Alberta’s Climate Plan
A burden with no benefit
Energy Industry Electrical Engineering Associates

Ken Gregory, Ba.A.Sc.
Friends of Science Society
April 11, 2017.
Friends of Science Event May 9, 2017

Friends of Science Society 14th Annual Climate Science and Policy Event

**Climate Dogma Exposed**

*Carbon Taxes Can’t Stop Nature... Can Kill the Economy*

**Can Canada Survive Climate Change Policy?**

- **Robert Lyman**
  - Ottawa energy policy consultant,
  - former public servant
  - Author of numerous reports.

- **Steve Goreham**
  - Author of “The Mad, Mad World of Climatism” and “Outside the Green Box”
  - Climate Science and the Myths of Renewable Energy

May 9, 2017 • 6:00 - 9:00pm • Red and White Club • McMahon Stadium, Calgary
Tickets Online • $45 members • $55 non-members • Table 8 $360 • Students $30

Buffet dinner included • Free Parking after 6pm • Or take the LRT

[www.friendsofscience.org](http://www.friendsofscience.org) – Order tickets by May 1, 2017

Note: This event is not affiliated with nor endorsed by the University of Calgary
Ken Gregory

- Retired professional engineer
- Studied climate science for 10 years
- Operates Website; FriendsofScience.org
- CliSci Newsletter editor
- Science News, Quarterly newsletters
Global Air Temperatures

Graph: Global Lower Troposphere Temperatures and CO₂

- Global Average UAH&RSS
- 2002+ Best Fit
- CO₂

Key Points:
- El Chichón
- Pinatubo

Source: FriendsofScience.org
Surface Temperature vs Models

No match before 1960 or after 1995
Previous Warm & Cold Periods
Climate always changes with no help from Man.

Average near-surface temperatures of the northern hemisphere during the past 11,000 years (after Dansgaard et al., 1969, and Schönwiese, 1995)
IPCC – Intergovernmental Panel on Climate Change

- Write reports on human-causation of climate change
- Reports to support Rio Summit – UNFCCC 1992
- Ignores natural climate change
- Based on models that do not include natural causes
- Charney report 1979 ECS 1.5-4.5 °C per double CO2
- IPCC AR5 report 2013 ECS 1.5-4.5 °C per double CO2
- Distribute $100 billion a year from industrial countries to others
GISS adjusted temperatures to better match climate models.
Climate Models vs Reality

Data points are 5-year averages, surface to 15 km. Model trend is 2.5 X reality
Tropical Mid-troposphere Models vs Observation

Tropical Mid-Tropospheric Temperature Variations
Models vs. Observations
5-Year Averages, 1979-2015 Trend line crosses zero at 1979 for all time series

Average of 102 CMIP5 Model Runs in 32 Groupings

Observations
Circles - Avg 4 Balloon datasets
Squares - Avg 3 Satellite datasets

JR Christy, Univ. Alabama in Huntsville
Model output: KNMI Climate Explorer
Global Sea Surface Temperature by Latitude

Models’ warming rate by latitude region is far from reality. There has been little warming in the tropics, cooling in southern oceans.
Alberta and Global Temperatures

Alberta's Annual Min & Max Temperature and Global Average Temperature

Temperature (deg. C)


Maximum Minimum Global HadCRUT4.4

FriendsofScience.org
Canadian Model – Global Surface

Global Surface Temperatures

- Model Trend is 4 Times the Observations!
- Canadian Climate Model: Trend = 0.44 °C/decade
- Surface UHIE Adj.
- LT Satellites: Ave. Trend = 0.11 °C/decade

All Trends = 0 °C at 1990

Surface from HadCRUT4.4, UHIE = urban heat island effect.

Legend:
- Surface Model
- LT Satellite
- Surface adj.
- Linear (Surface Model)
- Linear (LT Satellite)
- Linear (Surface adj.)
Upper Relative Humidity Declines

- Climate models all assume relative humidity stays constant.
- Radiosonde data show that upper atmosphere relative humidity declines with warming.
- 300 mbar pressure level is about 9 km altitude.
- The Water vapor effect at 11 km is 80 times that at the surface.
Black Soot on Snow

- Greenland’s and the Arctic’s snowy surfaces have been getting darker over the past two decades.
- “the Arctic has warmed about 1.6 degrees. Dirty snow caused 0.5 to 1.5 degrees of warming, or up to 94 percent of the observed change”
Feedbacks: Models vs Reality

- The direct affect of a CO₂ doubling $\rightarrow$ 1.1 °C
- Models With feedbacks $\rightarrow$ 3.2 °C (2500 years)

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Models</th>
<th>Reality</th>
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</thead>
<tbody>
<tr>
<td>Water Vapor</td>
<td>1.14</td>
<td>0.37</td>
</tr>
<tr>
<td>Clouds</td>
<td>0.34</td>
<td>-1.09</td>
</tr>
<tr>
<td>Surface Albedo</td>
<td>0.34</td>
<td>0.34</td>
</tr>
<tr>
<td>CO₂</td>
<td>0.28</td>
<td>0.28</td>
</tr>
<tr>
<td>Total</td>
<td>2.10</td>
<td>-0.10</td>
</tr>
</tbody>
</table>

Water vapor includes the direct radiative effect and lapse rate effect.
CO₂ Lags Temperature Changes

Temperature leads CO₂ changes by about 800 – 1000 years. CO₂ cannot be a main cause of climate change.
Alberta Climate Plan

- Early Phase-out coal-fired power plants by 2030
- Cap oil sands CO2 emissions at 100 MtCO2/year
- Cut CH4 emissions by 45% by 2025
- Carbon tax
  - $20/tCO2 in 2017
  - $30/tCO2 in 2018
  - 2018: 1.52 $/GJ on natural gas, 6.73 ¢/L on gasoline
- $9.6 billion revenue over 5 years
- $3.4 billion over 5 years, $2.2 billion/yr by 2032 in subsidies to wind and solar
Coal-fired Power Plant Phase-out

- Cost about $31 billion
  - $10 billion for replacement gas-fired power plants
  - $1.4 billion for coal plant compensation
  - $16 billion for renewables (mostly wind)
  - $4 billion for transmission lines

- Cumulative electricity costs increase $3.3-5.9 billion, then $1.5 billion/yr for 8 years.

- Add 7200 MW renewable; 14,700 MW total new capacity
- EDC Associates Ltd. report
Particle Emissions in Alberta

Forest fires create ~1000 times the particulate emissions of coal-fired plants.

Fabric filters stop 99.8% of particle emissions.
Climate Sensitivity – Energy Balance

- Transient Climate Response, double CO₂, exponential growth ➔ 125 yrs.
- Use IPCC AR5 greenhouse gas forcing
- New aerosol forcing estimates
- Evaluation over 153 years, averages over AMO.
- TCR = 1.21 °C ignoring millennium cycles and urban warming.
Northern Hemisphere Temperatures
Urban Heat Island Effect

- In the USA, only 11% of stations are in suitable locations, 69% are within 10 m of an artificial heat source.
59% of US Warming is Bogus

Compliant: 0.204 °C/decade
Non-compliant: 0.319 °C/decade
Final Adjusted: 0.324 °C/decade
Urban Heat Island Effect

- McKitrick and Michaels 2007: Almost half of warming over land is due to urban development
- GISS index: 45% of adjustment increase the warming trend
- IPCC Nonsense: “the locations of greatest socioeconomic development are also those that have been most warmed by atmospheric circulation changes.”
- Reduces trend from 1980 by 0.042 °C/decade.
### Summary Transient Climate Response Estimates

<table>
<thead>
<tr>
<th></th>
<th>TCR BE</th>
<th>TRC 5-95%</th>
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<tbody>
<tr>
<td>UN IPCC AR5</td>
<td>1.75</td>
<td>0.90 – 3.00</td>
</tr>
<tr>
<td>IPCC AR5 Forcings</td>
<td>1.33</td>
<td>0.90 – 2.50</td>
</tr>
<tr>
<td>Stevens Aerosol Forcing</td>
<td>1.21</td>
<td>0.90 – 1.65</td>
</tr>
<tr>
<td>With Natural Warming &amp; UHIE</td>
<td>0.85</td>
<td>0.55 – 1.30</td>
</tr>
</tbody>
</table>

IPCC high 95% estimate of TCR is 2.3 times too high!

BE = Best Estimate
AGW by 2100

- TCR of 0.85 °C gives 0.57 °C 2016 to 2100
  - Assuming exponential CO₂ increase
- IPCC RCP8.5 HIGH forecasts 3.5 °C 2016 to 2100
  - Extremely High forecast
  - CO₂ change 0.55%/yr to 1.2%/yr by 2070
  - 10 fold increase in coal use by 2100
  - Population growth accelerates
  - The ability of oceans to absorb CO₂ fails
  - It is a “barking mad scenario” sold as “business as usual”; Mat Ridley
Recent Studies of Equil. Climate Sensitivity

SCC based on

Reality is

Findings from the Recent Scientific Literature

- Bates (2016)
- Lewis and Curry with Steven, UHIE, millennium cycle
- Lewis and Curry (updated with Stevens, 2015 data)
- Skeie et al. (2014)
- Loehle (2014)
- Spencer & Braswell (2013)
- Otto et al. (2013)
- Masters (2013)
- Lewis (2013)

Center for the Study of Science, Cato Institute

Equilibrium Climate Sensitivity (°C)
Social Cost of Carbon (Dioxide) Models

- The IWG uses three economic models:
  - FUND, PAGE and DICE
- PAGE and DICE have no CO₂ fertilization effect
- The DICE model assumes that the optimum climate at 1900, near end of Little Ice Age.
- Dr. Robert Mendelsohn: PAGE has “uncalibrated probabilistic damage function”.
- PAGE “explicitly does not include adaptation”
Sea Level Rise: DICE vs Climate Models

Projected Sea Level Rise (MESSAGE)

- DICE
- MAGICC
- Expected

Sea Level Rise (m)

Year

1950 2000 2050 2100 2150 2200 2250 2300 2350

Climate model average
Social Cost (Benefit) of CO₂ using FUND

Transient Climate Response: 0.85 °C [0.55 – 1.30 °C]

SCC best estimate US$ -16.6 /tCO₂
likely US$ -19 to -12 /tCO₂
extremely likely US$ -21 to -4 /tCO₂

VERY BENEFICIAL!
Using 3% real discount rate
Net Benefit to Canada of CO2 Emissions

- In Canada, net benefits of CO2 increase throughout the 21st century.
- FUND: Canada net benefits $101 billion/yr by 2100. ($2016)
  - At 1.8 °C TCR
  - FUND default parameters
Transfer Wealth to the Wealthy

- IWG: world’s income/person in 2100 will be 5 X today despite warming.
- Carbon taxes and trading transfers wealth from us to the very wealthy.
- Carbon taxes increases costs of all goods & services
  - Regressive, hurts the poor
  - Benefits crony capitalists.
Affect of Alberta’s Climate Plan

- Compared to business-as-usual;
  - Reduce CO₂ by 0.026 ppm by 2030
  - Reduce global temperatures by 0.00007 °C
    - Insignificant and undetectable
IPCC 5th Report – Ignores the Sun

- 1030 scientific papers published 2004-2016 skeptical of IPCC position. Sun, ocean oscillations, low CS.
- The IPCC ignored 123 peer-reviewed article published 2008 – 2012 that show the Sun is a major climate driver.
- Also, 320 papers in 2014, 2015, 2016 show sun-climate link
- IPCC: “The forcing from changes in total solar irradiance alone does not seem to account for these observations, implying the existence of an amplifying mechanism”
- Then, ignores solar effects.
The Sun and Temperature Proxies

Solar proxy C14 vs temperature O18 over 3000 years.
NH Temperatures & Solar Activity
Solar Magnetic Flux

More active Sun $\rightarrow$ more solar wind $\rightarrow$ more magnetic flux $\rightarrow$ less cosmic ray $\rightarrow$ less aerosols $\rightarrow$ less low clouds $\rightarrow$ more sun light to the surface $\rightarrow$ global warming.
Hurricanes: No Relation to Temperature

No significant trend of hurricane energy
Tornado Trend Declines with Warming

Tornadoes require a cold front colliding with warm air. Northern warming makes tornadoes less likely.
Global Drought Declining

Global Integrated Drought Monitoring and Prediction System
There is a small declining trend of total drought throughout the period
Benefits of Warming

- Longer growing season
- Greater area of arable land
- Lower heating costs
- Fewer cold-related deaths and illness
- Lower cost of outdoor activity
  - Lower construction costs
  - Lower road maintenance costs
- Reduced tropics to pole temperature gradient
  - Fewer severe storms
CO2 is Plant Food

- CO2 increases since 1950 have enhance crop yields by 16%.
- A 300 ppm CO2 increase would raise the productivity of woody plants by about 50%.
- CO2 fertilization added $3.8 Trillion to global crop yields 1961 to 2011.

Canada’s GDP = $1.8 Trillion
CO2 is Greening the Planet

- CO2 fertilization caused 70% of leaf area greening trend from 1982 to 2014. Greening was 11% over 33 years. (April 2016)
- The greening over the past 33 years ... is equivalent to adding a green continent twice the size of mainland USA (18 million km²)
Warming Reduces Deaths

- In U.K., death records show cold kill 10X as many as heat.
- Death rate in Canada is 100 deaths/day greater in January than July.
- Study of 13 countries: Cold weather kills 20 times as many people as hot weather.
Alberta Wind Power – Extreme Variability

Average load factor: 34%
Wind Power

- Alberta 2015 average Wind capacity factor: 33%
- Southern Alberta Transmission Reinforcement (for wind power) cost: $2.5 billion.
- Wind transmission costs are 2 – 3 time greater than for conventional power.
- Ontario Feed-in tariffs 12.8 ¢/kWh
- My Enmax Dec. charge 4.3 ¢/kWh
Wind Turbines Kill Birds and Bats

- Windfarms kill 1.5 million birds and bats annually in the USA.
- In Altmont Pass, Calif., 4000 birds killed annually.
- Half of bat fatalities caused by direct blade contact, half by exploding lungs due to rapid pressure decline.
## Ontario Solar Feed-in Tariffs

<table>
<thead>
<tr>
<th>Type</th>
<th>Price (¢/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar (PV) Rootop</td>
<td>29.4 – 24.2</td>
</tr>
<tr>
<td>Solar (PV) Non-Rootop</td>
<td>20.9 - 21.4</td>
</tr>
<tr>
<td>ENMAX energy charge</td>
<td>4.3</td>
</tr>
</tbody>
</table>

### Additional Information

- **Ontario solar FIT costs up to 9 times the cost of Alberta electricity.**
- **Ontario recently approved a 20-year contract at 45.7 ¢/kWh for a new solar project – 11 X Enmax!!!**
Electricity Prices vs Solar+Wind Capacity

Electricity Cost vs Installed Solar and Wind Capacity Per Capita

Source: Eurostat, 2014
Carbon dioxide is a wonderful by-product of fossil fuel use.

Social net benefit of CO2 is about CDN$22/tCO2.

Expected warming by 2100 is trivial 0.6 °C or less.

Don’t subsidize wind or solar.

Alberta climate plan to cost $31 billion for unreliable power to reduce temperatures by 0.00007 °C

Alberta’s climate plan will be a burden with no benefit.
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Climate Dogma Exposed
Carbon Taxes Can’t Stop Nature… Can Kill the Economy

Robert Lyman
Ottawa energy policy consultant, former public servant
Author of numerous reports.

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Climate Science and the Myths of Renewable Energy

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Friends of Science

- Visit FriendsofScience.org for more information
- Our objective is to educate and share information.
- Toll-free Telephone: 1-888-789-9597
- E-mail: contact@friendsofscience.org
- Become a Member; $60/3-years
- Major Event; May 9, 2017

DONATE
Satellite vs Predicted Outgoing Radiation

ERBE satellite shows when tropical sea surface temperature (SST) increase outgoing radiation increases, but 11 climate models show outgoing radiation decreases.
U.S. Drought

- No correlation of temperature to drought.
- The most severe droughts in U.S. were in the 1930s and 1950s.
Ken Gregory has been studying climate science and policy for over 10 years. Invite Ken Gregory, B.App.Sc., a Friends of Science Speaker, to your club or organization to explain:

- How the Alberta Climate Plan will affect you.
- Why the climate panel didn’t consider the benefits of warming and CO2 fertilization.
- Why the climate plan may reduce temperatures by only 0.00007 °C by 2030.
- Why human-made emissions will warm the earth by no more than 0.6 °C by 2100.
- Why natural climate change may cause global temperatures to decline.
- Why the Canadian climate model shows a 1990 - 2015 global temperatures rise of 4 Times the actual measurements.
- Why the net social benefits of CO2 emissions are about CDN$22/tonneCO2.
- Why the net Canadian benefits of CO2 emissions increase throughout the 21st Century.
- Why we should never subsidize solar and wind power.
- Why phase-out coal will cost us over $29 billion.

Contact Ken toll-free: 1-888-789-9597 | E-mail: contact@friendsofscience.org
A speaker fee is not required. www.FriendsofScience.org
Solar Irradiance vs Sunspots
Declining CO2 Cause Warming from Ice Ages

- CO₂ concentrations slowly falls during ice ages
- Plants die due to low CO₂ creating sand deserts
- Large dust storms deposited dust on the ice sheets
- The earth’s precession causes solar warming 22,200 years
- Ice ages end after 4 or 5 cycles
- “The greenhouse-gas attributes of CO₂ play little or no part in this complex feedback system.”
Greenland Surface Mass Balance

- Greenland surface snowfall exceeds melting & sublimation, offset by glacier calving.
- Lower sea ice caused increasing snowfall
Global Sea Ice Area Anomaly

The graph shows the global sea ice area anomaly from 1996 to December 2015. The data is plotted on a linear scale for the y-axis, showing the anomaly in million square kilometers. The x-axis represents the years from 1996 to 2014. The graph includes monthly (blue line) and annual (red line) data. The baseline is set at 1979-2008 = 0, indicating the average sea ice area during that period. The data shows fluctuations over the years, with notable decreases in recent years.
Sea Level Rise: Little Impact

• No sea level rise on Canada’s west coast in 40 years.
• Global sea level rise by satellite data is 2.5 mm/yr before GIA.
Tropical Coral Islands Not at Risk from SLR

- Tropical coral islands grow as fast as SLR.
- Arial photos show that 23 of 27 islands grew or stayed the same area since 1950.
- Island atolls rise with sea levels.
Undocumented Temperature Adjustments

Hansen 1981
Urban Warming by Population Density

a. Global, by year

UHI Warming (deg. C)

Population Density (persons per sq. km)
13 UN climate conferences have not led to any reduction in CO2 emissions.
Measurements are below all the lower bound of the forecasts.
Canadian Model – World’s Worst

In the tropics the model trend is six times reality
Electricity Prices

Global Electricity Prices in 2015
Selected Countries

U.S. cents/KWh

Italy  Germany  UK  Spain  US  France  Poland  Australia  Canada

0  5  10  15  20
Wind Power Doesn’t Reduce Fuel Usage at High Wind Penetration

- Studies for the Netherlands and U.K.; wind power causes extra fuel usages compared to gas turbines.
- Cycling of back-up generators reduces efficiency.
- Replacement of efficient generators with low-efficiency fast reacting open-cycle gas turbines (OCGT).
- OCGT consumes 40% to 70% more fuel than CCGT.
- If wind capacity is small, extra wind power will cause a small fuel savings.
Polar Bear Numbers Stable Since 1980
The 97% Consensus Fraud

- Cook et al: Reviewed 11900 abstracts
- Found 0.54% (64) explicitly endorsed that over 50% of warming since mid-20th century was caused by mankind.
- The 97% includes explicitly and implicitly endorsed that man has caused some warming.
- Dangerous warming was never mentioned.
- Doran & Zimmerman: Survey 3,146 scientists responded
  - Selected 79, 75 said man is a “significant factor” in warming.
- Survey of American Meteorological Society (AMS) 4,092 members show that 1/3 believe that warming is not more than 50% man-made.
The Mann hockey stick graph got rid of the pesky medieval warm period and the little ice age.
- Assigned 390 X more weighting to hockey stick tree cores
- Investigated and corrected by Canadians Dr. McKitrick and McIntyre
The IPCC “trick” was the deletion of inconvenient data after 1960. The divergence between proxy and instrument readings reveals that the proxy reconstructions and/or temperature indexes are seriously flawed.
Climategate

- Emails, data and computer code released 2009, 2011
- Rewrite history to eliminate natural climate change
- Hide the decline by deleting proxy temperature data
- Apply arbitrary fudge factors to increase warming
- Block scientific paper that don’t support AGW
- Interfered with journals and editors that publish papers critical of AGW
- Illegally refused Freedom of Information requests
- Illegally conspired to obstruct FOI by deleting emails.
Climategate Investigations

- Penn State University investigates Michael Mann (creator of the "hockey stick" graph) Mann brings in $$ million of grants.
- Oxburgh Report: reviewed 11 article, none of the hockey stick articles, interviewed no skeptics, considered none of the issues. Blames “trick to hide the decline” on IPCC. Oxburgh is chair of Falck Renewables, multi-national wind-farms.
- Boulton-Russell Inquiry: Appointed Geoffrey Boulton who worked for UEA for 18 years. The claim the CRU was “discarding data known to be erroneous” is simply absurd. The tree ring data goes down instead of up – means that the data is a bad proxy – mislead IPCC readers.
- The Committee says it is common practice in the climate science not to share raw data.
IPCC 5th Report - Extremes

- complete reversal from AR4 on trends in drought, hurricanes, floods.
- no significant trend in global tropical cyclone frequency.
- No trend in the magnitude and/or frequency of floods.
- no trends in droughts.
Missing Upper Atmosphere Hotspot

Models predict an enhanced warming rate over the tropics 8-14 km altitude due to predicted increase in water vapor. The radiosonde and satellite data show no enhanced warming at all.
A new model predicts that solar activity will fall from cycle 24 activity by 60% during the 2030s to conditions last seen during the Little Ice Age.
Clouds

- Clouds are very poorly represented in models.
- Modelers assume clouds change only by temperature changes.
- Clouds change due to ocean circulation changes, including ENSO, Pacific Decadal Oscillation etc.
- Cloud fraction declined in 20th century due to forcing, not only temperature change.