, Doc. No. ST/ESA/SER.A/261/ES (New York: United Nations, 2007), at 5 online: Economic and Social Affairs <http://www.un.org/esa/population/publications/wpp2006/English.pdf>.

[21] "Global primary energy demand in the Reference Scenario is projected to increase by just over one-half between now and 2030 – an average annual rate of 1.6%. Demand grows by more than one-quarter in the period to 2015 alone. Over 70% of the increase in demand over the projection period comes from developing countries, with China alone accounting for 30%. Their economies and population grow much faster than in the OECD, shifting the centre of gravity of global energy demand." *World Energy Outlook 2006*, *supra* note 19 at 38.

[22] See e.g., *China's National Climate Change Programme*, National Development and Reform Commission, People's Republic of China, July 2007 at 20. "The development history and trend of various countries has revealed the obvious positive correlations between per capita CO2 emissions, per capita commercial energy consumption and the economic development level. In other words, with current level of technology development, to reach the development level of the industrialized countries, it is inevitable that per capita energy consumption and CO2 emissions will reach a fairly high level."

[23] "Should there be no change in energy policies, the energy mix supplied to run the global economy in the 2025–30 timeframe will essentially remain unchanged, with more than 80% of energy supply based on fossil fuels with consequent implications for GHG emissions. On this basis, the projected emissions of energy-related CO2 in 2030 are 40–110% higher than in

will soon be the world's largest carbon emitter.[24] Its per capita emissions may soon rival those of developed nations.[25]

This state of affairs is consistent with the terms of the Kyoto Protocol.[26] One of the principles of both the United Nations Framework Convention on Climate Change (UNFCCC),[27] and of the Kyoto Protocol itself, is "common but differentiated responsibilities", which suggests that the developed world should bear the burden of emission cuts, while the developing nations are exempt to provide time to "catch up" in their economic development and living standards.[28] This strategy ensures that annual global emissions will continue to rise. More recent international negotiations,

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2000, with two thirds to three quarters of this increase originating in [developing] countries. … For 2030, projections of total GHG emissions (Kyoto gases) consistently show an increase of 25–90% compared with 2000." *Climate Change 2007: Mitigation, supra* note 7 at 30.

[24] M. Auffhammera and R. T. Carson, "Journal Forecasting the Path of China's CO2 Emissions Using Province-Level Information" (2008), 55 J. Envtl. Econs. & Mgmt. 229.

[25] World Energy Outlook 2006, *supra* note 19.

[26] Online: Kyoto Protocol to the United Nations Framework Convention on Climate Change <http://unfccc.int/resource/docs/convkp/kpeng.html>; In B. Pardy, "The Kyoto Protocol: Bad News for the Global Environment", (2004) 14 J. Envtl. L. & Prac. 27 [The Kyoto Protocol: Bad News for the Global Environment], I argued that that Kyoto contains at least six features that make it a poor model for international climate change treaties: (1) It contains the wrong kind of targets or caps for GHG emissions, based upon reductions from historical output rather than absolute limits; (2) It incorporates the principle of differentiated responsibilities, which allows targets to vary from country to country, and results in many countries being exempt altogether; (3) For those countries which have reduction targets, it bases those targets on historical emissions, which rewards pollution - the greater the emissions, the more lenient the standards; (4) It promotes the development myth that it is feasible to simultaneously protect the global environment and develop the developing world along a traditional industrial path; (5) Its objective is not to prevent climate change but to manage it – not to roll back anthropogenic effects upon the climate, but to salvage a climate that will have something less than catastrophic effects upon human society.; (6) It purports to be valuable not because of its beneficial effects upon the atmosphere, which are inconsequential, but because it is a political, symbolic "first step". In all these ways, Kyoto is politically appealing but substantively inadequate.

[27] 31 I.L.M. 849 (1992), signed May 29, 1992, entered into force March 21, 1994. Online: United Nations Framework Convention on Climate Change <http://unfccc.int/resource/docs/convkp/conveng.pdf>

[28] In July 2008, the countries of the G8 agreed "to consider and adopt" a target of at least a 50% cut in carbon emissions by 2050, but the undertaking is not binding, did not identify upon what year's emission level the 50% reduction would be based, and the statement included no interim measures. In September 2007, Asia-Pacific Economic Cooperation (APEC) countries agreed to an aspirational goal of reducing energy *intensity* by 25 per cent of 2005 levels by 2030.

including resolutions adopted at the UNFCCC meeting in Bali, Indonesia in December 2007, have not changed this status quo.[29]

(c) The tragedy of the commons

The atmosphere is a global commons. A "commons" is a public resource, possessed by no one. In his classic article "The Tragedy of the Commons", Garrett Hardin described how people with access to a common resource are compelled to use the resource beyond its capacity.[30] The benefit of each use accrues to the user, while the burden is spread amongst everyone. Thus, for each individual, the equation is compelling: there is always more private benefit than burden. This phenomenon can be described in terms of "externalities". An externality is a cost or benefit of an activity that does not accrue to the actor but to others external to it. The tragedy of the commons describes a scenario in which the grazing cost of each additional animal placed upon the commons is externalized to the rest of the users of the resource.

One solution to the tragedy of the commons is to internalize the environmental externality, so that each user is no longer compelled to contribute to the overuse of the resource.[31] There are three ways to do this: collective action,[32] privatization of the resource, or imposition of restrictions from an authority with coercive power. In the case of the global atmosphere,

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[29] In Bali, developing countries were adamant about the need for developed countries to adopt hard targets, but were equally resistant to the proposition that they should do the same themselves. The Bali agreement, referred to as the "Bali Action Plan" or "Roadmap", does not include hard targets on emissions, and requires developing countries to adopt only "nationally appropriate mitigation commitments or actions", which do not contemplate net emission reductions: Framework Convention on Climate Change (14 December 2007), FCCC/CP/2007/L.7/Rev.1 14 December 2007, Art. 1(b)(ii), online: UNFCC <http://unfccc.int/files/meetings/cop_13/application/pdf/cp_bali_act_p.pdf>. The Bali Action Plan sets out a negotiating process for a new global deal to be concluded by 2009 at the 15th Conference of the Parties to the UNFCCC in Copenhagen.

[30] Garrett Hardin, "The Tragedy of the Commons", (1968) 162 Science 1243, online: <http://www.sciencemag.org/cgi/content/full/162/3859/1243>.

[31] Principle 16 of the Rio Declaration on Environment and Development states: "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." U.N. Doc.A/CONF.151/26; 31 I.L.M. 874 (1992).

[32] See generally Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge University Press, 1990).

only one of these three options, collective action, is feasible. Privatization of the atmosphere, and of the moving air within it, is not possible even if it were desirable.[33] Nor is there an authority with coercive power over the atmosphere, each state in the global commons having sovereignty over its own affairs.

Although the tragedy of the commons is widely known as a model of economic behaviour, the nature of the tragedy itself is often overlooked or ignored. In a competitive economic world, the commons is overused because people (or nations) are compelled to do so. They do not contribute to the collapse of a resource because they are motivated by greed or selfishness but because not doing so places them at an economic disadvantage and does nothing to save the resource. Voluntary abatement has the effect of internalizing the costs of environmental effects only upon the actor taking the voluntary action. Since everyone shares the total burden together, the reward for voluntary internalization of environmental costs is a greater share of the externalities of others.

The lesson of the tragedy of the commons is that no good deed goes unpunished. Any persons (or nations) wise enough to see the error in the overuse of the atmosphere, and foolish enough to voluntarily reduce emissions without a similar undertaking from all the others, hurt themselves while making no appreciable difference to the problem. The "collective action" referred to above means universal agreement to obligatory restrictions, not individual voluntary action in the hope that others follow suit. The first protects the resource. The second harms the actor and makes no change to the resource's fate.

Unlike many other environmental problems that have both local and global aspects (for example, toxic pollution, declining fish stocks, and denuded forests), climate change is purely global. The concentration of GHGs in the atmosphere is the same everywhere regardless of where the GHGs are emitted. While reducing *air pollution* improves local air quality and global environmental health, the same is not true with a reduction in *GHG emissions*. If total global emissions are still growing, the concentration of GHGs in the atmosphere does not improve anywhere, including in locations

[33] It is possible to establish private rights to pollute that can be bought and sold, such as in a cap-and-trade carbon market, but that is not the same thing as privatizing the atmosphere itself or the air within it, which moves from place to place without capture. Emission rights are analogous to fishing quotas, which give private rights to fish but not property rights over particular volumes of ocean water or the fish within it until those fish are captured.

where emissions have been reduced. The effect of reducing local emissions in the absence of collective action is to impose the environmental externalities of other countries on your own population. This difficulty is explored at greater length in Part 3 below.

(d) The clash over limits: population, territory, biocapacity and history

Collective action on climate change requires agreement on how to calculate common emission limits. Differences over this issue are acute.

In its *Living Planet Report 2006*,[34] the World Wildlife Fund lists countries by the size of their per capita ecological footprints (a significant portion of which consists of GHG emissions). Seven of the top ten are Western nations: the United States, Finland, Canada, Australia, Sweden, New Zealand and Norway (the others are the United Arab Emirates, Kuwait, and Estonia). The list appears to confirm the view that global environmental problems and climate change in particular are mainly the fault of Western industrialized countries. This idea has found its way into a multitude of international programs and instruments, including the UNFCCC and the Kyoto Protocol.[35]

However, in the same document, the WWF reports that six of the seven Western nations in the list above, including Canada, live within their biological capacities (the U.S. is the exception). Even given the large amount of environmental resources consumed by each citizen, including high per capita carbon emissions, the total ecological load in these six countries is still smaller than their ecosystems and natural resources are able to provide. These nations do not impose massive environmental externalities on the rest of the world. In contrast, the United States is in ecological deficit, as are China, India, and the oil-producing countries of the Middle East. These nations

[34] *Living Planet Report 2006*, *supra* note 18 at 14-19.

[35] The attitude of developing countries is reflected in the 1991 Beijing Ministerial Declaration of Environment and Development, which states: "the developed countries bear responsibility for the degradation of the global environment. Ever since the Industrial Revolution, the developed countries have over-exploited the world's natural resources through unsustainable patterns of production and consumption, causing damage to the global environment, to the detriment of the developing countries. Responsibility for the emissions of greenhouse gases should be viewed both in historical and cumulative terms, and in terms of current emissions. On the basis of the principle of equity, those developed countries who have contaminated most must contribute more." Erik Schokkaert & Johan Eyckmans, "Greenhouse Negotiations and the Mirage of Partial Justice" *in* Mohammed Dore & Timothy Mount, eds., *Global Environmental Economics: Equity and the Limits to Markets* (Oxford: Blackwell Publishers, 1999) at 205.

create significant environmental burdens upon the globe because their impacts exceed the capacity of their own ecosystems.

Finding fault with countries that have high per capita environmental impacts reflects the notion that every person on Earth should be entitled to the same or comparable amount of environmental resources. According to this sensibility, if Canadians consume more energy per capita than people in China, then Canadians are the environmental villains. In contrast, comparing a country's environmental impact with its biocapacity reflects the idea that countries have a responsibility to avoid imposing environmental externalities on others. If a country's ecological resources are able to absorb more GHGs than the country emits, then that country does not contribute to GHG accumulation in the atmosphere, and does not impose climate change externalities on people elsewhere.

These two propositions are mutually exclusive. Compare two countries, Canada and China. China has a population approximately 40 times that of Canada,[36] while the two countries are roughly the same size.[37] A country's biocapacity depends not merely on its size but also on the nature and quality of its ecosystems (including whether they are robust or fragile, their carbon-absorbing capacity, the health of their native species, and so on). For the sake of simplicity, assume that the biocapacities of Canada and China are comparable given that the two countries are close to the same size.

If each nation is obligated to avoid imposing environmental burdens upon the rest of the world, then Canada and China would have similar total environmental limits. The maximum environmental effects produced within the territory of China should be comparable to those produced within Canada. Since China's carbon emissions are presently about 18% of the global total and Canada's produces about 2%, China would have a far more onerous responsibility to reduce its emissions than Canada. In contrast, if it is the obligation of each country to ensure that each of its citizens imposes a comparable environmental impact to that of citizens in other countries, then Canada would have the greater obligation, since China, a country of 1.4

[36] Canada's population is approximately 33 million, which is about 0.5% of the world's population. China has about 1.4 billion citizens, which is close to 20% of the total. See online: Central Intelligence Agency, The World Factbook <https://www.cia.gov/library/publications/the-world-factbook>.

[37] Each constitutes about 2.5% of global land mass. Canada's territory is approximately 3.8 million square miles, and China's is 3.7 million. See online: Central Intelligence Agency, The World Factbook <https://www.cia.gov/library/publications/the-world-factbook>.

billion people, would be entitled to a level of GHG emissions over forty times that of Canada, with a population of 33 million.

Principles supporting each of these notions can be found in international environmental law. The principle of "common but differentiated responsibilities" cited above from both the UNFCCC and the Kyoto Protocol also appears in other international documents, including the Rio Declaration.[38] In addition, the notion of equitable utilization of resources can arise in situations where nations share a resource such as a watercourse or coastal area. On the other hand, it is also a principle of international law that each state has the responsibility to avoid causing environmental damage to other countries or the globe as a whole. Principle 2 of the Rio Declaration reiterates a key provision of the 1972 Stockholm Declaration:[39]

> 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 or other States or beyond the limits of national jurisdiction.* [emphasis added]

Neither of these two alternative approaches to calculating GHG limits, in pure form, is tenable in climate change negotiations. Per capita measurements would require developed nations with low populations to shoulder burdens disproportionate to the contributions that they make to annual GHG accumulation. Since developed economies are still dependent upon fossil fuels, and since industrial economic activity is roughly proportional to energy use, achieving emission reductions in the developed world of a magnitude that would reduce per capita emissions to a level comparable to the developing world could produce catastrophic economic effects. On the other hand, the population in some developing countries is so

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[38] U.N. Doc.A/CONF.151/26; 31 I.L.M. 874 (1992); Principle 7, in part, states: 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 to sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

[39] Principle 2, U.N. Doc.A/CONF.151/26; 31 I.L.M. 874 (1992). .

high that there is no realistic prospect that their overall environmental burden or level of emissions could be limited to their national ecological capacity if they continue to grow industrial-style economies.

The alternative to using either of these measures is to calculate each country's limit as a reduction from historical levels. The higher a country's historical emissions, the higher its future emissions would be permitted to be (once a common per cent reduction has been applied). The Kyoto Protocol reflected this approach, but that was one of its flaws.[40] Achieving agreement on Kyoto was possible from a political perspective only because developing countries were exempt from targets. If they had not been exempt, developing nations would have refused to agree to such an approach because it would have provided an advantage to established economies. The opposite approach is not feasible either. Countries with established economies would not contemplate reduction targets that were inversely proportional to historical emissions (the higher emissions in the past, the lower absolute emissions must be in the future) because the richest, most developed countries would have to achieve the lowest total emissions, which would cause disruption of their economies.

(e) Incremental accumulation

Concentrations of GHGs accumulate in the atmosphere incrementally – slowly, day-by-day, as the result of the normal activities of billions of people around the world. Carbon remains in the atmosphere anywhere from five to 200 years. Most of the carbon emitted in any particular year represents an increase to concentration levels from the year before.[41] Because the problem is incremental accumulation, slight modifications in individual behaviour accomplish little – at best, a reduction in the rate at which concentrations grow (or even more modestly, a reduction in the rate at which growth *accelerates*). The benefits of marginal behavioural change are especially dubious if economies continue to expand. Halting the increase in GHG concentrations therefore requires that the way people live, work,

[40] The Kyoto Protocol: Bad News for the Global Environment, *supra* note 26.

[41] "Atmospheric CO_2 concentrations have increased by almost 100 ppm since their pre-industrial level, reaching 379 ppm in 2005, with mean annual growth rates in the 2000-2005 period higher than in the 1990s. The total CO_2-equivalent (CO_2-eq) concentration of all long-lived GHGs is now about 455 ppm CO_2-eq. Incorporating the cooling effect of aerosols, other air pollutants and gases released from land-use change into the equivalent concentration, leads to an effective 311-435 ppm CO_2-eq concentration…." *Climate Change 2007: Mitigation, supra* note 7 at 27.

produce and consume change in a revolutionary way. Low-hanging policy fruit – energy conservation, improved fuel economy, investments in alternative technologies, and so on – give the appearance of progress, but they have no prospect of *halting* the increase in GHG concentrations. Incremental harm requires revolutionary change, and revolutionary change is not achieved by incremental means.

The most popular concepts in environmental law allow governments to avoid revolutionary change by emphasizing compromise between competing interests. The most obvious example of these concepts is sustainable development. The premise of sustainable development is that environmental, social and economic factors should be balanced to come to a proper decision in each particular situation. The notion of balancing is now found throughout environmental legislation and policy. The job of the regulator has become to manage environmental risks so as to provide for the most desirable ecological, economic and social outcomes.[42] "Balancing" is an incremental solution, and is the enemy of an 80% reduction in GHG emissions.

3. The response of domestic governments to climate change

Domestic governments can do little to overcome these obstacles to global GHG reduction. Provincial and municipal governments are particularly ill-suited to act on the international scene. The most that national governments of countries that contribute relatively minor amounts of GHGs, such as Canada, can do is support international initiatives towards a binding global GHG treaty that contains universal emission limits.[43] Given these obstacles, governments should seek to achieve goals that are within their means. The most constructive action available is to govern energy in a principled manner consistent with characteristics and requirements of markets, ecosystems and the rule of law.

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[42] For example, the National Energy Board has a mandate to pursue the "Canadian Public Interest", which is described as "inclusive of all Canadians and refers to a balance of economic, environmental and social interests that changes as society's values and preferences evolve over time. As a regulator, the Board must estimate the overall public good a project may create and its potential negative aspects, weigh its various impacts, and make a decision." Online: National Energy Board <http://www.neb.gc.ca/clf-nsi/rthnb/whwrndrgvrnnc/strtgcpln20082011-eng.html>,

[43] Canada's contribution to annual GHG emissions is approximately 2 per cent of the global total. See online: United Nations Framwork Convention on Climate Change < http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php>.

Governments should not pretend to do more than they have the ability to achieve. In particular, governments should not (i) fall into the very traps that these obstacles describe: taking incremental, voluntary steps to reduce domestic carbon emissions to arbitrary levels in a futile attempt to contribute to a solution in the absence of a binding global agreement that contains universal emission limits; or (ii) attempt to usurp the role of energy markets by controlling supply and demand, influencing prices, attempting to choose winners and losers in future technology, using public money to make investments and manipulating consumers into conserving energy.

Unfortunately, these are the very actions that many governments are taking. The current response to climate change from governments in Canada and elsewhere has been to set arbitrary targets for reduction of domestic GHG emissions by arbitrary dates,[44] along with a set of policies – including incentives, investments and subsidies – to help achieve these targets; and to increase the degree of government intervention in energy markets and technologies.

(a) Domestic climate change plans and the futility of internalizing the cost of GHGs

Domestic climate change plans are political documents that serve to persuade an electorate that the government of the day is environmentally aware and is tending to the difficult matter of climate change. Such plans often include suggestions that the country/province/community has a moral duty to reduce its emissions and that the good people of the

[44] For example, the Canadian plan calls for a 20 per cent reduction in national GHG emissions relative to 2006 levels by 2020 (*Regulatory Framework for Air Emissions*, Minister of the Environment, April 26, 2007); The Ontario government's plan pledges to reduce the province's GHG emissions to 6 per cent below 1990 levels by 2014, 15 per cent below by 2020 and 80 per cent by 2050: Office of the Premier of Ontario, News Release, "McGuinty Government Sets Ambitious, Realistic Greenhouse Gas Targets" (18 June 2007), online: CNW Group <http://www.newswire.ca/en/releases/archive/June2007/18/c5817.html>; Even some municipalities have climate change plans. Toronto City Council has set targets of 6 per cent reduction from 1990 levels by 2012, 30 per cent by 2020, and 80 per cent by 2050. See *Change is in the Air: Climate Change, Clean Air and Sustainable Energy Action Plan: Moving from Framework to Action, Phase 1* (June 2007), online: Toronto Energy Efficiency Office <http://www.toronto.ca/changeisintheair/pdf/clean_air_action_plan.pdf>.
In none of these cases is it clear how the targets are to be achieved.
For a consideration of the constitutionality of provincial GHG reduction plans, see Alaistair R. Lucas and Nigel Bankes, "Kyoto, Constitutional Law and Alberta's Proposals" (2004) 42 Alta. L. Rev. 355.

country/province/community are to be commended for supporting the government in making a sacrifice for the benefit of the earth and future generations.[45] However, the sacrifices stop short of changing the basic characteristics of a way of life. Such plans are not vehicles by which to examine, much less tackle, international obstacles to progress on climate change, including the five discussed above. Indeed, one could make the case that these five obstacles – industrialism, international development, the tragedy of the commons, the clash between developed and developing world on defining environmental limits, and incremental accumulation – are topics that governments do not wish to discuss, and that climate change plans allow governments to avoid rather than confront them.

Whenever a product or service includes costs that are not borne by the actors involved but are instead imposed upon bystanders, a market imperfection exists. As described in Part 2 above, these costs are externalities. One way to prevent or reduce environmental harm is to impose the cost of preventing the pollution on the facility that causes it, thereby "internalizing" the externality. Internalizing environmental externalities is economic language for the "polluter pays" principle, which simply states that the costs of pollution should be borne by the source of the pollution.

Many sources of energy have local environmental effects. Fossil fuels produce air pollution in addition to GHGs; nuclear energy creates radioactive emissions, risk of catastrophic accidents and long-lived radioactive waste; wind energy requires the transformation of land use and landscapes; hydro power floods land and alters waterways; and so on. The true cost of energy produced by these sources includes the environmental cost of such impacts. Therefore, the cost of these impacts should be internalized and included in the cost of the energy in order to achieve an economically accurate result.

[45] For example, Ontario Premier Dalton McGuinty's Press Release announcing his government's climate change plan in June 2007 stated, "For the last four years, Ontarians have worked together to fight climate change and reduce our emissions of greenhouse gases. We're doing our part to fight climate change in an ambitious and realistic way by shutting down coal plants, promoting energy conservation and investing in infrastructure that helps Ontarians reduce their greenhouse gas emissions. We're going even further by setting tough new targets for the future that will build on all we have achieved in four short years, together. …we've come a long way, but we have more to do, together. By putting Ontario at the forefront of green innovation, we can meet our responsibility to the generations to come and create jobs and new opportunities for people today." Office of the Premier of Ontario, News Release, "McGuinty Government Sets Ambitious, Realistic Greenhouse Gas Targets" (18 June 2007), online: CNW Group <http://www.newswire.ca/en/releases/archive/June2007/18/c5817.html>.

Demand for energy produced by each source would exist as long as the price was competitive and benefits to consumers outweighed cost. Failing to require internalization of environmental burdens acts like a subsidy because it allows the product to be sold at a price that does not reflect its full cost.[46] In such circumstances, the market's function in allocating resources is compromised.

Unlike domestic environmental impacts, climate change externalities are purely global. Each tonne of GHGs has the same effect regardless of where it is emitted. Therefore, requiring domestic producers to internalize the cost of emissions is not an effective solution unless all other countries that are significant sources of GHGs do the same thing. When it comes to GHGs, the "polluter pays principle" does not work unless governments act in concert.

Modifying Garret Hardin's commons model demonstrates why this is so. Assume that there are ten countries in the world, each with a population of 100, all of whom emit GHGs. The benefit of sending each tonne of GHGs into the atmosphere for each of the 1000 people is free disposal of one tonne of GHGs. The burden of each tonne, on the other hand, is shared amongst all 1000 people, or is 1/1000 of the atmospheric burden of one tonne of GHGs. Imagine that one of these ten countries develops a climate change plan to limit GHGs, requiring its citizens to internalize the cost of their emissions. The result is that the benefit of disposing of GHGs in the atmosphere disappears for that country's own people, but their respective burden for each unit of GHGs emitted by others remains the same. Reducing GHGs in your own country in the absence of a binding global treaty with universal emission limits requires your own people to reduce their environmental externalities but to continue to bear those from people in other countries.

Until collective action is realized, national or local requirements to reduce GHGs punish one's own citizens and make no appreciable difference to the problem. They are especially dubious when similar restrictions do not exist for other environmental hazards with local effects. There is little logic in domestic environmental laws that would limit the use of gasoline and natural gas because of carbon emissions, but permit nuclear fission, air pollution and the use of industrial pesticides that impose risk upon local citizens.

[46] "[T]he price system becomes … ineffective when the damage caused to others by certain uses of property cannot be effectively charged to the owner of that property." Friedrich A. von Hayek, *The Road to Serfdom* (Chicago: University of Chicago Press, 1944) at 38.

(b) Visible hands: political boondoggles in the name of climate change

Statist energy governance creates the potential for political boondoggles masquerading as climate change solutions. A boondoggle is "a useless and expensive piece of work, especially one which is paid for by the public"[47] or "a wasteful or impractical project or activity often involving graft."[48] Energy boondoggles become possible when energy sources or technologies are pursued or supported with public resources, ostensibly for the purpose of the public good.

In the climate change era, energy boondoggles abound. One of the advantages of a system in which the government sets the rules but does not control the game is that economic signals are transparent and distinct. Success leads to survival; failure to expiry. No other judgment is necessary to know whether a technology is competitive. In contrast, energy sources that are supported by public money are saved from the objectivity of that system – and when financial questions are even a little murky, it is difficult to figure out what works and what does not.[49]

Nuclear power and ethanol are two of the leading candidates for categorization as energy boondoggles. Governments have recently and enthusiastically turned to both as climate change solutions. Nuclear energy is presently promoted as a cheap and clean method of producing electricity, while ethanol has attracted attention as a viable substitute for gasoline. Both of these energy sources are extensively underwritten by the state.

(i) Nuclear energy and the cost of risk

Since its early development in the mid-20th century in Canada and elsewhere, the nuclear power industry has been promoted and supported by government. The federal *Nuclear Liability Act*[50] is just one notorious example of the ongoing subsidies that reduce the costs of nuclear power relative to other sources of energy. The Act "establishes a regime of nuclear liability that encourages nuclear development by channeling all third party

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[47] Cambridge Advanced Learner's Dictionary Online, *s.v.* "boondoggle", online: Cambridge Advanced Learner's Dictionary <http://dictionary.cambridge.org/define.asp?key=96652&dict=CALD>.

[48] Merriam-Webster Online, *s.v.* "boondoggle", online: Merriam-Webster's Collegiate Dictionary, 11th ed., <http://www.m-w.com/dictionary/boondoggle> .

[49] See Office of the Ontario Auditor-General, "Bruce Power Refurbishment Agreement, Special Review for the Minister of Energy", April 5, 2007, online: Office of the Auditor General <http://www.auditor.on.ca/en/reports_en/brucespecial_en.pdf>.

[50] *Nuclear Liability Act*, R.S.C. 1985, c. N-28 [*NLA*].

liabilities to the operator and by limiting the operator's liability."[51] That liability is limited to a maximum of $75 million for all claims arising from an accident.[52] Victims of the incident are barred from any other right of action against any other party who may be responsible, such as the manufacturer of the facility, and must share the $75 million with all other victims of the same incident.[53] The operator is obligated to carry insurance coverage only to the extent of this potential liability.[54] When this limit is exceeded, any supplementary compensation, if any, is provided by the federal government from public funds.[55]

Anyone who owns a car understands that risk is a cost. Insurance premiums reflect the monthly cost of the risk of driving translated into dollars. A driver specially exempted from liability for accidents would not need to carry liability insurance. The effect of her immunity would be to shift the risk of her driving to other drivers and pedestrians. If she caused an accident, those who were injured would have to bear the loss, even though it came about through no fault of their own. Even if she caused no accident, her operating costs would be lower than any other driver.

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[51] Online: Natural Resources Canada, Energy Sources, Nuclear Energy < http://www.nrcan.gc.ca/eneene/sources/uranuc/nucnuc/index-eng.php>.

[52] *NLA*, *supra* note 50, ss. 18-19. Liability is also subject to a limitation period of three years from the date when the person making the claim had knowledge or ought reasonably to have had knowledge of the injury or damage complained of, with an absolute maximum limitation period of 10 years from the date of the incident (s. 13). At the time of writing, a government Bill to replace the NLA with a new *Nuclear Liability and Compensation Act* had had first reading: Bill C-5, *An Act respecting civil liability and compensation for damage in case of a nuclear incident*, 2nd Sess., 39th Parl, 2007. The Bill would raise the liability limit to $650 million, and enable the Minister to establish a tribunal to assess damage claims for compensation from the tax-funded Nuclear Liability Reinsurance Account in the event of a nuclear incident. In most key respects the Bill would not change the existing liability regime.

[53] *Energy Probe v. Canada (Attorney General)* (1989), 68 O.R. (2d) 449 (Ont. C.A.), leave to appeal denied [1989] S.C.C.A. No. 223.

[54] *NLA*, *supra* note 50, s. 15. It should be acknowledged that in the absence of the statute, the operator would not be obligated to carry liability insurance. In the absence of insurance, liability from an accident would have the potential to bankrupt the operator before all the losses were paid.

[55] *NLA*, *supra* note 50, Part II. This legislative scheme of limited nuclear liability is similar to that seen in other OECD countries, and is consistent with the provisions of the Paris Convention on Third Party Liability in the Field of Nuclear Energy.

In the same way, immunity from liability for nuclear energy shifts the cost of nuclear power away from the operator and onto the public.[56] In the event of an accident, residents could suffer catastrophic injury and property damage easily amounting to loss greatly exceeding $75 million for which neither the operator nor manufacturer would be liable. But even before any accident occurs, statutory limits on liability subsidize the cost of nuclear power. Without such limits, nuclear plants would need liability insurance to cover the full costs of an accident rather than the artificial limit provided in the *Nuclear Liability Act*. The cost of full insurance is part of the cost of the energy produced at the facility. Therefore, in order to compare the cost of nuclear power with the cost of other sources of energy, all costs, including the costs of risk and the insurance to cover it, need to be included in the calculation. To exclude it is to cheat – and to facilitate false claims that nuclear energy is inexpensive.

(ii) Ethanol

Ethanol has been touted by some, including governments that subsidize its production, as an alternative fuel that can reduce use of petroleum.[57] However, there is evidence that ethanol increases GHGs instead

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[56] The costs of risk are shifted onto the public generally, because compensation could be paid from public funds, and onto those residents in the area of the facility, who could suffer injury or property damage in the event of an accident. These people cannot even protect themselves by obtaining their own insurance, since homeowner policies carry a standard nuclear exemption.

[57] A recent report for the OECD Round Table on Sustainable Development: Richard Doornbosch and Ronald Steenblik, "Biofuels: Is the Cure Worse than the Disease?" (2007) Document No. SG/SD/RT(2007)3) at 25 [OECD Report], online: <http://media.ft.com/cms/fb8b5078-5fdb-11dc-b0fe-0000779fd2ac.pdf> lists a range of subsidies undertaken by governments in the OECD for ethanol and other biofuels: "Output-linked support includes the protection from foreign competition provided by import tariffs on ethanol and biodiesel; exemptions from fuel-excise taxes; and grants or tax credits related to the volume produced, sold or blended.… Support to the downstream side of the biofuels market has generally been provided in one of five ways: credit to help reduce the cost of storing biofuels in between the production seasons; grants, tax credits and loans to build dedicated infrastructure for the wholesale distribution and retailing of biofuels; grants to demonstrate the feasibility of using biofuels in particular vehicle fleets (e.g. biodiesel in municipal buses); measures to reduce the cost of purchasing biofuel-capable fleets; and government procurement programmes that give preference to the purchase of biofuels.…Domestic production of biofuels is directly supported by governments through two main instruments: border protection (chiefly import tariffs) and production subsidies."

of reducing them,[58] and produces other detrimental environmental effects.[59] For the purpose of this article, a conclusion on whether ethanol increases or reduces GHGs is not necessary. If it is close enough one way or the other to be a matter of controversy, then ethanol is not the cheap and plentiful energy source that will enable the world to achieve an 80 per cent reduction in GHGs by the middle of the century. Building an ethanol infrastructure is therefore a mistake, since in order to achieve the necessary target, ethanol will have to be abandoned as inadequate.[60] Subsidies for ethanol production have little to do with climate change solutions.

The error in such investments lies not in the choice of the technology but in the identity of the investor. The question is not whether particular technologies or projects are deserving of support, but why government should

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[58] P.J. Crutzen et. al.,"N2O release from agro-biofuel production negates global warming reduction by replacing fossil fuels", (2007) 7 Atmos. Chem. Phys. Discuss 11191, online: Atmospheric Chemistry and Physics Discussions <http://www.atmos-chem-phys-discuss.net/7/11191/2007/acpd-7-11191-2007.pdf>; *Another Inconvenient Truth: How biofuel policies are deepening poverty and accelerating climate change*, Oxfam International Briefing Paper, (25 June 2008), online: Oxfam Canada <http://www.oxfam.ca/news-and-publications/publications-and-reports/another-inconvenient-truth-biofuels-are-not-the-answer-to-climate-or-fuel-crisis-says-oxfam>.

[59] OECD Report, *supra* note 57 at 35-42: "Most biofuels have an overall environmental performance that is worse then gasoline … Ethanol from starchy grains yields the smallest GHG reduction. … Biofuels have a more positive record in respect of their end-of-pipe emissions, but those made from grains and oilseeds are generally more damaging to the environment up-stream. Production of biomass for biofuels can therefore have widely differing impacts on biodiversity, water quality (through the use of fertilizers and pesticides), water use and soil erosion. … The current push to expand the use of biofuels is creating unsustainable tensions that will disrupt markets without generating significant environmental benefits. The upward pressure first-generation biofuels create on food prices, and the increasing burden their subsidisation places on taxpayers, are likely to make policies that support them indiscriminately less and less acceptable to the public. … To the extent that subsidisation of biofuels reduces the retail prices of transport fuels in some countries, biofuel-support policies are also insulating drivers from the true costs to society of their fuel consumption, be it reduced national security or increased emissions of CO2. A far more neutral and efficient policy tool would be to tax fuels according to the externalities they generate."

[60] OECD Report, *supra* note 57 at 42: "Current biofuel support policies are placing a significant bet on a single technology notwithstanding the existence of a wide variety of different fuels and power trains that have been posited as options for the future. Those policies – that support high blends of ethanol, in particular – necessitate major investments in vehicles and fuel-distribution infrastructure — investments that, once made, put pressure on policy-makers to protect them. … Governments should cease creating new mandates for biofuels and investigate ways to phase them out."

be the party making that decision. When the state controls the energy game, particular energy choices can be expected to be driven by political considerations rather than by economic, technological or environmental factors. The greater the financial and political investment that government makes in particular technologies or facilities, the stronger the biased interest in its success can be expected, and the greater the determination to provide support in the face of adverse economic and environmental signals.

4. The relevance of energy scarcity

There are four potential causes of energy scarcity, all of which are related to each other: geopolitical instability; demand growth outstripping supply capacity; insensitivity to price (supply does not increase when price goes up); and declining oil deposits under the crust of the earth (or reaching the point of "peak oil").[61] It is beyond the scope of this article to consider the technical factors relevant to each of the potential causes of scarcity, or indeed to make a judgment about the degree to which energy will become scarce in the foreseeable future. In particular, the debate about whether the era of peak oil is approaching, or indeed has been reached, is extensive and notorious, and is not addressed here.[62]

It is sufficient for the purpose of this article to consider the implications of energy scarcity for governance responses to climate change. If the use of fossil fuels in Canada and around the world declines, it will not be because of GHG reduction plans but because of scarcity. If governments submit energy decisions to market mechanisms instead of attempting to manipulate them by influencing prices and investing tax dollars in dubious technologies, then scarcity may well provide its own solution. If oil or other carbon-based sources of energy become scarce, their prices will rise. As prices rise, alternative forms of energy will become more competitive. Opportunity in energy will expand, and the supply of alternative sources of

[61] In a sense, it is odd that climate change and oil scarcity are both considered to be problems. After all, the problem of peak oil is not enough oil; the problem of climate change is caused by too much. "The world is facing twin energy-related threats: that of not having adequate and secure supplies of energy at affordable prices and that of environmental harm caused by consuming too much of it." *World Energy Outlook 2006*, *supra* note 19 at 1.

[62] If the era of peak oil has arrived, it is completely fortuitous that it is occurring at about the same time as climate change. There is no natural or inevitable relationship between these two events – no planetary feature that limited the amount of oil buried in the ground to the amount that human beings could burn so as to bring the climate to the edge of transformation.

energy will increase to fill the gap produced by the scarcity of oil and gas.[63] In order for this market dynamic to operate, subsidies in the energy sector should be removed – on oil, gas, nuclear, renewables, and on all other matters that have an impact upon the cost of energy use, such as road construction and car manufacturing. Consumers should not be protected from the rising cost of energy in an era of scarcity, since that is what will produce comparative cost advantage for alternative sources. Without the motivation of price, consumers have little reason to switch from one source of energy to another.

The same reasoning applies to energy conservation. Conservation occurs when it provides more private benefit than burden. Scarcity produces rising prices, and rising prices are the reason consumers reduce the amount of energy they use. People buy energy-saving florescent light bulbs when the financial advantage dictates that choice. Government contradicts itself if it limits energy prices while at the same time exhorting the public to conserve.

5. Conclusion

Statist energy governance is detrimental because it produces obstacles to innovation that might otherwise produce solutions to climate change and other energy problems. Decision-making comes to be dominated by political considerations.[64] Politicians, bureaucrats and regulators determine energy prices, supplies, sources and investments. In a competitive environment, many actors make those choices. The market reflects the aggregate effects of their decisions, and is a better decision-making mechanism than an agency pulling economic levers at a central location.

Governments play politics with climate change. Their proffered solutions bear little relationship to the nature of the problem. They ignore

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[63] However, since international reserves of coal are abundant, in many countries (including China) oil scarcity can be expected to increase the use of coal.

[64] In February 2007, Bryne Purchase, former Ontario deputy minister of Energy, Science and Technology, and the executive director of the Queen's Institute for Energy and Environmental Policy, opined that the main obstacle to good energy governance in Ontario was the politicization of energy policy. He cited the Ontario Liberal government's commitment to close the province's coal-fired generation facilities, its stubborn determination to control electricity prices, and its lack of transparency in pursuing an expanded role for nuclear energy as examples of the predominance of political factors in energy decision-making: "It isn't coal; politicizing energy policy is the demon", Bryne Purchase, "Coal Isn't the Demon; Politicizing Energy Policy Is" *The Globe and Mail* (31 January 2007), online: The Globe and Mail <http://www.theglobeandmail.com/servlet/Page/document/v5/content/subscribe?user_URL=http://www.theglobeandmail.com%2Fservlet%2Fstory%2FRTGAM.20070131.wcomment0131%2FBNStory%2FNational%2F&ord=591133&brand=theglobeandmail&force_login=true>.

significant obstacles to decreasing global GHG emissions, abdicate their role in governing energy in a manner that is consistent with domestic legal norms and competitive markets, and make the development of environmental solutions less rather than more likely. Climate change is not insoluble, but the conflict between atmospheric capacity and industrial civilization is a profound and vexing dilemma that requires imagination and principled thinking. Climate change charades are not among the strategies that will lead to its resolution.