



REALITY VS. CLIMATE CHANGE UNCERTAINTIES

A FACT-BASED REBUTTAL TO “ACTING ON CLIMATE CHANGE”

Global warming revealed this massive Big Rock “Okotoks” south of Calgary as glaciers that were miles deep, pushed this rock from present day Jasper (about 400 km. northwest) some 10,000 years ago. Thanks to this global warming, climate refugees could move in to the region. At an estimated 16,500 tonnes, Big Rock is the largest known glacial erratic in the Foothills chain. “Okotoks” became a sacred icon to the Blackfoot/Siksika people. Climate change continues to this day. (PHOTO: Wikipedia Commons)



Re-issued in response to

**"Springing Canada Forward"
An Open Letter to Prime Minister Trudeau on
Climate-Literate Stimulus Priorities.**

Post-COVID-19 Recovery

Reissued July 2020
First published April 2015

REALITY VS. CLIMATE CHANGE UNCERTAINTIES

A FACT-BASED REBUTTAL TO “ACTING ON CLIMATE CHANGE”

Some 70 scholars from across Canada combined efforts to issue a report entitled “*Acting on Climate Change – Solutions from Canadian Scholars.*” Friends of Science Society challenge the report’s claim of ‘solutions’ as the ‘low-carbon’ propositions are not backed up by any credible discussion of implementation, costs or rule of law. Many of the claims in the report are not supported by evidence.

Global Warming has Stagnated for 18+ Years – CO2 has Risen

The low-carbon proposals rely heavily on the vagaries of **predicted** climate change based on computer modelled *simulations*. In September 2013, the Intergovernmental Panel on Climate Change (IPCC) Physical Scientists reported the *evidence* that global surface warming had unexpectedly stagnated for the past 15+ years, despite a significant rise in carbon dioxide (CO2) from human industrial emissions.¹ There are two possible explanations. Climate models had estimated that the effect of CO2 was much greater than it is – or natural factors like solar cycles, atmospheric oscillations and others – have a greater effect than first thought.

Catastrophic Predictions? Not quite what the Scientists said.

Science is a field of inquiry. Things are rarely as cut and dried or catastrophic as the “*Acting on Climate Change*” scholars claim. Witness the “Uncertainties” in the Technical Summary of the IPCC Physical Science Report² which says: “*Based on model results there is limited confidence in the predictability of yearly to decadal averages of temperature both for the global average and for some geographical regions.*”

Power generation is a tricky business.

The report lofts the notion of ‘east-west intelligent grid connections’ with no further delineation of how that might be accomplished, at what cost or possible consequences to regional power grid reliability. Ideology fails when it does not consider engineering, execution, and economics. It is notable that the “*Acting on Climate Change*” report makes sweeping statements about establishing an east-west grid, with 100% reliance on low carbon wind/hydro, but Alberta’s power generation expertise seems to be absent – a province which boasts one of the highest per

POWER GENERATION,
DISTRIBUTION &
SUPPLY

A VERY COMPLICATED
INDUSTRY

The power industry is
based on three
elements:

- Reliability.
- Affordability.
- Sustainability.

You can have any two of
the three. But ‘squeeze
the balloon at any point
and unintended
consequences may
result.

¹ <http://www.ipcc.ch/report/ar5/wg1/> See Chapter 9.4 Box 9.2 Climate Models and the Hiatus in Global Mean Surface Warming of the Past 15 Years

² http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_TS_FINAL.pdf pg. 114 and 115

capita concentrations of engineers and geoscientists in Canada.³

Biologists and Ecologists people advocate for wind power- killer of bats and rare birds

The group of 70 scholars are mostly biologists and forestry/ecology experts who advocate strongly in “*Acting on Climate Change*” for wind power. Wind turbines kill thousands of rare and endangered species every year; in particular in one study 188 dead and dying bats were found **daily** at one wind farm location in Alberta. Bats consume predatory insects – especially pine beetles. Thus, wind power seems a contradictory recommendation if species protection and forestry management is the goal.

The ‘solution’ of an east-west intelligent grid is technically infeasible and inadvisable

An in-depth assessment in this report exposes the technical issues related to the “100% reliance on low carbon energy by 2035” and the claim that wind could replace fossil fuels and nuclear. Neither proposal is in the realm of reality today; such a grid would risk national black-outs in the event of solar Coronal Mass Ejections, as in 1989, that melted Quebec power transformers. Such a grid structure would leave Canada exposed to similar risks from a terrorist attack.

Canada is a nation of ‘rule of law’

Investment decisions and long-range industrial planning, and economies, rely on a stable and predictable business environment. Consequently, to have 70 scholars proclaiming that Canada can achieve 100% reliance on low carbon electricity by 2035, disregards the end-date of the existing federal government schedule for the phase-out of coal-fired plants by 20 years,* meaning there would be economic consequences of billions of dollars of compensation from the public purse to the industries facing early closure if the scholars’ proposals were followed.

**Indeed accelerated coal phase-out by NDP in Alberta has cost taxpayers untold billions.*

Polluter Pays – Consumer Pays...More

“*Acting on Climate Change*” does not refer to any of the significant, well-documented negative consequences experienced in other jurisdictions that have embarked on low-carbon campaigns or that have instituted cap-and-trade or carbon taxes. These include heat-or-eat poverty, sharp rise in power price, market distortions, and cascading subsidies that ultimately fall on the consumer/taxpayer. There appears to have been no research or reporting done on this at all.

Claims of Present-time Catastrophic Climate-related Events – Not Supported by Evidence

The “*Acting on Climate Change*” report employs the urban myth that Calgary’s 2013 flood was a ‘climate-related disaster.’ It was a weather event affecting a known flood plain. Calgary experienced 8 of its worst floods prior to 1933; two of them in the late 1800’s were about 35% worse than the 2013 flood.⁴ Canadian research scientist, Madhav Khandekar, formerly with Environment Canada, in his 2013 report “The Global Warming – Extreme Weather Link”⁵ reported that there was no evidence of increases in extreme weather globally.

These are areas of serious misrepresentation in “*Acting on Climate Change*.”

³ <http://www.albertacanada.com/business/industries/ec-about-the-industry.aspx> There are over 73,000 engineers and geoscience professionals and over 18,000 applied science and engineering technicians and technologists registers in the province – more per capita than any other province in Canada.

⁴ <http://www.prweb.com/releases/2013/7/prweb10908388.htm>

⁵ <http://www.thegwpc.org/content/uploads/2013/11/Khandekar-Extreme-Weather.pdf>

Contents

Chapter 1.....	5
1.1 Climate is Made in the Atmosphere, oceans and Cosmos – It is not “Made in Canada”	5
1.1.1 Examining the Climate Action Premise on Carbon Pricing.....	5
1.2 An Examination of Policy Principles Stated in “Acting on Climate Change”	6
1.3 We Cannot “Choose” our Future when we are Living in a Winter land	7
1.4 Humans can Influence, but not Control Climate.....	7
1.5 Evidence vs Models – Global Warming has Stagnated/Stopped	10
1.6 How are Global Mean Temperatures Arrived at?	11
1.7 Models are Not Reality – Few Nations have met Emissions Reduction Targets.....	13
1.8 Climate Models do not Reflect Reality.....	14
1.9 Models Cannot Predict Volcanos or Atmospheric Oscillations or Intensity of Either.....	15
1.10 Total Solar Irradiance is Dropping and is Not Mentioned in the Report	16
1.11 Has Climate Changed in Canada? Is our Air and Water at Risk?	17
1.12 Montreal Average Daytime Temperature Highs since 1900 – Your Environment.ca	18
1.13 Quebec City Average Daytime Temperature Highs since 1900 – Your Environment.ca.....	19
Chapter 2.....	21
2.1 Glowing claims of New Economy–But The reality is Economic Catastrophe	21
2.1.1 Unsupported Claims of Prosperity	21
2.1.2 Carbon Taxes and Stringent Climate Change Targets are Disastrous to the Economy.....	23
Chapter 3 - CASE STUDIES IN CLIMATE CHANGE POLICY FAILURE.....	25
3.1 Dr. Benny Peiser on “To Heat or Eat: Europe’s Failed Climate Policy”	25
3.2 US EPA Food-to-Fuel Policy	27
3.3 EU Carbon Trading Market.....	29
3.4 Ontario Coal Phase-out	31
3.5 German Transition to Renewables.....	33
Chapter 4.....	36
4.1 Power – To the People	36
4.1.1 Climate Change Policy should not Burden People	36

4.2 Alberta Engineering Expertise Absent from “Acting on Climate Change”	37
4.3 What of a National Wind Farm Fleet replacing Nuclear and Fossil Fuels?	38
4.5 Wind Farms Put Species-at-Risk – Even More at Risk.....	39
4.6 Alberta’s Deregulated Power Market – No Public Debt; Lots of Options.....	40
4.7 Proposal for 100% Replacement of Fossil Fuels/Nuclear by Wind Infeasible.....	44
4.7 Why not more wind? Ask Ontario.....	48
4.8 When Germany added more Wind and Solar, it also added more Coal-fired Power.....	49
4.9 The Natural Gas Conundrum – Cleaner, but much more expensive	51
4.10 Biomass – Questions and Challenges.....	51
4.11 Transportation Recommendations Not Cost-efficient or Low Carbon	53
4.12 Walkable Neighborhoods a Pricey Option that offer No Social Justice.....	54
Chapter 5 Policy Recommendations	56
CHAPTER 6	59
6.1 SOLAR HIBERNATION - CLIMATE COOLING.....	59
In Summary	62

This report was originally issued in 2015 to respond to the "Acting on Climate Change" report, issued by some 70 scholars. There are some minor updates within, such as the solar cycle charts, but most of the original material still offers valid counterpoints to the "Acting on Climate Change" report and to the more recent "Springing Canada Forward" open letter to Prime Minister Trudeau on Climate-Literate Stimulus Priorities.

CHAPTER 1

1.1 CLIMATE IS MADE IN THE ATMOSPHERE, OCEANS AND COSMOS – IT IS NOT “MADE IN CANADA”

1.1.1 Examining the Climate Action Premise on Carbon Pricing

“*Acting on Climate Change*” claims that the first step toward a low-carbon society is the establishment of a price on carbon. By ‘carbon’ the scholars actually mean carbon dioxide (CO₂) – a colorless, odorless, tasteless gas that you breathe out at 40,000 ppm (parts per million) with every breath. “Carbon” is a term that refers to black soot – the byproduct of burning biomass (i.e. wildfires) or fossil fuels that results in black-tinged smoke. That black smoke is evidence of ‘carbon’ – but that is not the substance referred to by ‘pricing carbon’ – they mean putting a price on the “Social Costs of Carbon (Dioxide)” from industrial emissions. The Social Costs of Carbon (SCC) are usually arrived at using a mathematical model called an “Integrated Assessment Model (IAM).”

These IAMs are the domain of economists, not climate scientists.

Noted American economist Robert Pindyck in his paper “Climate Change Policy: What do the Models Tell Us?”⁶ His own answer? “Very little.” Pindyck writes:

*“A plethora of integrated assessment models (IAMs) have been constructed and used to estimate the social cost of carbon (SCC) and evaluate alternative abatement policies. **These models have crucial flaws that make them close to useless as tools for policy analysis.**”*

The “Social Cost of Carbon” is based on the alleged future damage to human health and the environment due to the present time use of fossil fuels. A ‘price on carbon’ is established using one of the IAMs that Pindyck refers to above.

However, according to Dr. Ross McKittrick, professor of economics at the University of Guelph, ‘costs of carbon’ are based on economic models that are calibrated to climate change models – not actual temperatures – leading to wildly exaggerated results.⁷ Furthermore, the “Social

⁶ <http://www.nber.org/papers/w19244>

⁷ Fyfe et al. (2013) General Circulation Model trends averaged 0.21 °C/decade, more than four times the observed level based on Figure 1b, which has a 15 year period of 1998 to 2012 inclusive

Benefit of Carbon” is missing in these evaluations. In no other aspect of Western economic planning are benefits excluded when trying to do a cost-benefit analysis.

The benefits of fossil fuels to society are real and tangible. The ‘Social Costs of Carbon’ are all predictive.

There has been an unexpected ‘pause’ in global warming – which is now over 18 years – despite a significant rise in human produced carbon dioxide (CO₂), once considered the driver of global warming and climate change. Thus, Dr. McKittrick’s view is that policy makers and the public would well-served by waiting 2 to 4 years before making any policy moves that would be difficult to dismantle if it turns out that carbon dioxide is not the ‘knob’ on climate variability, as current evidence suggests.

The views of these economists are absent from *“Acting on Climate Change.”*

There is no broad agreement that carbon pricing is essential, it may not be necessary at all. In this document, Friends of Science Society will examine the outcomes of carbon pricing in other jurisdictions to assess the effectiveness of carbon pricing.

Readers are advised to watch the series of short video clips *“McKittrick on Climate Change”*⁸ and the layman’s guide to Social Costs of Carbon companion guide.⁹

1.2 An Examination of Policy Principles Stated in *“Acting on Climate Change”*

“Acting on Climate Change” offers 5 parameters for policies designed to ‘address climate change and reduce greenhouse gas emissions.’

They are:

Environmentally effective – to meet GHG reduction targets without causing other excessive environmental impacts

Cost-effective – achieve reduction at least possible cost

Administratively feasible – not too complex or beyond implementation.

Equitable – not place unjustified burdens on any region, sector or income group

Politically feasible – acceptable to the public and elected leaders

⁸ <https://youtu.be/g30JfQIK6GA?list=PLZcRTdbkGEnHfU8-dkQfGnO67K6p1m8rh>

⁹ http://www.friendsofscience.org/assets/documents/McKittrick_Climate_Change_SCC_Feb_14_2015.pdf

As we review the claims of “*Acting on Climate Change*” we shall apply their five principles to existing case studies in jurisdictions where carbon pricing, cap-and-trade and stringent climate change targets have been implemented and we will see whether constructive outcomes are achieved.

1.3 We Cannot “Choose” our Future when we are Living in a Winter land

In Chapter 1 of “*Acting on Climate Change*,” readers are told that Canada is party to the UN Framework Convention on Climate Change and that we have thus “subscribed to the objective of limiting global temperature increase to 2°C” – when in fact we have not so subscribed. The UNFCCC agreement is to ‘stop dangerous human interference with the climate system.’¹⁰

Though Canada is still signatory to the UNFCCC, in 2011 Canada pulled out of the Kyoto Accord in order to avoid paying ~\$14-18 Billion in climate change penalties as Canada, like numerous other countries in the developed world, were not able to meet the greenhouse gas reduction targets set by others, without severely damaging our economy.

The authors of “*Acting on Climate Change*” are presenting climate change as a human choice – not a consequence of natural forces. This is absurd.

1.4 Humans can Influence, but not Control Climate

“*Acting on Climate Change*” makes the fatuous statement in its opening paragraph of Chapter 1 that ‘Controlling climate change requires a society...’ There is no evidence that humans can **control** climate change – though there is evidence that human activities may possibly **affect** climate change to an as yet undefined extent. There is a very big difference between the words ‘control’ and ‘affect.’

Control – to have power over something¹¹

Affect – to produce a material influence upon or alteration in¹²

There is no evidence that human beings can **control** climate change, no matter what they do.

There is an unsubstantiated **hypothesis** that human industrial emissions of carbon dioxide and other greenhouse gases, if released in quantity, **may** lead to warming of the climate on earth. This theory is not supported by long-term data and present evidence of the 15+ year “pause”

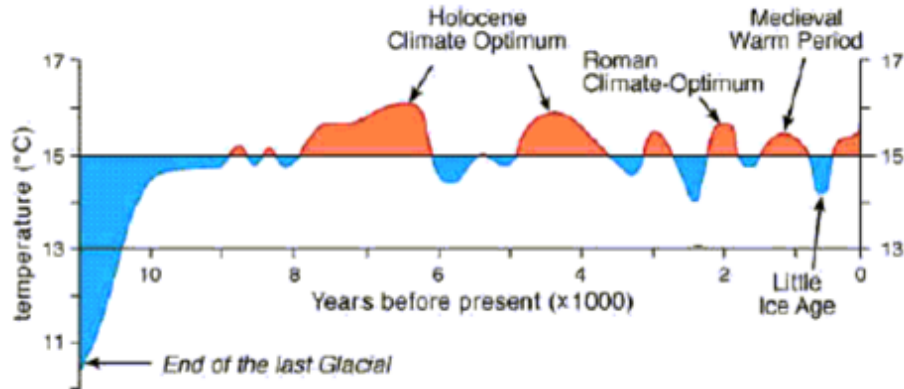
¹⁰ http://unfccc.int/essential_background/convention/items/6036.php Preventing “dangerous” human interference with the climate system is the ultimate aim of the UNFCCC.

¹¹ <http://www.merriam-webster.com/dictionary/control>

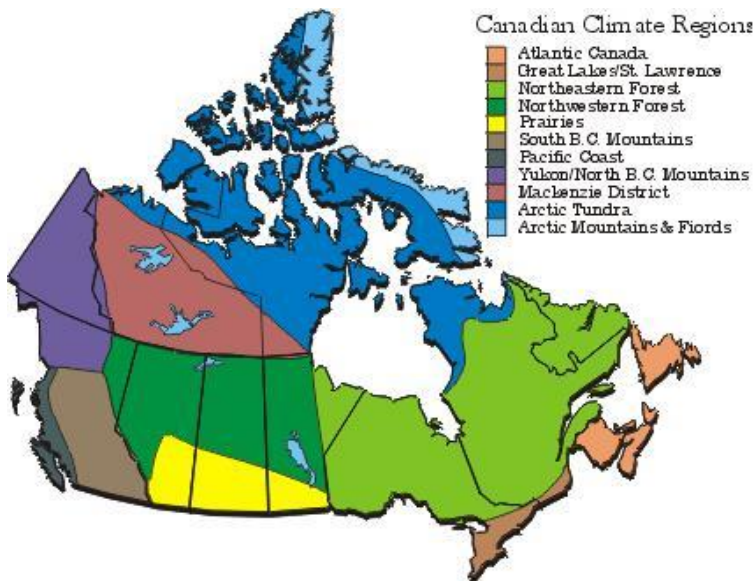
¹² <http://www.merriam-webster.com/dictionary/affect>

and stagnation in global warming, despite a significant rise in carbon dioxide (CO₂). This evidence suggests the Anthropogenic Global Warming theory is faulty.

Very long-term geologic evidence and proxies indicate there have been numerous natural warming and cooling cycles throughout time. It is presently a matter of debate amongst scientists as to what measure of influence human activity may have on climate.



Human activity that affects climate is not only related to carbon dioxide (CO₂)/greenhouse gas emissions from industry. Other human activities like land disturbance, deforestation, and the urban heat island also have impacts. Certainly in Canada’s wintery climate, Canadians will always have a significant need to keep warm and light the dark winter nights, fossil fuels and wood/biomass along with hydro and nuclear make up the bulk of power generation now and in the foreseeable future.

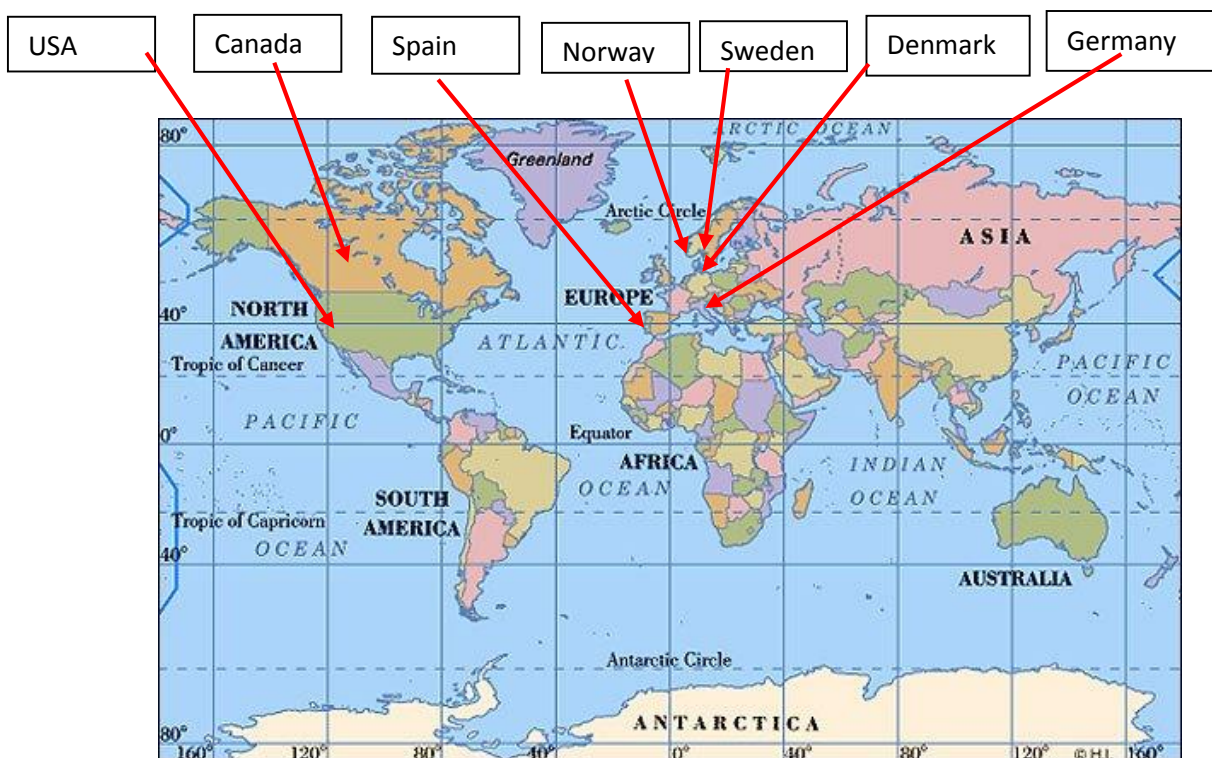


When examined on a regional basis, average winter temperature for 2013-2014 were among the 10 coldest on record for two of the eleven climate regions: the Northeastern Forest (6th coldest at 1.7°C below the baseline average) and the Great Lakes/St Lawrence Lowlands (8th coldest at 1.8°C below the baseline average). Other regions that experienced winter temperatures considerably colder than the 1961-1990 average are the Northwestern Forest (13th coldest at 1.9°C below average), Prairies (14th coldest at 2.0°C below average) and Atlantic (17th coldest at 0.6°C below average) regions. All eleven climate regions exhibit positive trends in winter temperatures over the 67 years of record. The strongest trend is observed in the Mackenzie District (4.4°C) while the weakest trend is observed for the Atlantic (0.5°C).

Source: Environment Canada
<https://www.ec.gc.ca/adsc-cmda/default.asp?lang=En&n=383F5EFA-1>

Consequently, as a relatively 'young nation,' our individual family needs for heating, light and transportation – and similar demands for industry and business – are much greater as a given fact, than those of highly populated European Union (EU) which boasts densely packed urban areas that date back 2000 years (as in the case of London, England), well-established public transit routes (many of which were originally built by the Roman Empire), moderate winter and summer temperatures by comparison to Canada. The EU benefits from more moderate temperatures overall as well as close proximity to trade markets for food, goods and services, within the EU. This results in many energy and economic efficiencies – particularly in terms of public transit – with high volume use virtually guaranteed. It is impossible to achieve similar efficiencies in Canada due to the reality of distances, sparse population density and weather.

Further, the EU is well-served by an age-old collection of ocean ports and a network of river canals that crisscross central Europe and which are used for low-cost transportation of goods year round (sea or river freight being the most cost-efficient of any form of transport).



Country	Population	Population Density	Avg Winter Temps	Geographic Size	Fits into Canada
Denmark	5,614,000	132/km ²	-2° to 4 °C	43,094 km ²	231.6
Norway	5,080,000	14/km ²	-10° to 16 °C	385,178 km ²	25.9
Germany	80,602,000	231/km ²	-5° to 2 °C	357,168 km ²	27.9
Spain	47,207,000	94/km ²	2° to 9 °C	504,645 km ²	19.78
Sweden	9,644,864	24/km ²	-4° to -5 °C	449,964 km ²	22.18
USA	318,900,000	35/km ²	-16° to -8 °C	9,857,306 km ²	1.01
Canada	35,160,000	4/km²	-32° to -6 °C	9,984,670 km²	N/A
India	1,252,000,000	421/km ²	20° to 8 °C	3,287,540 km ²	3.03
China	1,350,000,000	145/km ²	-1° to -9 °C	9,596,961 km ²	1.04

The foregoing comparison illustrates why Canadians are greater users of fossil fuels and have more emissions per capita. We live in a much colder climate. Transportation demands for travel and shipment of goods are many times those of other nations; likewise we are unable to capitalize on transportation cost-efficiencies due to our sparse population and general landlocked status, with no natural internal river corridors (as in Europe’s canal system or the US Mississippi/Missouri system).

1.5 Evidence vs Models – Global Warming has Stagnated/Stopped

Since the muted announcement in 2013 by the IPCC Physical Sciences Working Group I, that global warming had stagnated/stopped, despite a rise in carbon dioxide (CO₂) and that they had no explanation for this it has become clear that there is a problem with the theory of Catastrophic Anthropogenic Global Warming (CAGW).

Is Canada thus still obligated to the UNFCCC if ‘dangerous’ interference appears less critical than originally forecast? This is an important policy question to consider.

Members of the public may not be familiar with the process of how climate scientists are ‘foretelling’ future trends. Climate models are used. These are very complex

mathematical calculations that run simulations on advanced computing systems. While actual climate data make up the foundation of the model, a great deal of subjective assessment is involved which throws some doubt on how climate models deal with CO₂. The effect of increased CO₂ has never been scientifically verified. And is at best highly subjective.¹³

People who have a rational objection to claims of impending climate change catastrophe, usually note that the 'climate sensitivity' of carbon dioxide (CO₂) – meaning the calculated impact of rising carbon dioxide – is a factor that has likely been over-estimated and set at too high a rate.

CLIMATE MODEL PREDICTIONS ARE EXTREMELY HIGH
Global Circulation Models trends averaged 0.21 °C/decade, **more than 4 times** observed level over the **15 year period of 1998 to 2012 inclusive** Fyfe et al. (2013)

Citizens must understand that climate change policies (i.e. carbon taxes, emissions standards, industry policies) are based on climate predictions that were **FOUR TIMES** higher than the actual temperatures during 1998-2012. **Human emissions of greenhouse gases and carbon dioxide levels were not reduced by these policies**, yet some **\$1.2 Trillion in public money was spent**, world-wide over about a decade to 2012, on climate change mitigation efforts.

Perhaps policies were too stringent? Perhaps the theory is faulty? These are valid questions to ask.

1.6 How are Global Mean Temperatures Arrived at?

Global mean temperatures are measured in a few different ways and this can also lead to different and, for the layman, confusing results.

The most accurate *global* measurements are from satellites – but these satellites have only been operating, in ever increasing numbers and accuracy – since the 1970's.

Consequently, the long term land temperature records are the next most reliable, but they are spotty. In North America they date back about 100 years.

¹³

http://cseg.ca/assets/files/resources/abstracts/2010/0058_GC2010_Effect_of_Doubling_Concentration_of_CO2_in_the_Atmosphere.pdf

The next most accurate are land monitors – but these are not evenly spaced on the planet, and land mass covers only 30% of earth.

Sometimes one monitor is used to ‘average’ the regional location’s temperature – but for instance a monitor in Calgary in winter on a Chinook wind day (when balmy Pacific winds melt winter snows) would not reflect the -20°C weather in nearby Edmonton at all (which often sits under a ‘dirty ridge’ of cold, trapped, stagnant weather inversion). Likewise in summer, Calgary might have very temperate weather at 20°C, but in Medicine Hat, a three hour drive south east, it might be 40°C above; while it might be 5°C and simultaneously snowing in Banff in upper elevations, just a 40 minute drive west of Calgary in the Rocky Mountains.

Calgary + 20°C
Edmonton - 20°C
Medicine Hat + 40°C
Banff + 5°C
Avg. temperature 11.25°C

Would an average of those temperatures be informative on climate change?

Another monitoring system that is relatively new is the Argo ocean buoy system, some ~3,000 floating (and some diving) monitoring drones that are dotted across the oceans. Again, the oceans cover 71% of the earth’s surface and feature warm and cold changing currents under the sea, and in some places the oceans are 10 km deep, deeper than the highest land mountain is high. Thus, the Argos coverage, while important, is literally a ‘drop in the bucket.’

Land and ocean data are often averaged together by climate scientists to arrive at a ‘global mean temperature’ but there are normal seasonal variations (i.e. winter/summer extremes in Northern Hemisphere in particular where there is the greatest portion of land mass) that must be accounted for.

And then there are clouds.

Trying to model a cloud is about as easy as trying to hold one in your hands...They are a major source of error...”
– David Orrell *Apollo’s Arrow*

1.7 Models are Not Reality – Few Nations have met Emissions Reduction Targets

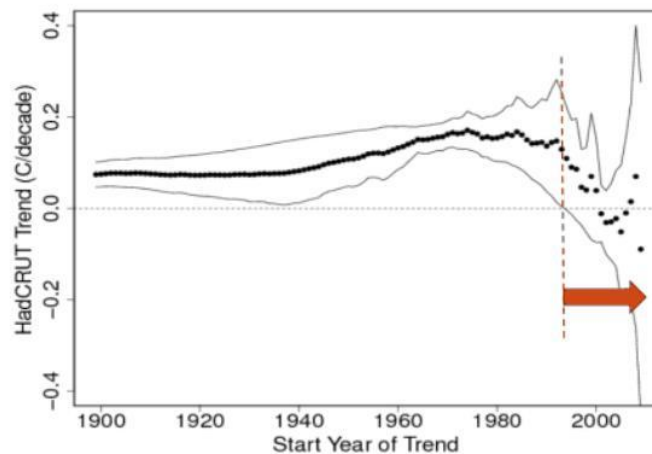
Model simulations cannot capture climate changes accurately, nor can they make exacting long-term forecasts – a fact that is openly stated by the IPCC Physical Scientists in their “Uncertainties” section of the Technical Summary of the 2013 report.

Thus, it seems completely inappropriate of the authors of “*Acting on Climate Change*” to illustrate ‘predicted changes in average annual temperature’ maps (pg. 18 of “*Acting on Climate Change*”) without appropriate disclaimers regarding how these simulations are designed, their fallible nature and these uncertainties.

Likewise, presenting a modelled result (Figure 1A) as the “*Acting on Climate Change*” authors have done that assumes an outcome if ‘*all countries immediately took ambitious mitigation actions*’ is simply not based in reality. Why present it?

Most countries are in default of their Kyoto Accord commitments and several, like Canada, have withdrawn. Major developing nations like China and India have no intention of taking immediate action to reduce GHGs.

Further – as we have pointed out – global warming has stagnated. Here is a trend analysis from a presentation by Dr. Ross McKittrick of May 2013.¹⁴



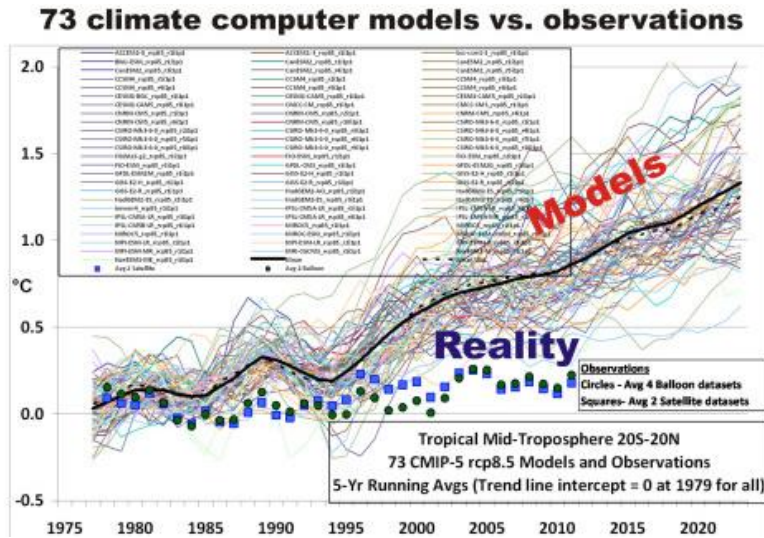
mcmckittrick.com

Source: Dr. Ross McKittrick – graph illustrates trend computed over a sample with the start date moving forward as indicated on the horizontal axis and the end date fixed at 2013

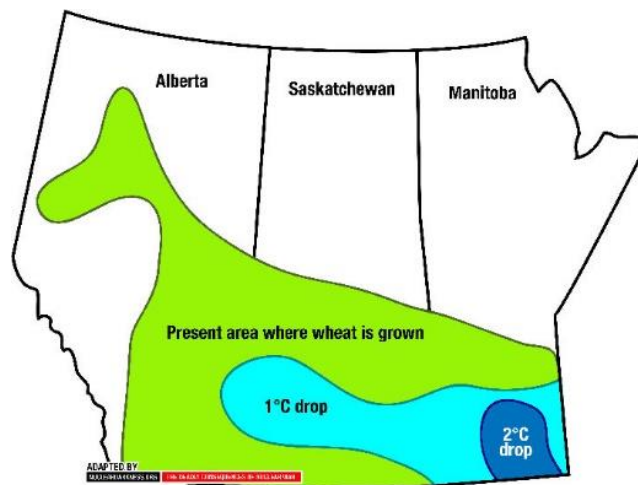
¹⁴ <http://www.friendsofscience.org/index.php?id=750>

1.8 Climate Models do not Reflect Reality

In Annex 2, “Acting on Climate Change” authors refer to the use of CMIP5¹⁵ climate models, most of which are encompassed in the graph below which clearly demonstrates that models have diverged very far from reality.



Since climate change means that climate could be *warmer OR cooler*, it is curious that these scholars do not address that possibility as well. Colder temperatures would be far more catastrophic in the Canadian context than warming.



¹⁵ <http://cmip-pcmdi.llnl.gov/cmip5/> Coupled Model Intercomparison Project Phase 5

The preceding map¹⁶ indicates the agricultural crop loss resulting from just a one or two degree drop in temperature. This would be devastating to Canada's economy and to millions of people around the world who rely on Canada's bountiful grains and pea crops for staple food.

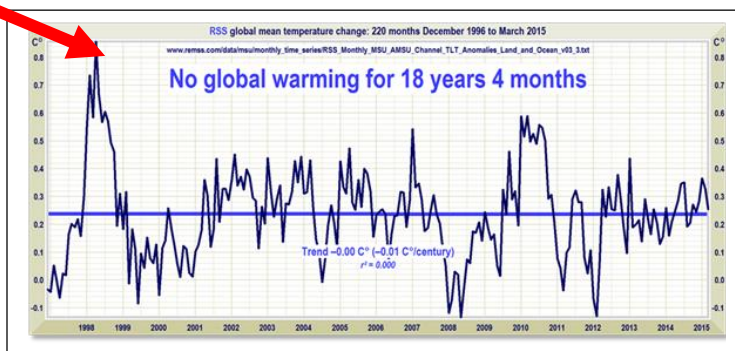
1.9 Models Cannot Predict Volcanos or Atmospheric Oscillations or Intensity of Either

Models are unable to predict natural factors like volcanos. The 1816 "Year without Summer"¹⁷ was the result of the Mount Tambora volcanic explosion in Java/Sumatra, which had a global impact. The ruined crops in the US Midwest, due to the weather extremes caused by the volcanic ash, gases and aerosols that slowly travelled through the earth's atmosphere, are often cited as the driver of the American settler wagon-train movement west. Destitute farm families who had been wiped out, had nothing to lose by seeking better farm land.

Similarly, some of the 2-3 degree cooler weather of the Little Ice Age is attributed to the Laki volcanic explosion in Iceland in 1783.¹⁸ Volumes of toxic gases swept England and Europe, wilting crops and killing cattle and hundreds of thousands of people. There was an estimated 4.8°C drop in the 225 year average temperature on the North American east coast.

Prior to the impact of the Laki volcano, cooler than average temperatures and some weather extremes of the Little Ice Age led to the collapse of the Jamestown colony.¹⁹

ENSO
1998



Atmospheric Oscillations are natural, cyclical patterns that significantly affect climate, but climate models cannot predict these with any accuracy. There are some decadal patterns that some of these oscillations follow, however the intensity of the effect cannot be predicted.

A recent El Nino Southern Oscillation (ENSO) occurred in 1998, spiking global mean temperatures higher than normal.

This 'hot' weather events also happened to also coincide with James Hansen's infamous 1988 presentation to Congress on global warming²⁰ a decade before the big El Nino, making him appear as if a prophet (though El Nino is a natural weather event). Few people realize that this

¹⁶ Map originally outlined to illustrate possible crop reduction outcome following a temperature drop due to a nuclear winter. Source no longer available on internet.

¹⁷ The Year without Summer: 1816 and The Volcano That Darkened the World and Changed History, William K. Klingaman and Nicholas P. Klingaman

¹⁸ <http://volcano.oregonstate.edu/laki-iceland-1783>

¹⁹ http://www.encyclopediavirginia.org/Little_Ice_Age_and_Colonial_Virginia_The#start_entry

²⁰ <http://www.pbs.org/wgbh/pages/frontline/hotpolitics/interviews/wirth.html>

hearing was orchestrated to happen on the hottest day of the year, and that then Senator Timothy Wirth and others apparently tampered with the building ventilation the night before to make the room seem even hotter.

From the FRONTLINE INTERVIEW:

WIRTH: Believe it or not, we called the Weather Bureau and found out what historically was the hottest day of the summer. Well, it was June 6 or June 9 or whatever it was, so we scheduled the hearing that day, and bingo: It was the hottest day on record in Washington, or close to it. It was stiflingly hot that summer. [At] the same time you had this drought all across the country, so the linkage between the Hansen hearing and the drought became very intense....

And did you also alter the temperature in the hearing room that day?

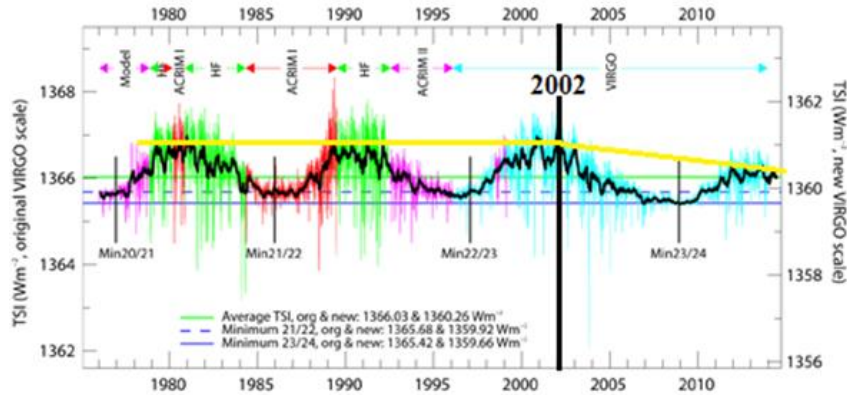
... What we did it was went in the night before and opened all the windows, I will admit, right? So that the air conditioning wasn't working inside the room and so when the, when the hearing occurred there was not only bliss, which is television cameras in double figures, but it was really hot. ...

So Hansen's giving this testimony, you've got these television cameras back there heating up the room, and the air conditioning in the room didn't appear to work. So it was sort of a perfect collection of events that happened that day, with the wonderful Jim Hansen, who was wiping his brow at the witness table and giving this remarkable testimony. ...

Those are the contrived roots of 'global warming.'

1.10 Total Solar Irradiance is Dropping and is Not Mentioned in the Report

According to **solar physicists***, the present drop in solar activity may be leading to just such cooling with the World Radiation Center of Davos, Switzerland reporting a drop in Total Solar Irradiance (TSI) that is visible on the following graph since 2002, coincident to the period of stagnation in global cooling. (i.e. TSI may have been dropping prior to that time but is not visibly evident due to the nature of the graph).



Source: World Radiation Center

Yellow trend line has been added to illustrate drop in irradiance, visible since 2002

**Note: Solar physicists and climatologists have differing views on the causes of climate change and which are the more significant factors. Climatologists, and especially those involved in the IPCC, see Total Solar Irradiance as a nominal factor in climate change. By contrast, solar physicists examine the broader range of impacts of solar activity as well as the energy factors. NASA's Solar Dynamics Observatory has only been up in space since 2004. Friends of Science generally agree with the view of solar physicists and of the majority of earth scientists, that the sun is the major factor in climate change. The IPCC mandate is to study the human-induced factors of climate change, not all factors.*

1.11 Has Climate Changed in Canada? Is our Air and Water at Risk?

Throughout much of the "Acting on Climate Change" document and the associated "Alternatives Journal/AJ" there seems to be a widespread impression that Canadians are at immediate risk due to climate change and to pollution.

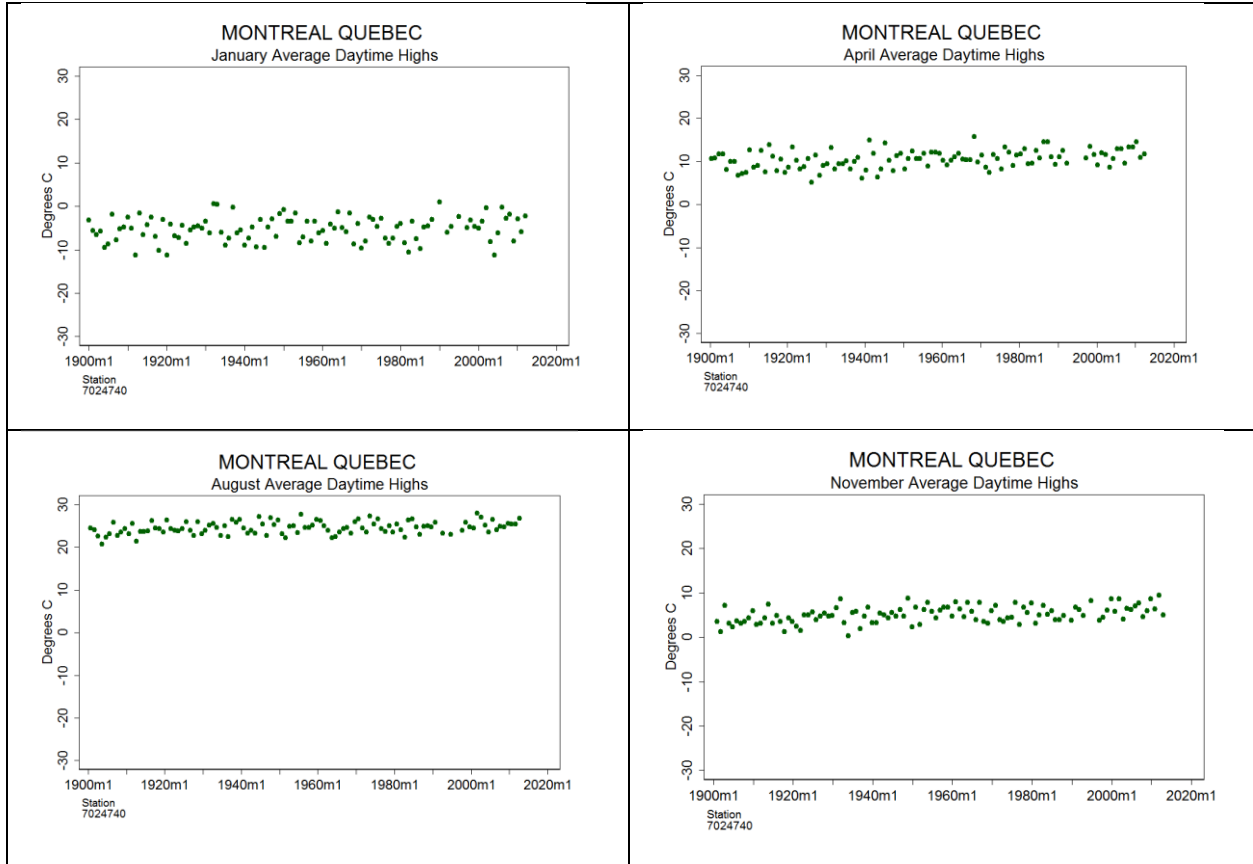
In fact, a review of the long-term federal and provincial data, now on-line by community at **YourEnvironment.ca** illustrates that there is little change in temperature over the past 100 years in most Canadian cities.

Further, federal and provincial environmental policies are working well – in virtually all centers there is a visible decline in pollution like "NO_x and SO_x" (nitrogen and sulfur emissions), as well as fine particulate matter (soot) from the combustion of fossil fuels or biomass (PM_{2.5} microns or PM₁₀). This information also on **YourEnvironment.ca**

In fact, the World Health Organization ranks Canada as having some of the cleanest air in the world.

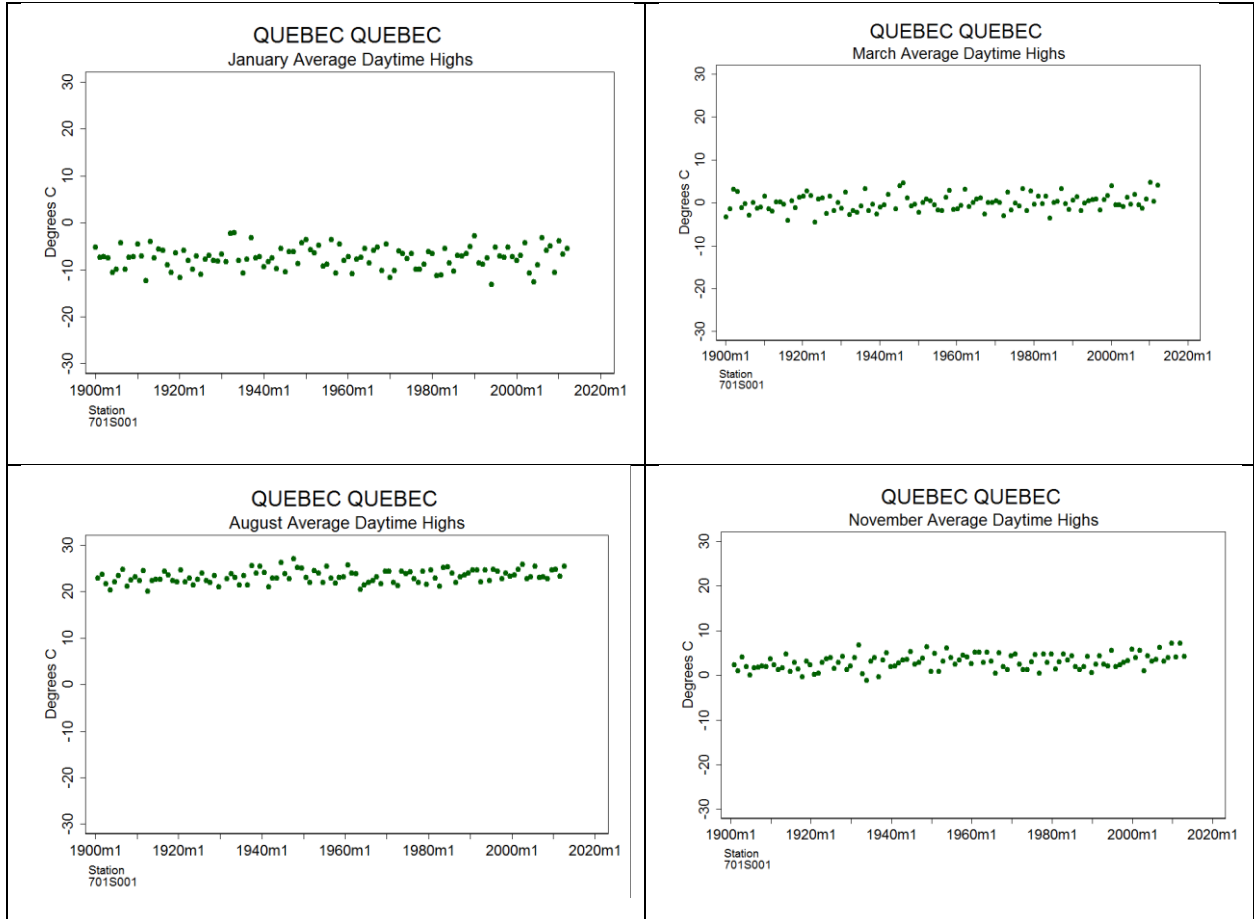
1.12 Montreal Average Daytime Temperature Highs since 1900 – Your Environment.ca

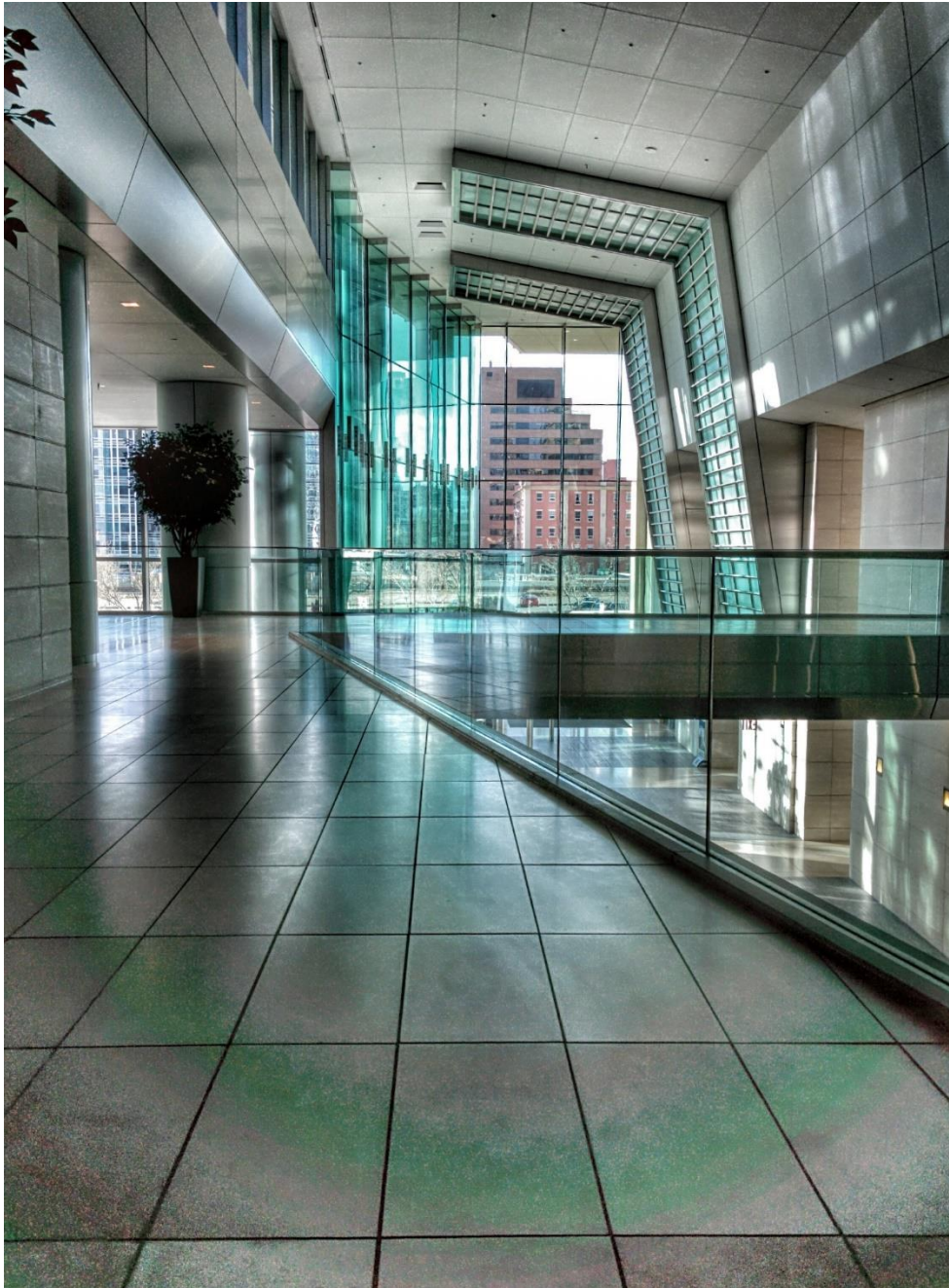
No warming evident.



1.13 Quebec City Average Daytime Temperature Highs since 1900 – Your Environment.ca

No warming evident.





8th Avenue Place SW Calgary is a LEED Platinum certified building.
<http://www.eighthavenueplace.com/>

CHAPTER 2

2.1 GLOWING CLAIMS OF NEW ECONOMY—BUT THE REALITY IS ECONOMIC CATASTROPHE

2.1.1 Unsupported Claims of Prosperity

On page 19 of *Acting on Climate Change* the authors make several claims that are not supported by evidence whatsoever. They state:

“A major societal challenge for the 21st century, transitioning to a low-carbon society and economy will create opportunities to enhance prosperity and well-being by modernizing infrastructure, developing regional renewable energy sources, improving the livability of cities and creating new businesses and employment.”

This flies in the face of evidence. The adjacent sidebar block shows the millions of dollars subsidizing green or low-carbon ventures in the United States. Many companies have gone bankrupt despite substantial financial support from taxpayers. We quote several examples from our recently released report that questions Ontario’s Climate Change Discussion paper 2015: “Ideology or Evidence.”

In Ontario, a “Better Place” electric vehicle company was cited as a case study in successful ‘sustainable’ investment in the October 2012 report “Accountants for Business – Canada and the Green Economy.” As reported by CBC Television May 27, 2013 Better Place went from an **asset value of \$2 Billion in 2012 to a bankruptcy value of \$12 million by 2013.** Some of Wall Street’s expert investors lost a spectacular \$900 million according to a May 28, 2013 report in the Wall Street Journal.

This past summer [2013] Siemens AG fired CEO Peter Loescher who had led that German icon into a “Green Energy Disaster” taking the company “down a green energy hole,” as reported in

Low-Carbon Catastrophes

Evergreen Solar (\$25 million)*
SpectraWatt (\$500,000)*
Solyndra (\$535 million)*
Beacon Power (\$43 million)*
Nevada Geothermal (\$98.5 million)
SunPower (\$1.2 billion)
First Solar (\$1.46 billion)
Babcock and Brown (\$178 million)
EnerDel’s subsidiary Ener1 (\$118.5 million)*
Amonix (\$5.9 million)
Fisker Automotive (\$529 million)
Abound Solar (\$400 million)*
A123 Systems (\$279 million)*
Willard and Kelsey Solar Group (\$700,981)*
Johnson Controls (\$299 million)
Brightsource (\$1.6 billion)
ECOtality (\$126.2 million)
Raser Technologies (\$33 million)*
Energy Conversion Devices (\$13.3 million)*
Mountain Plaza, Inc. (\$2 million)*
Olsen’s Crop Service and Olsen’s Mills Acquisition Company (\$10 million)*
Range Fuels (\$80 million)*
Thompson River Power (\$6.5 million)*
Stirling Energy Systems (\$7 million)*
Azure Dynamics (\$5.4 million)*
GreenVolts (\$500,000)
Vestas (\$50 million)
LG Chem’s subsidiary Compact Power (\$151 million)
Nordic Windpower (\$16 million)*
Navistar (\$39 million)
Satcon (\$3 million)*
Konarka Technologies Inc. (\$20 million)*
Mascoma Corp. (\$100 million)
*Denotes companies that have filed for bankruptcy.
<http://dailysignal.com/2012/10/18/president-obamas-taxpayer-backed-green-energy-failures/>

Investors.com on July 31, 2013 topped off with a 22% decline in shares since his take-over in 2007.²¹

A “Better Place” received \$1 million from the Ontario provincial government.²²

As for quality of investments, one has to wonder if renewables are worth it. The Financial Times issues an article titled “Private equity retreats from renewables fad,” which highlighted a recent survey from Prequin that identified just 22 percent of all renewable funds earned an internal rate of return higher than 3 percent.

Joseph Dear, chief investment officer of Calpers, the world’s sixth-largest pension fund, last year described clean-tech investment as a “noble way to lose money.” Calpers suffered annualized losses of 9.7 percent in the sector. “We are all familiar with the J-curve in private equity. Well, for Calpers, clean-tech investing has got an L-curve for ‘lose’” added Dear. “If it takes 12 years to get the money out, the internal rate of return is not going to be very good, even if the investment is reasonably successful.”

An example is that reported by Bloomberg on Jan. 9, 2014:

*In Texas, the wind tends to blow the hardest in the middle of the night. That’s also when most people are asleep and electricity prices drop, which would be a big problem for the companies that own the state’s 7,690 wind turbines if not for a 20-year-old federal subsidy that effectively pays them a flat rate for making clean energy no matter what time it is. Wind farms, whether privately owned or part of a public utility, receive a \$23 tax credit for every megawatt-hour of electricity they generate.*²³

In Australia, Pacific Hydro’s wind power project just lost \$700 million of ‘mom and pop’ retirement pension savings.²⁴

Powerline of the US is reporting that as Thomas Steyer preaches divestment to institutional investors, private funds are snapping up the valuable divested energy stocks, leaving institutions hold the bag....of wind.²⁵

These are serious real world examples of **climate change opportunists plundering the taxpayer’s purse**. There is little evidence of the much touted jobs, innovations, prosperity or modern infrastructure proclaimed (without supporting references) in “Acting on Climate Change.”

²¹ <http://www.prweb.com/releases/2013/12/prweb11393573.htm>

²² <http://news.ontario.ca/medt/en/2011/03/ontarios-electric-vehicles-plan-revs-up.html>

²³ <http://www.bloomberg.com/bw/articles/2014-01-09/wind-energy-companies-prepare-for-tax-credits-end>

²⁴ <http://stopthesethings.com/2015/03/15/pacific-hydros-ponzi-scheme-implodes-wind-power-outfit-loses-700-million-of-mum-dad-retirement-savings/>

²⁵ <http://www.powerlineblog.com/archives/2014/04/the-epic-hypocrisy-of-tom-steyer.php>

2.1.2 Carbon Taxes and Stringent Climate Change Targets are Disastrous to the Economy

The (US) National Association of Manufacturers (NAM) released a study conducted by NERA Economic Consulting that shows a carbon tax would have a devastating impact on manufacturing. The report, titled Economic Outcome of a U.S. Carbon Tax ([Full Study](#) | [Executive Summary](#)) found that levying such a tax would result in higher prices for natural gas, electricity, gasoline and other energy commodities. *Manufacturing output in energy-intensive sectors could drop by as much as 15 percent and 7.7 percent in non-energy intensive sectors.*

The study examines two carbon tax scenarios: one levied at \$20 per ton increasing at 4 percent, and the other designed to reduce carbon dioxide (CO₂) emissions by 80 percent. *In both cases, any revenue raised by the carbon tax would be far outweighed by the negative impact to the overall economy.* A carbon tax would lead to lower real wage rates because companies would have higher costs and lower labor productivity. Over time, workers' incomes could decline relative to baseline levels by as much as 8.5 percent. The increased costs of coal, natural gas and petroleum products due to a carbon tax would ripple through the economy and result in higher production costs and less spending on non-energy goods.²⁶

The UK Experience to date:

"The aluminium industry in Europe has lost 34 per cent of its capacity in the last seven years and forty thousand jobs have been lost. That's not because demand has reduced; demand is increasing, and being filled with imports which now amount to more than 50 per cent. A similar story in steel where a hundred thousand jobs have been lost, and plant closures have taken place. A similar story in petroleum refining. It is now cheaper to bring in refined petroleum products from Africa or Russia than it is to refine them here in Europe. And again we have refineries closing. Ten thousand direct jobs; forty thousand indirect jobs lost. That is the extent of the disaster we are creating. I am proposing to meet the glass industry, the chemicals industry, and the cement industry, and I have good indications that we will find a similar story....And if I may make, Mr Chairman, a final, but absolutely critical point, I have from the petroleum industry a copy of a British Government report, which indicates that the CO₂ emissions associated with imported refined petroleum products, are 35 per cent higher

²⁶ See more at: <http://www.nam.org/Issues/Carbon-Tax/#sthash.RrT1okJG.dpuf>
<http://www.nam.org/Issues/Carbon-Tax/>

than petroleum products refined in the European Union, and anecdotal evidence from the steel industry suggests that a tonne of imported steel implies double the CO2 emissions of a tonne of steel made in Europe. **So we have a policy which is exporting jobs, exporting investment, exporting manufacturing, and increasing CO2 emissions at the same time.**

“Mr. Commissioner, if that is not madness, what is?” Roger Helmer, UKIP MEP to EU Parliament²⁷

From the US Chamber of Commerce:

"U.S. Chamber of Commerce, in an amicus brief with the Supreme Court opposing further expansion of emissions regulations cites the EPA's documents, from 2004, which state that related permits would cost businesses “. . . an average of \$125,120 and required 866 hours for the applicant to complete . . .” – death to small and medium businesses.”

²⁷ http://www.ukipmeps.org/articles_1141_The-Madness-of-Europes-Industrial-Massacre---Roger-Helmer-MEP.html

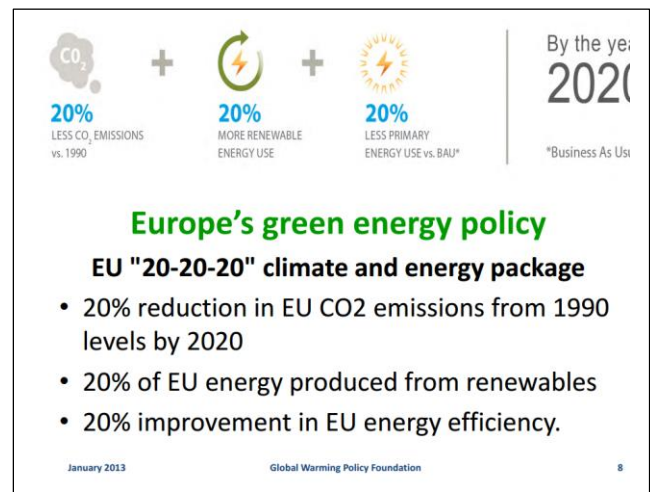
CHAPTER 3 - CASE STUDIES IN CLIMATE CHANGE POLICY FAILURE

3.1 Dr. Benny Peiser on “To Heat or Eat: Europe’s Failed Climate Policy”

Dr. Peiser is a social anthropologist and head of the Global Warming Policy Foundation of the UK. In May 2013, he was guest speaker at Friends of Science 11th Annual Luncheon. <http://www.friendsofscience.org/index.php?id=653>

Dr. Peiser explained that in 2000 the EU had committed itself to the Lisbon Accord and stringent climate change reduction policies. Dr. Peiser told how Europe’s policies to promote inefficient wind and solar power, and impose carbon taxes and emissions trading have caused soaring energy prices, economic decline and plunged millions of families into fuel poverty.

Far from sparking prosperity and innovation, these policies (even prior to the 2008 recession) led to widespread unemployment. As of 2013, some 26.5 million men and women were unemployed in the EU-27. Millions of vulnerable people were forced into ‘heat-or-eat’ poverty. During the winter of 2013 thousands died due to sudden cold snaps. The UK was almost left entirely without power and heat as wind turbine farms produced nothing on very cold days; only a last minute arrival of LNG tankers from the Gulf saved the grid. A retired coal-fired power plant had to be restarted. Meantime UK wind farms are paid a fortune for ‘constraint’ – to shut down.²⁸



²⁸ <http://www.telegraph.co.uk/news/earth/energy/windpower/11323685/Wind-farms-paid-1m-a-week-to-switch-off.html>

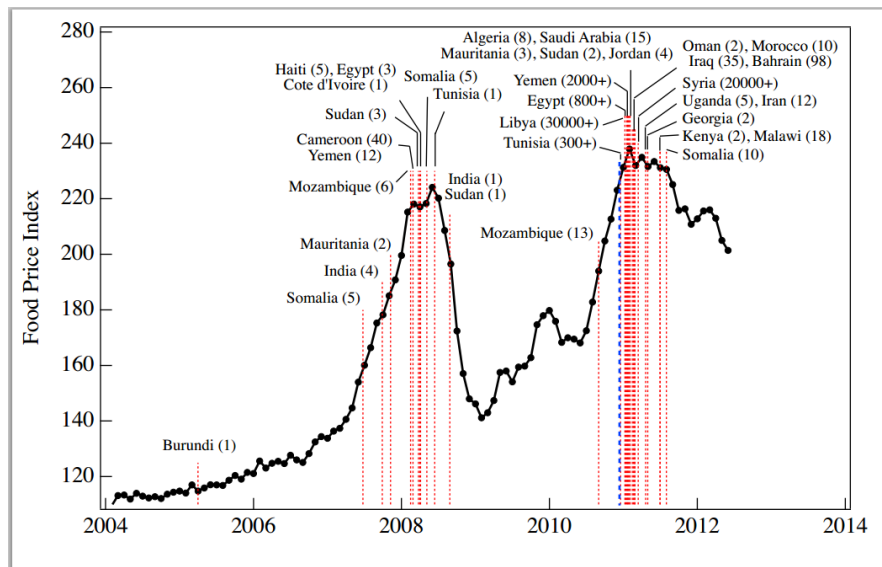
<i>Principle</i>	<i>Objective Met?</i>	<i>Objective not met.</i>	<i>Comment</i>
	<i>Yes</i>	<i>No.</i>	
<i>Environmentally effective</i>		X	No environmental benefits. Industry outsourced emissions to countries with less stringent regulations, lower power prices, or better tax advantages. This led to more unemployment
<i>Cost-effective</i>		X	Phenomenally expensive. Polluter did not really pay – it was all passed on to consumers.
<i>Administratively feasible</i>	X		Complex set-up; now very difficult to disentangle or dismantle.
<i>Equitable</i>		X	The poor and middle class were pushed into heat-or-eat poverty; rich speculators on the carbon trail got much richer. Shareholders in conventional power lost value.
<i>Politically feasible</i>	X		People were afraid of global warming; speculators capitalized on benefits/incentives to renewable providers.

3.2 US EPA Food-to-Fuel Policy

According to a recent study by New England Complex Systems Institute (NECSI) one of the main drivers of global unrest is attributed to the US EPA food-to-fuel ethanol policies that have removed massive food corn stocks from global food/cattle feed/food additive markets. NECSI.edu/publications/food/
This has been exacerbated by commodities speculators.

The NECSI report, predicting imminent, catastrophic, civil unrest was delivered to the US government just 4 days before Mohamed Bouazizi immolated himself in Tunisia, and set off civil revolt across the Middle East. Based on calculations of the Food Price Index vis a vis local economies, NECSI could accurately chart upcoming revolts. For people living on a \$1 a day in countries with ~40% unemployment – even an incremental price rise is a problem; prices skyrocketed.

It was not an “Arab Spring” but rather an “American Climate Policy Genocide.”



Meanwhile in the US, corn production to ethanol does not result in any net energy, uses water and has been accused of contaminating river ways with over-use of agricultural chemicals. In one YouTube interview, the US Corn Lobby is described as being so powerful that “even Big Oil runs” when they enter the room. Noted food security expert Peter Timmer says the combined ethanol/commodities trading policies will be difficult or impossible to untangle as so many vested interests are now tied up in it and so much money. The EPA is not required to consider any implications of its policies outside the USA.

<i>Principle</i>	<i>Objective</i>	<i>Objective</i>	<i>Comment</i>
	<i>Met?</i>	<i>not met.</i>	
	<i>Yes</i>	<i>No.</i>	
<i>Environmentally effective</i>		X	Ethanol production is wasting valuable food crop land, water and agrichemicals while diverting megatons of food from a hungry world for no net energy benefit , and much land/water damage. Likewise ethanol is damaging to car motors, meaning they must be replaced sooner or the car junked – more wasted resources.
<i>Cost-effective</i>		X	US taxpayers are subsidizing corn producers; the world is paying for civil unrest world-wide, much of it related to these policies. The EU is facing a crisis of unheard of proportion as asylum seekers flood southern Europe.
<i>Administratively feasible</i>	X		Apparently.
<i>Equitable</i>		X	No. The poorest and most vulnerable are being decimated and killed. Western soldiers are being sent into conflict.
<i>Politically feasible</i>	X		Powerful lobbies are driving the continuation of this failed and tragic climate change policy.

3.3 EU Carbon Trading Market

The European Union Emissions Trading System (EU ETS)²⁹ began in 2005. This is a cap-and-trade system wherein: *“the EU ETS covers more than 11,000 power stations and industrial plants in 31 countries, as well as airlines.”*

“A ‘cap’, or limit, is set on the total amount of certain greenhouse gases that can be emitted by the factories, power plants and other installations in the system. The cap is reduced over time so that total emissions fall.

In 2020, emissions from sectors covered by the EU ETS will be 21% lower than in 2005. By 2030, the Commission proposes, they would be 43% lower.

Within the cap, companies receive or buy emission allowances which they can trade with one another as needed. They can also buy limited amounts of international credits from emission-saving projects around the world. The limit on the total number of allowances available ensures that they have a value.

After each year a company must surrender enough allowances to cover all its emissions, otherwise heavy fines are imposed.

The price of carbon trades reached an all-time high in 2008 of 34.90 euro, but collapsed to 3.00 euro and remains about 7.00 euro per tonne CO₂e (Carbon dioxide equivalent). During the peak period of trading, Interpol had to shut down the EU ETS several times for fraud and corruption.

INTERPOL’S “Guide to Carbon Trading Crime”³⁰ outlines how the intangible nature of carbon makes it an ideal market for criminal activity. As Mark Schapiro described carbon trading in Harper’s Magazine Feb. 2010 as “...the absence of delivery of an invisible substance to no one.”

The lucrative nature of this elusive ‘commodity’ in a global market that is valued at USD 176 Billion (Interpol 2013) had led to diverse criminal acts such as computer hacking, theft of certificates and resale (leading to VAT losses to countries and low income taxpayers), laundering organized crime money. REDD Monitor reports various illegal activities related to forests and carbon trading.³¹ “Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development.”³²

²⁹ http://ec.europa.eu/clima/policies/ets/index_en.htm

³⁰ <http://www.interpol.int/en/News-and-media/News/2013/PR090/>

³¹ <http://www.redd-monitor.org/2011/10/05/forest-carbon-cash-and-crime-new-report-from-global-witness/>

³² <http://www.un-redd.org/aboutredd>

<i>Principle</i>	<i>Objective</i>		<i>Comment</i>
	<i>Met?</i>	<i>not met.</i>	
	<i>Yes</i>	<i>No.</i>	
<i>Environmentally effective</i>	X		INTERPOL has found that sometimes emissions were increased in order to make more money. Forests have been subject to illegal harvesting while also part of a carbon trade. At current rates, this carbon price is not a deterrent to a 'polluter.'
<i>Cost-effective</i>		X	USD 176 Billion in capital is presently diverted into trading on the lack of delivery of an invisible substance to no one. This could probably be put to more practical purposes in the tangible, value-added world.
<i>Administratively feasible</i>	X		Possibly created jobs in a non-valued added field.
<i>Equitable</i>		X	Consumers end up carrying the burden of 'polluter pays' carbon and cap-and-trade. This has led to widespread heat-or-eat poverty in the EU.
<i>Politically feasible</i>	X		The EU wanted to be a 'world leader' in climate change policy – instead this has been a fiasco where speculators and organized crime have prospered at the expense of taxpayers.

3.4 Ontario Coal Phase-out

In 2004, with much urging from a number of ENGOs and well-known eco-activists like David Suzuki, Ontario began an early phase-out of coal-fired power plants, while instituting a massive wind and solar regime.

The premise was that coal-fired power plants were causing fine particulate matter air pollution, responsible for asthma, other respiratory ailments and premature deaths. This was based on an Illness Cost of Air Pollution model which was tested using known health data and then the model was run in reverse (hind-casting) to see how closely it matched reality. The model greatly exaggerated results, ending up predicting that more people would die of air pollution related causes than died in total.

None-the-less, green ideology gripped Ontario and the plan proceeded.

Today, Ontario has the 'greenest' grid in Canada, partly due to its hydro and nuclear facilities. All coal-fired power plants have been phased-out. Power prices are rising and industrial power prices are the highest in North America.

The Ontario public are burdened with debt for their power system. Economist Ross McKittrick reviewed the Green Energy Act in a report for the Fraser Institute³³ and found that power prices are 10 times that of what they would have been had coal-fired power plants simply been better outfitted with emissions scrubbers; if the GEA proceeds as planned, prices will skyrocket 70 times over the simpler refit plan.

Wind power is often generated at night when there is little demand, but due to the power arrangements with wind producers, Ontarians pay wind producers for power that is sent outside of the province. "The Auditor General of Ontario estimates that the province has already lost close to \$2 billion on surplus wind exports, and figures from the electricity grid operator show the ongoing losses are \$200 million annually."

Thousands of rural residents have had their pastoral views ruined – and many have lost their health and property values due to wind turbines on or near their property.

Numerous scandals have been exposed related to gas plant construction and cancellation deals.

³³ <http://www.fraserinstitute.org/research-news/news/display.aspx?id=19538>

<i>Principle</i>	<i>Objective</i>		<i>Comment</i>
	<i>Met?</i>	<i>not met.</i>	
	<i>Yes</i>	<i>No.</i>	
<i>Environmentally effective</i>	X		Asthma rates had been dropping for years; the Ontario Ministry of Environment said the smog was related to US pollution; Ministry of Health reports that asthma is more a socio-economic issue. There has been no benefit to the environment since natural gas peaking plants must ramp up to meet demand. The footings of cement and rebar for wind power are CO2 intensive. There is no net Return on Energy Investment from wind farms.
<i>Cost-effective</i>	X		
<i>Administratively feasible</i>	X		
<i>Equitable</i>	X		Thousands of people's lives have been ruined by turbines on or near their property; consumers are burdened with high power prices; future generations are saddled with debt.
<i>Politically feasible</i>	X		

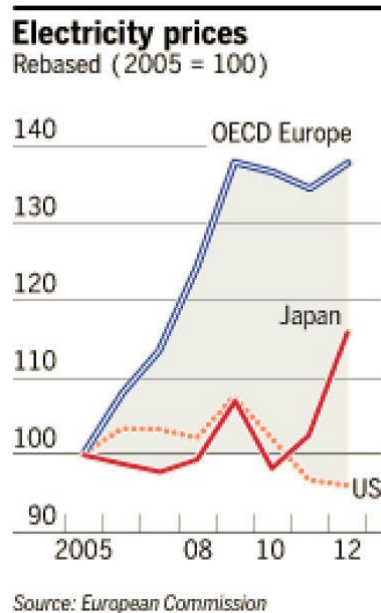
3.5 German Transition to Renewables

Germany, bastion of Stichting Greenpeace, boldly took the global lead on green energy and soon found itself a leader in renewable power from wind and solar – but at what price.

German consumer power rates are now the highest in Europe.³⁴ Many industries have installed their own power generators rather than be subject to an unreliable power source on the grid that has cost some industries a fortune in damages to high precision equipment. Major industries have threatened to move offshore, taking jobs with them, so Germany has provided subsidies to them (which fall on consumers). Conventional power producer markets have been hit hard and many want to shut-down but because conventional thermal (coal/natural gas) power is required to back-up renewables, they have been ordered to remain in operation. Subsidies have been provided.

These cascading subsidies fall on the taxpayer.

Initially carbon prices were at 34.90 euro, but since this has fallen to about 7.00 euro, and since more thermal power is required to back-up the growing wind turbine farms, some 20+ new coal-fired power plants are being built in Germany.



³⁴ <http://www.spiegel.de/international/germany/high-costs-and-errors-of-german-transition-to-renewable-energy-a-920288.html>

<i>Principle</i>	<i>Objective</i>	<i>Objective</i>	<i>Comment</i>
	<i>Met?</i>	<i>not met.</i>	
	<i>Yes</i>	<i>No.</i>	
<i>Environmentally effective</i>		X	When you add more wind and solar to a conventional grid, you need equivalent thermal back-up to manage the sudden variability of wind/solar supply. There has been no net benefit to the environment.
<i>Cost-effective</i>		X	Costs of this transition to renewables are pegged at \$600 billion euro.
<i>Administratively feasible</i>	X		There are some 4000 different subsidies in place.
<i>Equitable</i>		X	The poor are especially disadvantaged, but all aspects of the socio-economic and industrial spectrum have been hit hard by these policies.
<i>Politically feasible</i>	X		Germany's powerful green movement made a significant push for these policies and had the political clout at the time to do it.



Photo credit: Shutterstock

“Time and task were both disorienting, for if you were to remove everything from our lives that depends on electricity to function, homes and offices would become no more than the chambers and passages of limestone caves- simple shelter from wind and rain, far less useful than the first homes at Plymouth Plantation or a wigwam. No way to keep out cold, or heat, for long. No way to preserve food, or to cook it. The things that define us, quiet as rock outcrops - the dumb screens and dials, the senseless clicks of on/off switches- without their purpose, they lose the measure of their beauty and we are left alone in the dark with countless useless things.”

— [Jane Brox](#), *[Brilliant: The Evolution of Artificial Light](#)*

CHAPTER 4

4.1 Power – To the People

4.1.1 Climate Change Policy should not Burden People

The introduction of industrial fossil fuel use completely changed life for human kind.

The French economist and demographer Emile Levasseur described how, if one steam horsepower was equivalent to the power of 21 men, in 1840, French industry had a million new workers, thanks to steam power. By 1885-87 that number had risen to 98 million or “deux esclaves et demi par habitant de la France” (two and a half slaves for each inhabitant of France.) - Matthew Sinclair
“Let them eat carbon; the price of Failing Climate Policies and how governments and big business profit from them”

Today, it is estimated that people in the Western world have the equivalent of ~97 men working on their behalf, through the power generated by fossil fuels. Thus life is comfortable, creative, filled with recreation and travel options and numerous time-saving, handy electrical devices. And...reliable power, on-demand.

However, wherever stringent climate change targets have been introduced, along with carbon taxes and cap-and-trade policies, the power that once enriched the lives of human beings has become a burdensome debt, fraught with problems.

- In the EU by 2013, **power prices skyrocketed 37% over 8 years above par with the US.**
- Millions of ordinary citizens were pushed into **heat-or-eat poverty; thousands died in England** due to poor nutrition or poor residential heating during the 2013 cold snaps.
- In Germany, wind-farms were subsidized. Carbon taxes were imposed. Power prices rose. **Businesses threatened to move off-shore** and were given a subsidy incentive to stay. Conventional power providers, ordered to remain operating as renewables cannot function on the grid without conventional power back-up. As an incentive, subsidizes

were paid to conventional providers. **Balancing market power prices rose 400%. Grid reliability suffered** as too much wind and solar came on-line – causing major industries to install their own, on-site power generation systems. The German renewable power transition is expected to cost up to €1 Trillion Euro up to 2030. **The cycle of subsidies and taxes fell on consumers.**

- **Germany is now building more than 20 new coal-fired power plants.** For every wind or solar farm, you need equivalent conventional back-up power.
- EU carbon markets were shut down by Interpol for **corruption and fraud.**
- **Organized crime capitalized** on the intangible nature of carbon and renewable generation.
- In the end, **the environment was not helped one bit.**

4.2 Alberta Engineering Expertise Absent from “Acting on Climate Change”

“Acting on Climate Change” is heavy on climate change ideology and the promise of renewables, but light on practical, hands-on engineering discussions of what is within the realm of reality.

On page 21 the fantastic claim is made that *“It has been shown that wind alone could provide several times existing fossil and nuclear electricity supply up to a cost (including transmission) of about 8 cents/kWh.”*³⁵

Such a claim is completely unsupported by evidence. The public are being misinformed and misled by such statements. Here is an assessment of the principle that the wind is ‘always blowing somewhere’ across Europe.³⁶ It’s not.

In 2012, Alberta Energy released a report, “Review of the Cost Status of Major Transmission Projects in Alberta.” The report said, “To accommodate wind generation in southern Alberta . . . The existing capacity of the transmission system . . . is insufficient for additional wind-powered generation . . . Current Estimated Cost (is) \$2.82 billion.”

Albertans are expected to build \$2.8 billion worth of new transmission lines in the next four years that will carry a mere 32 per cent of their design capacity.

Alberta’s entire fleet of wind turbines would cost only about \$2.8 billion at \$2000/kW capacity which is the price quoted for Black Spring Ridge. Since a large amount of the cost of wind power is due to capital cost, **the cost of power to consumers is roughly speaking more**

³⁵ <http://faculty.geog.utoronto.ca/Harvey/Harvey/papers/Harvey%20%282013,%20Wind%29.pdf>

³⁶ <http://euanmearns.com/wind-blowing-nowhere/>

than doubled when transmission is taken into account. We have not even started to factor in the costs of storage to make wind power a reliable source of electricity independent of fossil fuel backup.

The billions we've spent so far on wind and associated power lines in Alberta have not significantly reduced carbon dioxide emissions.

They are generally one way collection lines. Since they carry mostly wind generated electricity they are being used just as ineffectively as the wind turbine themselves with a very low capacity factor.

4.3 What of a National Wind Farm Fleet replacing Nuclear and Fossil Fuels?

On page 21 of "*Acting on Climate Change*" it is claimed that a report shows that wind power could 100% replace fossil fuels and nuclear in Canada.³⁷ However this paper was not prepared by any power engineering experts. Theoretically there are many wind resources in Canada – capturing them is another matter.

Power industry experts reviewing the Harvey paper which claims wind could 100% replace fossil fuels or nuclear, state that the paper's analysis assumes capacity factors that average more 40% or higher. The Harvey paper says this can only be achieved by having mostly off-shore turbines along the ocean coasts, Hudson Bay, Great Lakes, etc. and so the transmission distances to load centres would be very long which is a huge cost factor both in capital costs and line losses.

For Alberta, the paper says that 50% of supply will come "from Saskatchewan or further east" (wherever that would be) but yet in Table 1 it shows only 365 kilometres of transmission distance which doesn't even get as far as the Saskatchewan border from Calgary.

It would take ~4,500 wind turbines to replace the existing fossil fuel capacity in Alberta. This is not within the realm of reality in terms of cost, land use, or power generation.

Based on what you've seen happening in Ontario and other parts of the world where local people vehemently reject wind farms near their property, how eager would the people in BC, Saskatchewan and/or Manitoba would be to build them on their lands to supply Alberta?

³⁷ <http://faculty.geog.utoronto.ca/Harvey/Harvey/papers/Harvey%20%282013,%20Wind%29.pdf>

4.5 Wind Farms Put Species-at-Risk – Even More at Risk



Wind farms are killing bats – bats are a necessary natural aid for agriculture and the preservation of healthy forests. They are one of the principle consumers of pine beetles (for forest health) and mosquitoes (for human comfort) and agricultural predatory insects.

“A bat mortality study supervised by U of C biology professor Robert Barclay that began in 2006 has determined that the vast majority of bats found dead below turbines near Pincher Creek suffered severe injuries to their respiratory systems consistent with a sudden drop in air pressure – called barotrauma – that occurs when the animals get close to turbine blades. ...”³⁸



Baerwald, whose team has picked up as many as 188 dead bats a day at Summerview, says half the corpses show no outward sign of injury or contact with the blades. And some of the bats they find are still alive, but are unable to fly and have blood in their mouths and noses.³⁹

³⁸ <http://www.ucalgary.ca/news/aug2008/batdeaths>

³⁹ <http://www.canada.com/ottawacitizen/news/story.html?id=af37ff70-f5e7-44dc-afc2-d80a71460403>

This cruel and unusual way to die is an offense to society’s stand against cruelty toward animals. Likewise, majestic raptors, most of them endangered species, are attracted to the towers and unable to recognize the threat of the spinning turbine arms. Thus it seems contrary to all other principles of protecting species for the scholars behind “Acting on Climate Change” to propose wind farms as a solution for power generation.

The Obama administration is reportedly applying different rules to the killing of birds for wind energy companies and for companies that use non-renewable resources
by The Commentator on 14 May 2013 12:25



Meanwhile, at much demonized coal-fired power plants, falcons nest safely and the public delight in live web cam coverage. ⁴⁰



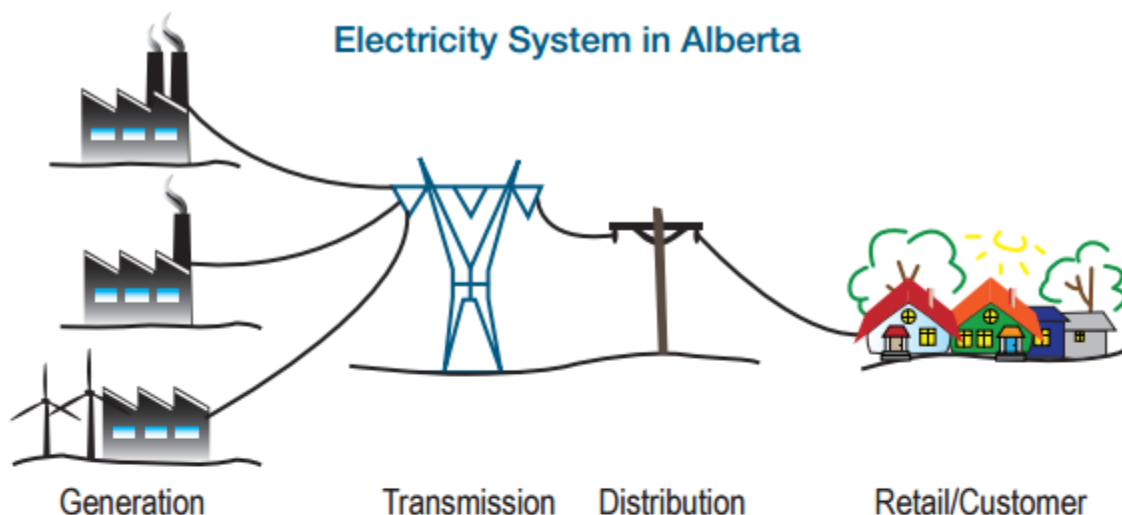
4.6 Alberta’s Deregulated Power Market – No Public Debt; Lots of Options

Almost coincident to the release of “Acting on Climate Change” the University of Calgary Alumni Association hosted a Distinguished Speakers Panel on March 11, 2015 featuring a number of experts from Alberta’s power industry.

The audience learned that Alberta had deregulated the market, expanded power options, extended thousands of kilometers of transmission lines, increased capacity during a time of

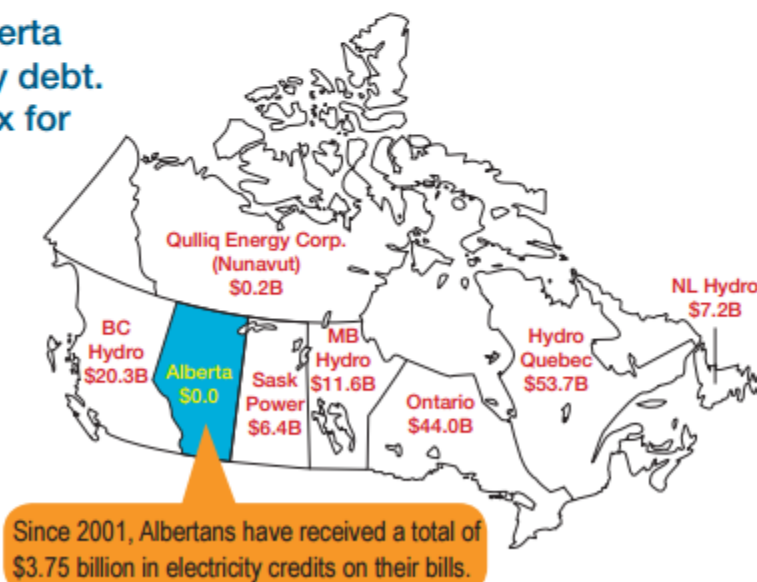
⁴⁰ <https://www.capitalpower.com/responsibility/environment/perergrinefalcons/Pages/default.aspx>

dramatic, rising demand, and kept the grid stable and prices affordable – all **without incurring any public debt, unlike other provinces.**⁴¹ *Post coal-phase-out has indebted Alberta.*



The Government of Alberta carries no electric utility debt. This means no utility tax for Albertans.

Canadian Electric Utilities Debt
(Figures are in Canadian billions of dollars)



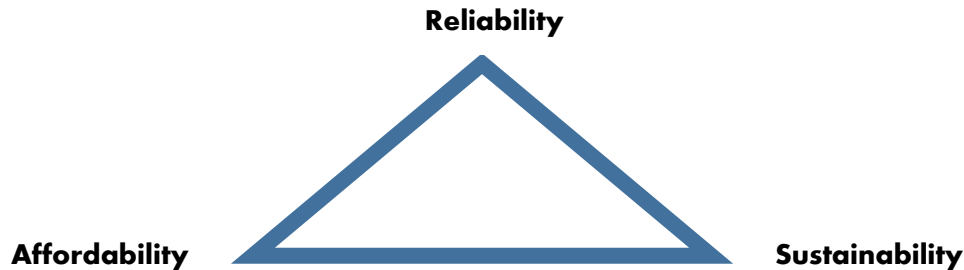
Source: London Economics, 2014

The U of C panel experts were unanimous in their perspectives on the challenges of the power generation industry – and how **citizens generally take the reliability of on-demand power for granted.** Behind the scenes, tremendous precision engineering and power management is invisibly ensuring that Canadians have reliable, quality power

⁴¹ <http://www.energy.alberta.ca/Electricity/pdfs/ElectricityQuickCard.pdf>

supply.

The audience learned that power generation is founded on three principles – and generally you can have any two of the three – but not all three at once.⁴²



“Acting on Climate Change” report makes a breezy policy pronouncement – the second most important policy item:

“The second one is (ii) to ensure electric connections between the provinces that produce hydro-electricity and those that do not. Such interconnection would allow Canada to have 100% carbon free electricity and could become the backbone of our transition to a low carbon sustainable society.”⁴³

Unfortunately, this kind of misinformation comes from 70 scholars who are commenting **outside their area of expertise and making assumptions about a very complex industry.** Based on a review of the biographies of the scholars participating in the “Acting on Climate Change” report, there is little or no hands-on expertise in the area of power generation. Since hydro-electric power and wind are deemed to be low-impact ‘renewables’ (once the dam is built; once the wind farm is up wind is ‘free’) it is understandable that people might make the assumption that a simplistic link of transmission lines east and west would give all Canadians access to ‘100% reliance on low-carbon energy by 2035.’ (pg. 8)

This statement first of all ignores the rule of law – that coal industry and coal-fired power plant operators have a scheduled decommissioning program that will exceed 2035 by another ~20 years. If these operators and shareholders were to have their industry phased out, Canadians would be paying a fortune in compensation to the owners, shareholders and employees.

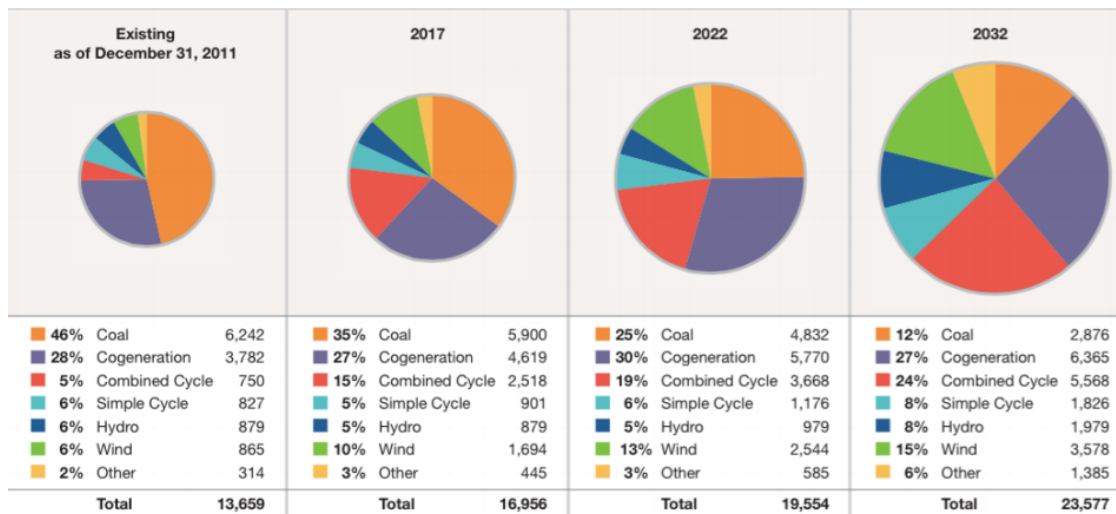
However, equally important to counter this claim of ‘low carbon energy’ by 2035 is the fact that wind is notoriously difficult to integrate to the grid due to its variable nature. If referring to the use of wind power in place of conventional, even Alberta’s Electrical System Operator (AESO) foresees only a nominal contribution of wind to the grid, as

⁴² <http://schulich.ualgary.ca/files/schulich/evan-bahry.pdf>

⁴³ <http://publications.mcgill.ca/reporter/2015/03/acting-on-climate-change-solutions-from-canadian-scholars/>

shown in Dean William Rosehart's March 11, 2015 presentation at the University of Calgary Alumni's Distinguished Speaker Panel.

From Coal to Gas



AESO 2013 Long-term Transmission Plan

http://www.aeso.ca/downloads/AESO_2013_Long-termTransmissionPlan_Web.pdf

If the proposed 'solution' for '100% reliance on low-carbon energy' is based on channeling hydro power via long transmission lines from Quebec, there are serious technological barriers to implementing such transmission – not to mention that the engineering and interprovincial policy planning for such a proposal – if even deemed possible - would require 20 years to simply establish transmission line routing, land acquisition/access, and ordering of materials before any such work could even begin. Likewise a wind alternative, also proposed, is technically infeasible. (See 3.4 below)

Practically speaking, such a plan would be phenomenally expensive and would also put various areas of the country at **extreme risk of black-out or other grid failure with no local resources to manage replacement power generation.**

Witness the 1989 Coronal Mass Ejection from the sun that knocked out the power grid in Quebec⁴⁴ even resulting in the melting of massive transformers.⁴⁵ This type of specialized equipment cannot be replaced overnight and must be ordered years in advance.

⁴⁴ <http://www.smithsonianmag.com/science-nature/what-damage-could-be-caused-by-a-massive-solar-storm-25627394/?no-ist>

⁴⁵ http://science.nasa.gov/science-news/science-at-nasa/2008/06may_carringtonflare/



PJM Public Service
Step Up Transformer

Severe internal damage caused by
the space storm of 13 March, 1989



The suggestion that any grid could go ‘100% low-carbon’ is far-fetched – particularly in regard to wind-power, based on reviews by well-known energy and policy commentators, like author Robert Bryce.

Smaller Faster Lighter Denser Cheaper by Robert Bryce argues against renewables ... but purely physics and economics: that their alternative possibilities are inherently too weak as fuels to scale them up to meet the world’s unceasing demand for more electricity. ⁴⁶

From studies of wind farms he calculates that the average power density for wind energy is about one watt per square meter. A wind farm large enough to power just one data center for Facebook would require nearly 11 square miles of land, he says. On a far larger scale, the United States has about 300 billion watts of coal-fired generation capacity. So to replace it by wind power would sop up 300,000 square kilometers of land, about the area of Italy. Here he is tilting at windmills – **no one has ever proposed shuttering the nation’s coal mines and relying on wind** – but the comparison serves his contention that in the big picture, wind power will always be a minor player. -New York Times Review June 7, 2014

4.7 Proposal for 100% Replacement of Fossil Fuels/Nuclear by Wind Infeasible

⁴⁶ <http://www.nytimes.com/2014/06/08/business/energy-environment/review-of-smaller-faster-lighter-denser-cheaper.html? r=0>

Throughout the "Acting on Climate Change" document there are many references to wind and hydro replacing fossil fuels (Fig. 4 Map, pg. 31, pg. 32) and as the second policy orientation on page 40. On the cover of the companion magazine "Alternatives Journal" <http://www.alternativesjournal.ca/> - the cover illustration of the print version features a map of Edmonton, Alberta 'split open' to reveal wind-turbines, described as "...the illustration metaphorically captures the desire to break through the fossil fuel dependent paradigm that is driving climate change. The cloud-wrapped wind turbines exemplify the future friendly approaches advocated by the scholars in this issue."

Since wind generation and east-west hydro connections feature prominently in the "Acting on Climate Change" report, we provide an in-depth technical analysis and critique of one of the references that suggest wind could be a 100% replacement for fossil fuels and nuclear.

Technical

GENERATION PERSPECTIVE - ALBERTA

Even if we take it as a given that there is enough wind *potential*, there are major technical issues with using a national wind/hydro hybrid system to supply all of Canada's power.

The biggest problem with wind is that it doesn't respond to demand. In fact, in Alberta, wind is negatively correlated to peak demand. Alberta's summer peak occurs when there is extreme heat and in these situations, there is ALWAYS an absence of wind. Alberta's winter peak occurs when there is extreme cold and in these situations, there is ALWAYS an absence of wind.

The Alberta Electricity System Operator (AESO) publishes Long Term Adequacy Metrics to monitor the long term supply of electricity in Alberta. In the adequacy calculations, **wind is excluded due to the fact that wind does not respond to demand**. See [www.aeso.ca/downloads/Division_202_-_Section_202-6_Adequacy_of_Supply_\(Oct_1_2014\).pdf](http://www.aeso.ca/downloads/Division_202_-_Section_202-6_Adequacy_of_Supply_(Oct_1_2014).pdf), section 4(2)(b)(v) and 4(2)(c)(v) on page 3 for the detail. The methodology "excludes wind" from the calculations.

Alberta currently consumes about 80,000 GWh of electricity per year and wind generation in the province has a capacity factor of around 30%. See pages 19 and 10 here http://www.aeso.ca/downloads/2014_Annual_Market_Stats_WEB.pdf. In theory, if Alberta were to be self-sufficient on an energy basis, Alberta would need to install over 30 GW of wind turbines. Even with 30 GW of wind capacity, there would be times when wind contributes ZERO to the supply. In these cases Alberta would need to import 100% of its power from other provinces. When the wind is blowing, Alberta would then would be producing over 3 times as much power as the province would be consuming. This would mean that Alberta would need to export or spill up to 20 GW of power. Spill is a definite possibility as there is no guarantee there would be demand for that much power.

"Acting on Climate Change" authors refer to the paper "The potential of wind energy to largely displace existing Canadian fossil fuel and nuclear electricity generation", Energy, 50, 93-102, 2013."⁴⁷ In this paper, the researcher talks about installing between 18.4 and 25.8 GW of wind in Alberta. This is 31% and 28% respectively of total wind capacity in their plan. This shows how heavily they rely on Alberta for generation. Ontario is the other major contributor to their plan with between 45% and 48% of total wind capacity. The researcher also uses a capacity factor of 40% for Alberta when in reality it is only 30%. The researcher quotes higher capacity factors than Alberta for some other provinces, above 50% in some provinces. A few internet searches show that these values may be overly optimistic by at least 10%.

The research paper on the 'potential of wind to replace fossil fuels and nuclear energy' relies mainly on wind from Alberta and Ontario. Although, as the researcher mentions, it is true that there are benefits of diversification for wind sources, both provinces experience similar patterns. Higher wind in the winter months and lower in the summer. This can be seen in the AESO Market Statistics above and here for Ontario

<http://coldaircurrents.luftonline.net/2013/01/monthly-capacity-factor-of-wind.html>. It is a certainty that there will be periods when both Alberta and Ontario simultaneously have low or no wind output. In these situations, the vast majority of the country would be entirely dependent on Hydro. Hydro has some flexibility but would not be adequate. A large portion of hydro is run of river and it can't be turned on/off at will. **Major blackouts would occur and the consequences would be severe at times of extreme hot or cold temperatures.**

In the paper, Section 4.1 Future Research Steps of the paper, the researcher of the wind potential paper talks about looking into wind correlations and hourly demand. The fact that this was not done before writing this paper is the fatal flaw. Perhaps if/when the work is continued to incorporate information like the foregoing, reality will set in.

TRANSMISSION PERSPECTIVE

These are general comments on the matter.

Given the low capacity factor for wind, two to three times as much transmission is needed when compared to conventional generation. The author of the 'wind potential' paper plans on transmitting wind energy across the country using High Voltage Direct Current (HVDC) lines to nodes in major demand centers. They consider only the "HVDC portion of the transmission and distribution system." They ignore the integration of these HVDC lines into existing grids and they also don't consider any transmission reliability issues. Even if we assume that their math for the HVDC lines is correct, they are severely understating the true cost of transmission and distribution.

⁴⁷ <http://faculty.geog.utoronto.ca/Harvey/Harvey/papers/Harvey%20%282013,%20Wind%29.pdf>

Power grids operate on Alternating Current (AC); converting Direct Current (DC) power is expensive and requires an extra step for integration. AC current is the form of power used in households and businesses.

In Alberta, we spend around \$1 million to integrate 1 MW of wind generation. See pages 61 and 62 of http://www.ucahelps.alberta.ca/documents/ABE_TFCMC_Report_7_WEB_-_June_2014.pdf for background and costs of "SOUTHERN ALBERTA TRANSMISSION REINFORCEMENT (SATR); PROJECT 787 - To accommodate wind generation in southern Alberta."

In summary, Alberta would need to integrate the 18.4 to 25.8 GW of wind generation if following the proposal outlined in the paper claiming 'the potential of wind' to replace fossil fuels. HVDC lines would also need to be built across the country and the provinces receiving the power would also need to reinforce their grids. Alberta would also need to reinforce the grid to receive power and get it to load centers when the local wind isn't blowing. The bottom line is that the author of the 'wind potential' paper considerably understated the transmission requirements.

ECONOMIC

The whole plan of replacing fossil fuels/nuclear with wind is technically infeasible. But if we ignore that fact and pretend it could actually work, the economics make the prospect untenable. The "wind potential" paper estimates their hybrid wind/hydro plan would be able to supply the entire country at a price of between 4.5 and 6.39 cents per kWh including transmission costs. This is less than the majority of the country pays just for electricity right now and begs the question, if wind energy is so inexpensive, why hasn't this plan already been implemented?

First, the author states that power from wind costs between 3.75 and 4.97 cents per kWh. This requires "government-backed utility financing" at 3%. Then he states that private financing is closer to 12% and would essentially double the delivered cost of wind power. The reality is there is no "government-backed utility financing" in Alberta and even Ontario wind is being developed by private investors. Again, these are the two provinces where the author expects most of the wind power to be developed. Also, as discussed above, the transmission costs are likely two to three times higher than the author states. The bottom line here is that wind energy in this plan would cost at least double what the author is claiming.

If we assume the author's proposed cost of \$2k per kW of wind and that transmission costs are around 35% of wind costs (estimated from Table 1) this would require a capital investment of around \$160 to \$200 billion. Then, if we actually use realistic transmission assumptions it would likely be around \$240 to \$380 billion. This is in addition to the existing perfectly good infrastructure that we already have. Where would this money come from?

PHILOSOPHICAL

Our society is generally based on free markets, voluntary transactions between people. The premise of the 'wind potential' paper is anathema to free markets and describes a philosophy that would obligate society to pay \$100's of billions for an energy plan that won't even keep the lights on. There would also be \$100's of billions of stranded generating assets and potentially bankrupt utilities. This would result in a huge loss of wealth to Canada and we would never realize all the positive benefits if the money was invested in productive assets rather than wasted on wind turbines.

On wind versus conventional generation, the paper discusses how wind resources are vast and "a very small wind farm area in each sector would be sufficient to displace the entire current national fossil fuel- and nuclear-generated electricity." This may be true but it would still be a much, much larger area than conventional generation. Also, large corridors across the entire country would need to be draped in transmission lines. One doesn't have to read too far in to this website to understand how people really feel about transmission lines

<https://retasite.wordpress.com/>.

4.7 Why not more wind? Ask Ontario.

Wind power is crippling Ontario. Unlike Alberta, which carries zero utility debt, Ontario faces crippling debt.⁴⁸ Fraser Institute report⁴⁹ compared its circumstances to California and Greece. Part of the debt is due a restricting of the electricity market and retiring public debt of that time. However a Fraser Institute report on the Ontario Green Energy Act (GEA) attributes rising power prices to the GEA.⁵⁰

The alarm over Ontario power rates and the impact on consumers and industries has resulted in numerous articles and reports – an outspoken commentator is former banker Parker Gallant.⁵¹

Energy commentator Stephen Aplin writes that Ontarians did not care where their power came from during the black-out of last winter; and that coal-fired power plants are on standby in the event natural gas prices rise.⁵² In his opinion, more nuclear should be built as it has zero emissions once built; however like wind farms, nuclear reactors are very fossil fuel and CO2 intense in the process of construction and of getting the uranium ready for use.

⁴⁸ <http://www.theglobeandmail.com/report-on-business/ontarians-should-brace-for-shocks-from-electricity-market-changes/article23800270/>

⁴⁹ <http://www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/publications/state-of-ontarios-indebtedness.pdf>

⁵⁰ <http://www.fraserinstitute.org/research-news/news/display.aspx?id=19538>

⁵¹ <http://business.financialpost.com/fp-comment/ontarios-power-trip-dear-minister-heres-how-you-can-stop-power-price-hikes>

⁵² <http://canadianenergyissues.com/2014/01/14/end-of-coal-in-ontario-not-if-theres-a-power-crunch/>

Table A1: Total Ontario generation, and related CO ₂ emissions, in hour preceding 15:08 EST on Apr 04 2015		
FUEL	MWh	CO ₂ , tons
Nuclear	12,157	0
Hydro	2,916	0
Gas	637	275
Wind	1,327	0
Biofuel	1	1
Oil & Gas	0	0
Solar	76	0
TOTAL	17,114	276
CO ₂ intensity per kWh (CIPK) in the last hour: 16.13 grams.		

Table A2: Total Ontario generation, and related CO ₂ emissions, midnight to 15:08 EST on Apr 04 2015		
FUEL	MWh	CO ₂ , tons
Nuclear	190,356	0
Hydro	48,375	0
Gas	10,276	4,422
Wind	19,180	0
Biofuel	16	16
Oil & Gas	0	0
Solar	582	0
TOTAL	268,785	4,438
Average CO ₂ intensity per kWh (CIPK) over period: 16.54 grams		

The above figures were displayed on Aplin's showing real-time (at the time of writing this report) output from Ontario's various power components on the grid. Despite the large number of wind turbines in Ontario and the expense, they are small power contributors when compared to nuclear, hydro and natural gas.

For every megawatt of wind or solar, you need an equivalent amount of conventional power generation available on-line to back up demand when wind/solar drops out. This is effectively a wasteful doubling of resources to serve a single purpose.

Likewise, the 'ZERO' CO₂ output for wind never accounts for the CO₂ output of natural gas peaking plants that balance wind's variable nature.

4.8 When Germany added more Wind and Solar, it also added more Coal-fired Power

Germany, once the bastion of green energy, is now building more than 20 coal-fired plants, super-critical design like the modern plants of Alberta. Why? Green energy is killing industry and the economy; Germany, like Alberta, has lots of coal – the most affordable and reliable source of power generation. (In fact Alberta's coal is much higher quality for cleaner burn.)



The public generally think of coal-fired power plants with a Dickensian view, but modern **supercritical power plants**, like the two most recent plants in Alberta (Keephills3, Genesee3), the new Boundary Dam plant in Saskatchewan (with carbon capture and storage) or those under construction in Germany, have extremely high environmental standards and filter some ~99.8% fine particulate matter emissions (PM2.5).

See how a supercritical coal-fired plant works:
<http://youtu.be/fjVhwg5o0vA>

The phase-out coal campaign was successful in Ontario in terms of shutting down coal-fired power plants, but an examination of similar phase-out coal rhetoric in Alberta revealed that the anti-coal claims are not based on evidence. That report entitled “Burning Questions” is available on-line.⁵³

In the research document “Burning Questions,” it is revealed that wildfires, most of which are human caused (60-80%), emitted a thousand times the PM2.5 of coal-fired power plants in

53

http://www.friendsofscience.org/assets/documents/FoS_BurningQuestions_Health_Coal_Wildfires_Jan2015.pdf

Alberta in 2011 – and that wildfire emissions contain highly toxic materials (referencing 2 recent reports – one from B.C. and one from Quebec). They also significantly affect climate change.

Research at US Naval Research Labs has revealed that wildfires have an impact on climate change as the pyro-cumulonimbus clouds reach higher above the tropopause and thus particulate matter, aerosols and gases are carried far beyond the location.^{54 55}

This new area of research may have impact on climate findings as well as raise questions about the relative impact of natural versus human-made emissions affecting respiratory disorders.

4.9 The Natural Gas Conundrum – Cleaner, but much more expensive

Natural gas is often touted as a ‘cleaner’ replacement for coal-fired power, but natural gas is a volatile market commodity. Consequently the pillar of ‘affordability’ may be put at risk.

Today’s price for natural gas in Alberta is ~\$4.63/GJ and unlike coal, the price for natural gas is highly volatile and in all likelihood will escalate as more and more gas is used for power generation in the USA. As is the case in the EU.

Natural gas-fired power plants accounting for almost 30 percent of Europe’s capacity are at risk of shutting or being mothballed as utilities opt to burn cheaper coal, according to the International Center for Natural Gas Information.

--Isis Almeida, Bloomberg, 2 June 2014

4.10 Biomass – Questions and Challenges

Canadians should question the wisdom of wood pellets shipped by fossil fuels and sold for peanuts to satisfy EU climate change targets.

In “Acting on climate Change” there are comparisons of Canada to Sweden in terms of ‘low-carbon’ sources. These statements fail to recognize that Canada is blessed with large amounts of high quality coal (especially in Alberta, BC and Maritimes), while Sweden has nuclear power generation and hydro. Likewise, Sweden is tiny compared to Canada, barely fitting into Saskatchewan.⁵⁶ Sweden has a more temperate climate than Canada, despite a similar latitude, due to warming influences of the Gulf Stream off Norway. Most of the population is located in the warmer south, where less fuel is used as winter temperatures range from -3 to -22°C.

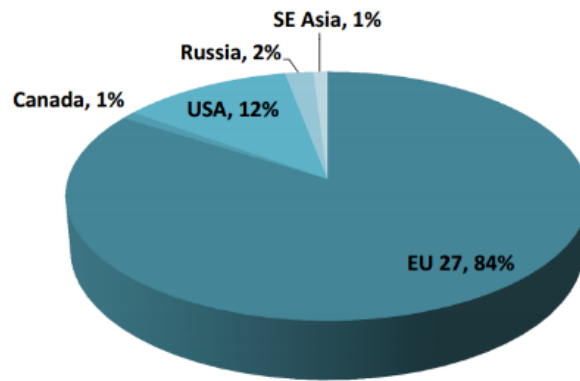
⁵⁴ <http://www.nrl.navy.mil/media/news-releases/2010/nrl-scientist-seeing-clearly-the-effects-of-pyrocumulonimbus>

⁵⁵ https://www.academia.edu/3207896/The_untold_story_of_pyrocumulonimbus

⁵⁶ <http://www.ifitweremyhome.com/compare/CA/SE>

More recently a small amount of wind has been added to Sweden’s mix, as well as biofuels – such as Canadian wood pellets⁵⁷ – cut and processed in Canada using fossil fuels, then shipped thousands of kilometers by ocean freighter using the more polluting heavy diesel used by ocean freighters, to Europe, where wood pellet use can qualify for ‘green’ renewable subsidies.

Global Pellet Consumption 2011



Total: 14.4 mn tonnes

Europe: 12.0 mn tonnes

Wood Pellet Association of Canada

Source: Argus & Lammers et. al.

2

Europe is Canada’s largest market

Canadian shipments in 2011

- 1.2 million tonnes
- UK – 51% (power)
- Netherlands – 24% (power)
- Belgium – 16% (power)
- Denmark – 2% (power)
- Italy – 6% (heat)
- Sweden 2% (power)
- Mostly long-term bilateral contracts, FOB and CIF

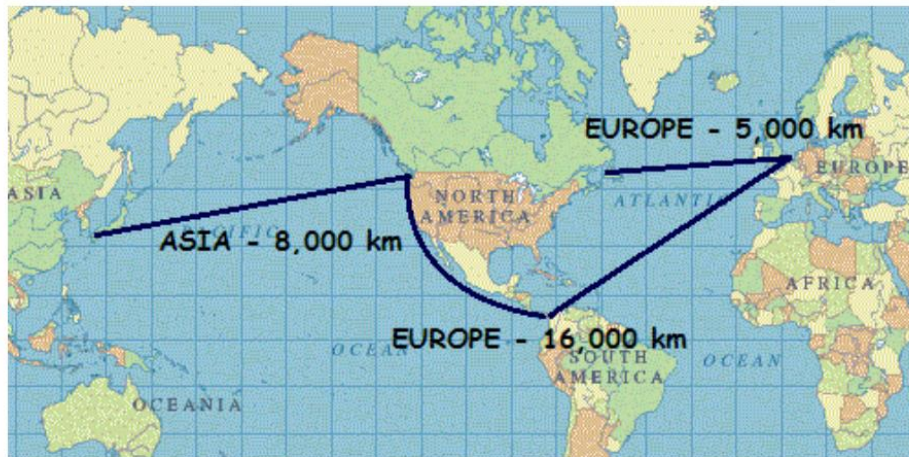


Wood Pellet Association of Canada

3

⁵⁷ [http://www.pellet.org/images/17_Murray - WPAC.pdf](http://www.pellet.org/images/17_Murray_-_WPAC.pdf)

Canadian Pellet Shipping Routes



Wood Pellet Association of Canada

4

The Economist's "The Fuel of the Future: Environmental Lunacy in Europe" (April 16, 2013) describes this nonsensical but profitable outcome:

"The scramble to meet that 2020 target is creating a new sort of energy business. In the past, electricity from wood was a small-scale waste-recycling operation: Scandinavian pulp and paper mills would have a power station nearby which burned branches and sawdust. Later came co-firing, a marginal change. But in 2011 RWE, a large German utility, converted its Tilbury B power station in eastern England to run entirely on wood pellets (a common form of wood for burning industrially). It promptly caught fire.

Undeterred, Drax, also in Britain and one of Europe's largest coal-fired power stations, said it would convert three of its six boilers to burn wood. When up and running in 2016 they will generate 12.5 terawatt hours of electricity a year. This energy will get a subsidy, called a renewable obligation certificate, worth £45 (\$68) a megawatt hour (MWh), paid on top of the market price for electricity. At current prices, calculates Roland Vetter, the chief analyst at CF Partners, Europe's largest carbon-trading firm, Drax could be getting £550m a year in subsidies for biomass after 2016 – more than its 2012 pretax profit of £190m."⁵⁸

4.11 Transportation Recommendations Not Cost-efficient or Low Carbon

⁵⁸ <http://www.economist.com/news/business/21575771-environmental-lunacy-europe-fuel-future>

"Acting on Climate Change" makes the case for more public transit in Canada. People are frequently misled into thinking that public transit is a more efficient, low-cost, and less polluting means of transporting the public, without considering the emissions intensity of the construction materials and process themselves.

"Acting on Climate change" makes numerous references to the need for public transport and touts the Portland and Calgary light rail electric systems as examples. Consider this evaluation of the Portland light rail system (Portland's population 606,456):

"Portland's North Interstate Rail light rail line is estimated to save about 23 billion BTU per years, while its construction is estimated to have consumed 3.9 TRILLION BTU...it would take 172 years to offset the extra energy needed for construction. Not only would this exceed the lifespan of the line but long before 172 years automobiles are likely to be so energy efficient that light rail will offer no savings at all."

From a study by Randall O'Toole of the Cato Institute: "Does Rail Transit Save Energy or Reduce Green House Gas Emissions?" April 14, 2008

Compare the movement of 127,300,000 people in Japan by bullet train in a nation with the geographic footprint of 377, 944 km² (about the size of Newfoundland and Labrador at 405,212 km² population 526, 977). In Japan, this is a cost-efficient, space-saving initiative, whereas in sparsely populated Canada, such a venture, except in the highest density population corridors, makes no sense whatsoever on either economic or environmental terms.

4.12 Walkable Neighborhoods a Pricey Option that offer No Social Justice

As the pundits often say, people are healthier in walkable neighborhoods. Perhaps it is because they are richer and thus have access to good food and quality health care. Population density is a key factor to success in 'walkability'.

Walkable neighborhoods in Europe or the US east coast are often the yardstick of comparison – but advocates forget that these were formed decades or centuries ago, before the development of the car, and those European cities are often built around ocean or river ports.

Walkable neighborhoods rely on population density. For example, Calgary has a population density of 1,329/ sq. km. compared to New York City at 10,249 (or 18,897 in the metro area).

Alberta has a population density of 5.69 per sq. km compared to the Netherlands at 403, Germany 228, Italy 203; yet West Edmonton Mall gets 30 million visitors a year, in a city of a million people and a province of ~3 million. The point being is that businesses need shoppers to survive - so 'planning for walking' is one thing but you need the buyers. Either you have to make the place into a big attraction, or you need lots of people with nowhere else to go. Or you

need small retailers who will mark things up substantially and who will be satisfied to serve a local coterie of buyers. And thus you need wealthy shoppers with lots of disposable income.

Walkable neighborhoods create social inequity. Canada Walks is often cited as an evaluation tool for a city's 'walkability' often in reference to urban walkability guru Chris Leinberger. The fact is Chris Leinberger measures walkability success by property values, not just walkability. He considers it a walkable neighborhood if the property values have risen 71% higher than elsewhere – meaning no room for social justice.

"Leinberger says the walkability of these places is key to their economic success – with economic success judged primarily by real estate values. In fact, he downgrades Silver Spring, Maryland to a "copper" economic ranking for having affordable rents – a factor which gave it a platinum ranking for social equity....Indeed, high rents are the only measure of economic success Leinberger uses. And they inherently count against social equity. Leinberger would like to see property values climb as high as they possibly can, and then reserve some of that wealth to preserve affordable housing options for lower-income residents. A community where equity and diversity are maintained because prices stay within reach is, by definition, failing in his book....So high property values are, to Leinberger, the only indicator of successful walkable urbanism. But is walkable urbanism the only indicator of high property values? His work argues that it is. He says walkability is the factor that makes places thrive.... and the premium for housing in walkable urban neighborhoods is nearly that high, at 71 percent. "⁵⁹

⁵⁹ <http://dc.streetsblog.org/2012/09/13/leinberger-walkable-urbanism-is-the-future-and-dc-is-the-model/>

CHAPTER 5 POLICY RECOMMENDATIONS

	Short Term	Middle Term	Long Term
Policy Orientation 1:			
Carbon pricing			
Climate Policy Changes:	Wait 2-4 years to see if the trends are toward warming or cooling, and if there is a correlation to carbon dioxide (CO2) or not.	Be prepared to institute incentives for improved fuel efficiencies and heating or other human and infrastructure supports in the event of an evident cooling trend. (i.e. Little Ice Age)	Be prepared for cooling or warming.
Carbon tax or cap-and-trade	Be prepared for warming OR cooling climate.	Establish agricultural supports and food management policies well in advance of critical cooler climate change challenges.	Develop diverse climate reporting from various disciplines with more 'real-time' advice and less political interference than IPCC.
	Dismantle the IPCC.	Establish regional climate science review groups who share information via internet.	
	Stop wasting precious fossil fuels on international 'fly-in' climate change conferences.		
	Climate conferences can be handled by SKYPE.		
	Delist ENGO charities that have been funded by offshore foundations pushing climate policies	Examine policies that were instituted through such ENGO ideological campaigns; dismantle them as appropriate when the evidence indicates them to be wasteful.	
	Put a price on the industrial and technological value the ANNEX 1 countries have provided to the rest of the world; this to be balanced off against any 'climate credits' claimed by developing countries.	Refuse to be held hostage by non-producing nations and rent-seeking organizations using emotional rhetoric to ramp up climate change hysteria – when there is no supporting evidence.	
Policy Orientation 2:			
Low-carbon or conventional power – or a combination?			
Combination seems to be working well in Alberta which has a deregulated market, choice of green energy options, and no public debt.	The potential of wind and solar have not been realized in current incarnations. Continue R&D to resolve existing problems (i.e. storage/variability).	Observe the likelihood that 'clean coal' with value-added by-products and virtually no emissions are a near-term possibility due to technological advances.	
	Expand R&D on known technologies in order to mitigate pollution and to raise efficiency.	Continue incremental improvement in transportation emissions management.	
Policy Orientation 3:			

Oil and gas sector vis a vis climate policies.

Oil and gas are the drivers of an industrial economy – and in turn the fundamental creators of jobs and prosperity.

Clarify the contribution of major oil and gas operators to the economy and to educational institutions through taxes as well as corporate donations.

Expose proxy war being waged by ENGOs against Canadian industry world-wide.

Continue to incrementally raise emissions management standards and efficiency/environmental targets.

Investigate and prosecute as required any offshore interference (or by proxies such as ENGOs) in Canada's energy industry development.

Policy Orientation 4:

Consideration of pros and cons of multi-level energy efficiency models and evaluate pros and cons of cooperation on electrification.

Obtain expert advice in this area and go slowly.

If it 'ain't broke – don't fix it.'

Policy Orientation 5:

Carefully consider cost and consequences of a rapid move toward low-carbon transportation; especially in the cost-benefit, long-term debt, ridership, and overall energy consumption of construction.

Dismantle existing carbon/climate policies that are shown to have negative socio-economic impacts (i.e. rush-to-renewables in Ontario) in such a way as to allow gradual ending of programs so as not to create another layer of crisis

Policy Orientation 6:

Disentangle various policies that presently have begun to tie land use, landscape, transportation and energy infrastructure.

Policy Orientation 7:

Evaluate unintended consequences of energy efficient building programs. Enhance the elements that work and cancel or reform those that don't.

Policy Orientation 8:

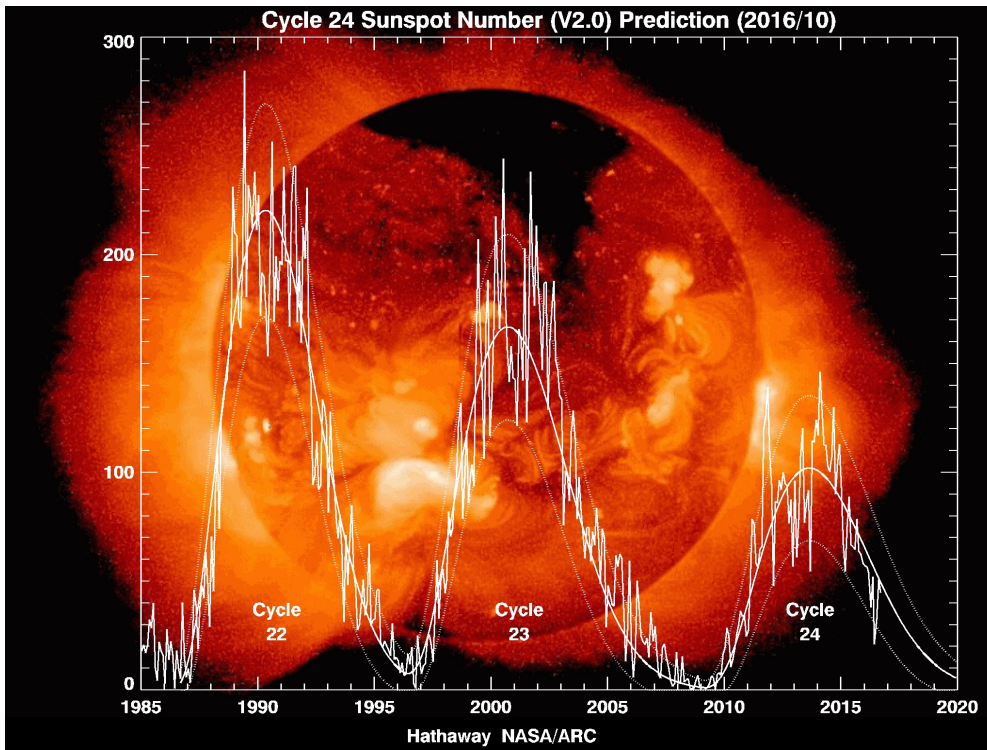
Safeguard biodiversity. No more wind farms.

Policy Orientation 9:

Safeguard forests. Stop selling them out as carbon sinks. Stop underpricing valuable wood pellets and wasting valuable fossil fuel resources shipping our wood pellets thousands of kilometers away to get green subsidies for foreign power plants.

Policy Orientation 10:

Continue to fund R&D into improvement of efficiency, emissions management, and harvesting of valuable emissions (i.e. creation of graphene) from conventional coal and natural gas plant emissions and processes. Continue development of thorium research.



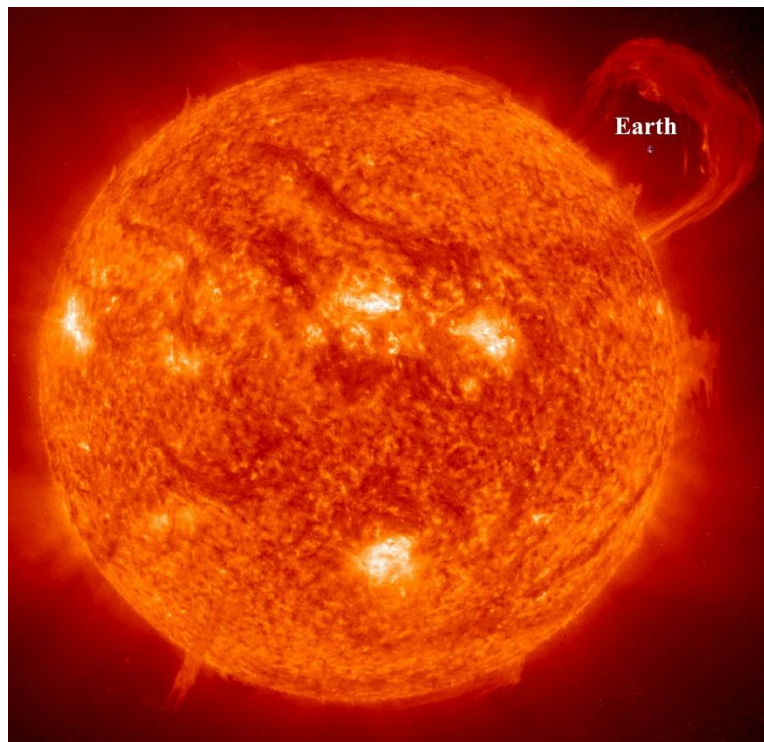
NASA incorrectly predicted in 2006 that solar cycles 23-24 would be more active than they were. Below – Globe and Mail story of Feb. 04, 2015. “So far this year, Saint John has seen more than 160 centimeters of snow. Normally, Saint John has 15 to 20 centimeters accumulated at this time of year.” <http://www.theglobeandmail.com/news/national/more-snow-coming-to-storm-battered-saint-john-tonight/article22779334/>



CHAPTER 6

6.1 SOLAR HIBERNATION - CLIMATE COOLING

Climate scientists for the IPCC are not doing the same research work as solar physicists. The two groups generally disagree on the causes of climate change and the trends.

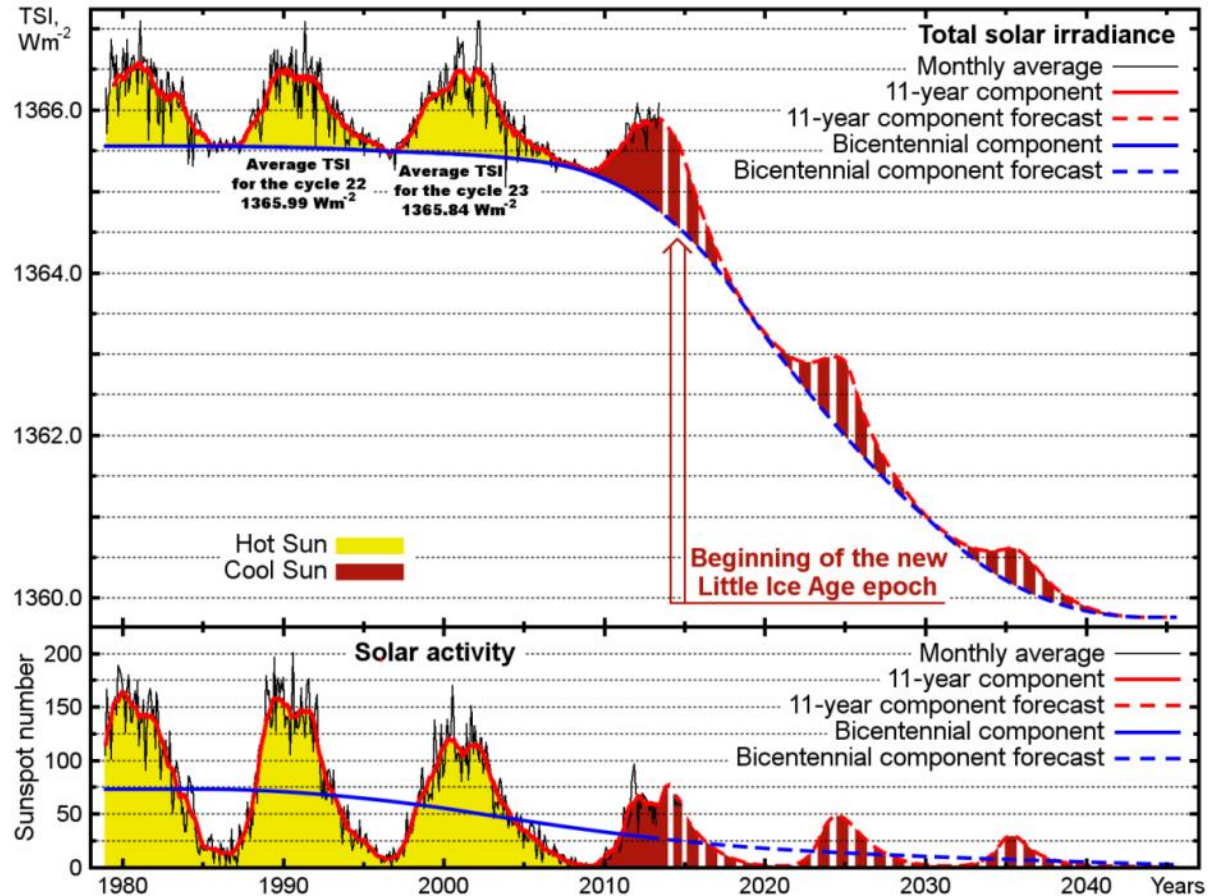


Solar scientists follow solar cycles which have been tracked for 400 years, compared to the scan data records of climatologists. Likewise earth scientists in general dispute the claims of climate scientists on Catastrophic Anthropogenic Global Warming (CAGW) but neither sector of solar or earth science gets the widespread media coverage of the catastrophic claims that CAGW activists attach to common, natural weather events.

If the claim is that we should engage the precautionary measure for global warming - what of being prepared for global cooling - solar 'hibernation.'

The prediction of intensified global cooling is now being made by solar physicist **Habibullo Abdusmatov** of the Pulkovo Observatory of the RAS, Saint Petersburg, Russia **placing the cold point of the impending cold period to occur during solar cycle 29 around 2060.**

This slide is included with the paper.



CURRENT LONG-TERM NEGATIVE AVERAGE ANNUAL ENERGY BALANCE OF THE EARTH LEADS TO THE NEW LITTLE ICE AGE

by

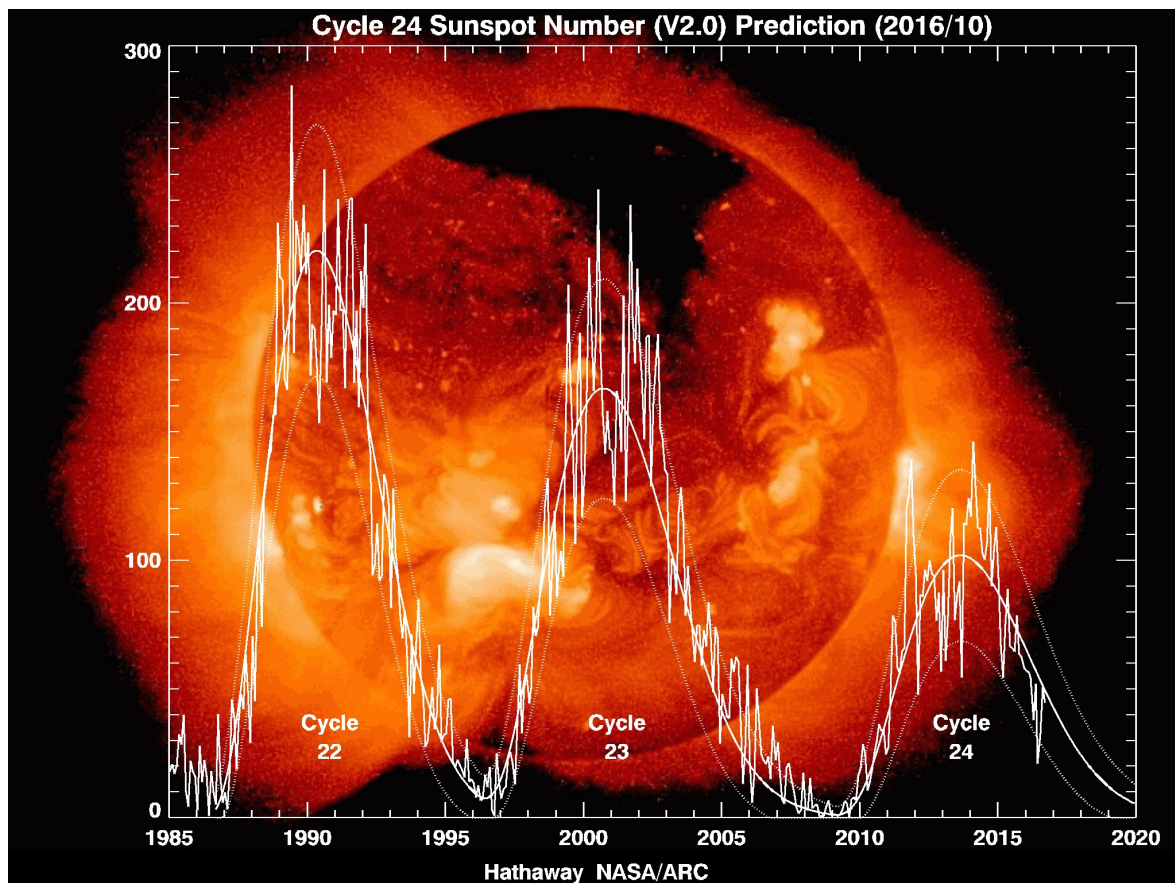
Habibullo ABDUSSAMATOV

Pulkovo Observatory of the RAS, Saint Petersburg, Russia

The average annual decreasing rate of the total solar irradiance (TSI) is increasing from the 22-nd to the 23-rd and 24-th cycles, because the Sun since the 1990 is in the phase decline of quasi-bicentennial variation. The portion of the solar energy absorbed by the Earth is decreasing. Decrease in the portion of TSI absorbed by the Earth since 1990 remains uncompensated by the Earth's radiation into space at the previous high level over a time interval determined by the thermal inertia of the Ocean. A long-term negative deviation of the Earth's average annual energy balance from the equilibrium state is dictating corresponding variations in its energy state. As a result, the Earth will have a negative average annual energy balance also in the future. This will lead to the beginning of the decreasing in the Earth's temperature and of the epoch of the Little Ice Age after the maximum phase of the 24-th solar cycle approximately since the end of 2014. The influence of the consecutive chain of the secondary feedback effects (the increase in the Bond albedo and the decrease in the concentration of greenhouse gases in the atmosphere due to cooling) will lead to an additional reduction of the absorbed solar energy and reduce

the greenhouse effect. **The start of the TSI's Grand Minimum is anticipated in the solar cycle 27±1 in 2043±11 and the beginning of the phase of deep cooling of the 19th Little Ice Age for the past 7,500 years around 2060±11.**

This graph is from NASA clearly showing a decreased solar activity from solar cycle 22 to solar cycle 24



Predicted changes in climate over the next 30 years include:

- a. Highly variable and extreme weather events are expected during the transition from the past warm period to one of rapid global cooling.
- b. This next climate change to a long and deep cold era is expected to last for at least the next thirty to forty years.
- c. **The extent and depth of the cold weather produced in this new climate era is estimated to be the worst in over two hundred years producing a global temperature reduction of 1.0 to 1.5 degrees centigrade.**

The human catastrophes caused by cooling periods include the mysterious Dark Ages Cold Period of about A.D. 536, extending to different times according to region around the world, leading to a virtual collapse of the magnificent civilizations that had preceded it. There are

varying theories of the causes – whether a series of massive volcanic eruptions or the earth being hit by a large bolide (crater forming meteor) – either or both causing catastrophic emissions of dust, particulate matter and aerosols that led to ‘*a failure of bread*’ – as recorded in Irish records of the time. Famine.

Likewise, the Little Ice Age⁶⁰ that followed the Medieval Warm Period⁶¹ was a time of massive upheaval in society and low temperatures led to catastrophic events for humankind. Scientists note that this period was a time of low solar activity/hibernation as well as many volcanic events.

Whether you ascribe to the theory that solar activity affects earth’s climate or not, there is ample evidence throughout time of fairly regular, cyclical changes of climate – from warm, as we have experienced for the past 100 years or so – to cooler.

Should we not be prepared for either?

IN SUMMARY

We have demonstrated that the claims of “*Acting on Climate Change*” are not supported by the evidence. We have shown that climate change policies around the world have, for the most part, damaged economies, pushed less privileged people into economic despair and not helped the environment. Some climate change policies are inherently wasteful and some allow speculators and criminal elements to capitalize at the expense of taxpayers.

We advise policy makers to wait 2-4 years and see what the climate trends are, before instituting any additional climate change policies.

We also recommend that policy makers prepare for the more likely possibility of global cooling and its attendant risks and challenges for the public.

Respectfully,

Friends of Science Society

⁶⁰ “The Little Ice Age: How Climate Made History” by Brian Fagan a very readable account which refers to low solar activity and increased volcanic activity, plus other atmospheric and oceanic factors affecting climate at that time.

⁶¹ Medieval Warm Period had regional variations – epoch-long mega-droughts in the area of modern-day south western US; pleasant stable temperatures and abundant crops in modern-day Europe). See “The Great Warming” by Brian Fagan.



About

Friends of Science Society is an independent group of earth, atmospheric and solar scientists, engineers, and citizens who are celebrating its 18th year of offering climate science insights. After a thorough review of a broad spectrum of literature on climate change, Friends of Science Society has concluded that the sun is the main driver of climate change, not carbon dioxide (CO₂).

Friends of Science Society

P.O. Box 23167, Mission P.O.

Calgary, Alberta

Canada T2S 3B1

Toll-free Telephone: 1-888-789-9597

Web: friendsofscience.org

E-mail: [contact\(at\)friendsofscience\(dot\)org](mailto:contact@friendsofscience.org)

Web: climatechange101.ca