

## Are You Responsible for Climate Change?

Highlight Edition (abridged)

Landowners & Wind Turbines Don't forget the steel, concrete, and remediation costs

Interview with Freeman Dyson One of the world's most respected scientists explains why he rejects climate alarmism

> The Climate Change Scare UN official reveals the real reason behind it

This publication is free. Your donation of \$10 per book (\$20 for three books) will help us recover costs.

Does climate change occur naturally or is it mostly your fault?

## About

The purpose of Grassroots Alberta Citizens Initiative is to promote the responsible and efficient use of tax dollars, and to carry out an educational role with respect to wealth creation and responsible public policy. This publication is a project of Grassroots Alberta Citizens Initiative. See inside back cover for more information.



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Edmonton was under a lake

Saskatoon was covered by a mile of ice

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# The Okotoks Big Rock: Moved by climate change

It's the most prominent mountain peak located entirely within Alberta. Originally, it was called the Mountain of the Great Crossing. The early French traders referred to it as La Montagne de la Grande Traversée. In 1916, the name was changed to Mount Edith Cavell.

Edith Cavell was a British nurse. She worked at a hospital in Brussels during WWI. At the time, Brussels was under German control. As Allied soldiers were wounded, many ended up in Cavell's medical facility. She not only patched them up. She helped them escape.



Mount Edith Cavell is 250-300 miles (350-500 km) northwest of Okotoks, which is interesting because that is where a huge chunk of rock thought to be from Mount Edith Cavell is resting. It's known as the Okotoks erratic, and was moved by climate change that occurred a long time ago.



Cavell was arrested in the summer of 1915 and executed, betrayed by a man she should have been able to trust.

Cavell was arrested in 1915, betrayed by a man she should have been able to trust. She had helped about 60 British and 15 French soldiers escape.

In October 1915, the Germans had Cavell executed by firing squad, turning her into one of the most famous people in the Allied war effort. Following her death, memorials were established all over the world.

Hospitals, streets, care homes, schools, and colleges were named in Cavell's honour. There was even an Edith Cavell postage stamp. In Alberta, we named a mountain after her. The Mountain of the Great Crossing became Mount Edith Cavell.



Mount Edith Cavell is about 60 miles (100 km) southwest of Hinton. It's 250-300 miles (350-500 km) northwest of Okotoks, which is interesting because that is where the Okotoks Big Rock, a huge chunk of rock thought to be from Mount Edith Cavell, is resting.

The Big Rock is an erratic—a rock not native to an area—that has been transported far from its origin by melting glacial ice. Located 7 km west of Ok otoks, it measures 40 metres by 18 metres by 9 metres, and weighs 18,000 tons. It's the largest glacial erratic in the world, and is one of numerous erratics that lie along a narrow strip that stretches from Jasper National Park to Montana.

At one time, Canada's Yukon was one of the few parts of our country not covered with ice. Saskatoon was under a mile of ice. Massive sheets of the stuff stretched as far south as the 38th parallel. Then came climate change. Ice melted. Ocean levels changed. But why?

*Princeton Journal Watch* says the "evidence is strong that ice ages are driven by periodic changes in the amount of sunlight reaching the poles due to changes in the Earth's rotation and orbit."

Princeton indicates that "although the timing of ice ages are best explained by changes in sunlight in the northern part of the globe," warming occurs first in the southern hemisphere, with a corresponding rise of carbon dioxide (CO-2), also seeming to start in the south.<sup>1</sup>

Climate change and global warming are not unique to the planet Earth or to the 21st century. A few years ago, *Live Sci*-



"Anyone who claims that the [climate change] debate is over and the conclusions are firm has a fundamentally unscientific approach to one of the most momentous issues of our time."

— Pål Brekke

Brekke is a solar physicist/astrophysicist whose thesis focused on the sun's ultraviolet (UV) emissions. He was part of science operations at NASA's Goddard Space Flight Center and is a Senior Advisor at the Norwegian Space Centre. He has published dozens of peer-reviewed scientific articles.

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#### Are You Responsible for Climate Change?

*ence* stated, "Earth is heating up lately, but so are Mars, Pluto, and other worlds in our solar system, leading scientists to speculate that a change in the sun's activity is the common thread."<sup>2</sup>

Some politicians and environmentalists insist that the cause of climate change is carbon dioxide alone brought about through the use of fossil fuel.<sup>3</sup>

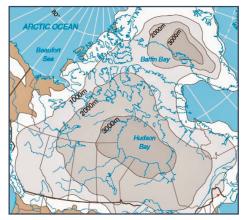
## The Climate Models Are "Full of Fudge Factors"

Recently, the Global Warming Policy Foundation (GWPF) issued a report with a foreword by Freeman Dyson, one of the world's better-known and more famous scientists. Dyson and the report's authors looked at climate change, and in particular at CO-2.<sup>4</sup> They say:

Models used to influence policy on climate change have overestimated the rate of warming, under-estimated direct

benefits of CO-2, overestimated the harm from climate change and underestimated human capacity to adapt so as to capture the benefits.

When journalist Paul Mulshine asked Dyson about climatologists who predict massive warming, Dyson responded, "Their comIPCC's Summary for Policy Makers says the increase between the average temperatures of the 1850–1900 period and the 2003–2012 period is 0.78°C, based on the single longest dataset available.<sup>8</sup>



Canada was covered with massive ice sheets that melted due to climate change long before diesel engines and coal-fired electricity were invented. (The depth of the ice sheets is in metres.) <sup>9</sup>

tween 2000 and 2010—even though human activity poured record amounts of CO-2 into the atmosphere.

According to Mulshine, Dyson is quick to point out that there's more evidence for the beneficial effects of CO-2 than negative effects. "It's certainly true that

> CO-2 is good for vegetation," Dyson said. "About 15 percent of agricultural yields are due to the CO-2 we put in the atmosphere."

Dyson says the problem when talking global warming is that the computer models can't be trusted. They're simply models. He added that the discrepancy be-

puter models are full of fudge factors."5

It's clear that the computer models are wrong, Dyson said, noting that global temperatures were absolutely flat between climate change predicted by computer models and what's actually occurred these past years has been revealing and distinct.

## Climate Change on Mars

Habibullo Abdussamatov, head of space research at Pulkovo Astronomical Observatory, has linked climate change on Mars to fluctuations in the sun's output. He also blames solar fluctuations for Earth's warming. His comments were published by *National Geographic News*.<sup>6</sup>

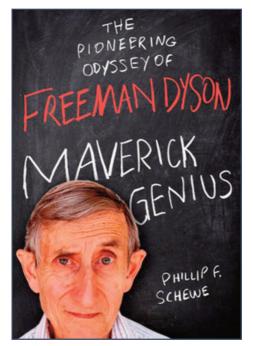
"Man-made greenhouse warming has [made a] small contribution [to] the warming on Earth in recent years, but [it] cannot compete with the increase in solar irradiance," Abdussamatov said. "The considerable heating and cooling on the Earth and on Mars always will be practically parallel."

## Climate Change Is Always Occurring

Climate change is always occurring. According to the National Oceanic and Atmospheric Administration, during the era known as the PETM, the global mean temperature "appears to have risen by as much as 5-8°C (9-14°F) to an average temperature as high as 73°F." (Today's global average is less than 60° F.)<sup>7</sup>

According to the IPCC's Summary for Policy Makers, the total increase between the average temperatures of the 1850–1900 period and the 2003–2012 period is 0.78°C, based on the single longest dataset available.<sup>8</sup>

The University of North Carolina reports that in places such as the U.S. southeast, temperatures are—on average—actually cooler today than they were 100 years ago.<sup>10</sup>



For decades, Dyson has been regarded as one of the world's most important thinkers. He says the computer models that calculate global warming are "full of fudge factors." In an interview with journalist Paul Mulshine, he pointed out how significant it is that as much as 15% of global agricultural production is due to increasing levels of CO-2 in the post-Industrial Revolution era.

Above: Cover of the book *Maverick Genius: The Pioneering Odyssey of Freeman Dyson.* 

- 1 https://blogs.princeton.edu/research/2013/04/30/how-the-ice-ages-ended/
- 2 http://www.livescience.com/1349-sun-blamed-warming-earth-worlds.html
- 3 http://earthguide.ucsd.edu/virtualmuseum/climatechange2/07\_1.shtml
- 4 http://www.thegwpf.org/content/uploads/2015/10/benefits1.pdf
- 5 http://blog.nj.com/njv\_paul\_mulshine/2013/04/climatologists\_are\_no\_einstein.html
- 6 http://news.nationalgeographic.com/news/2007/02/070228-mars-warming.html
- https://www.climate.gov/news-features/climate-qa/whats-hottest-earths-ever-been
   https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIAR5\_SPM\_brochure\_en.pdf
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- 9 Image: Australian Climate Sceptics (http://theclimatescepticsparty.blogspot.ca/) and written-in-stone.blogspot.ca

## World-class scientists: CO-2 is not a pollutant Despite the claims of Premiers Notley and Wynne

In speaking about her climate pact with Premier Kathleen Wynne of Ontario, Rachel Notley said: "Partnerships like these are critical to meeting our shared objectives to reduce carbon pollution."

Clearly, Notley believes carbon dioxide (CO-2) is a pollutant. No small number of academics and world-class scientists would disagree.

Will Happer is an atomic physicist at Princeton and a member of JASON, a small group of elite scientists who advise the U.S. government on matters of science and technology, mostly of a sensitive nature. Happer is also past director of the Office of Science at the U.S. Department of Energy.

Happer says: "We need to be vigilant to keep our land, air, and waters free of real pollution... but carbon dioxide (CO-2) is not one of these pollutants." Testifying before the U.S. Congress, he said: "We try to keep CO-2 levels in our U.S. Navy submarines no higher than 8,000 parts per million, about 20 times current atmospheric levels. Few adverse effects are observed at even higher levels."

Freeman Dyson, like Happer, is one of the elite scientists involved with JASON. For more than four decades, Dyson taught theoretical physics at Princeton's Institute for Advanced



Study, which the *New York Times* called "the most rarefied community of scholars." The *Times* says Dyson is "a scientist whose intelligence is revered" even by scientists.

Dyson says: "The idea that global warming is the most important problem facing the world is total nonsense and is doing a lot of harm."

Nobel Prize-winning physicist Ivar Giaever calls climate change alarmism a new religion. He said: "In the last 100 years... temperatures [have] gone up 0.8 degrees C and everything... has gotten better. So how can [we] say it's going to get worse when we have the evidence? We live longer, [have] better health, and better everything. But if it goes up another 0.8 degrees C we are going to die, I guess."

There are environmental organizations that share the perspective of these scientists. The group "Plants Need CO-2" is

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One thing you should not do is confuse pollution with CO2—CO2 is not pollution.

Ivar Giaever, Nobel
 Prize-winning physicist

big on exploding pollution myths about wetlands and plant life. The group, headed by the past chair of the National Wetlands Coalition and twice chair of the Audubon Nature Institute, says it's false to say that CO-2 is a pollutant.

The "Plants Need CO-2" group says that there are 20+ factors driving climate change, and that the empirical evidence (as opposed to computer climate models) indicates CO-2 is not a major driver of that change. Historically, rising CO-2 levels do not precede changes in temperature, the group says. Instead, rising

CO-2 levels follow temperature change.

Government agencies and Premier Notley may refer to CO-2 as a pollutant, but the undeniable fact is that CO-2 is not a pollutant, but a life-giving gas. Without it, our planet would be dead.

by Kevin Avram

## Landowners: You'll want to consider the steel and concrete associated with wind turbines

Many landowners who accept wind turbines on their property don't necessarily think through what the remediation process is going to involve, or what the impact might be long term.

The bases of these big wind turbines can be massive. The online web story accompanying the photo on the right said: "The construction of one typical turbine involves the use of heavy equipment to create roads to the site; dig a hole 10 feet deep and 100 feet wide. Into this are deposited 53 truckloads of concrete and 96,000 lbs of steel rebar."



Base sizes vary, but do require vast quantities of steel and concrete.

In other words, once the turbine is removed in 15, 20, or 25 years, what will happen to the 96,000 pounds of steel and the rock-solid 53 truckloads of concrete that make up the base?

# Leading thinkers and scientists speak out against climate change alarmism

The following quotes and comments are taken from a report assembled by the U.S. Senate Environment and Public Works Committee. The report is a compilation of statements and observations made by hundreds of prominent scientists and leading academics. (The full report is at: GrassrootsAlberta.ca)

## Frailty of Models



"Since I am no longer affiliated with any organization nor receiving any funding, I can speak quite frankly... As a scientist I remain skeptical...

"The main basis of the claim that man's release of greenhouse gases is the cause of the warming is based almost entirely upon climate models. We all know the frailty of models concerning the air-surface system."

(Atmospheric scientist Dr. Joanne Simpson, the first woman in the world to receive a Ph.D. in meteorology, formerly of NASA, who has authored more than 190 studies and has been called "among the most preeminent scientists of the last 100 years.")

## Not Very Scientific



"Anyone who claims that the debate is over and the conclusions are firm has a fundamentally unscientific approach to one of the most momentous issues of our time."

(Solar physicist Dr. Pål Brekke, senior advisor to the Norwegian Space Centre in Oslo. Brekke has published more than 40 peer-reviewed scientific articles on the sun and solar interaction with the Earth.)

## Where Are the Real Measurements?



"So far, real measurements give no ground for concern about a catastrophic future warming."

(Scientist Dr. Jarl R. Ahlbeck, a chemical engineer at Abo Akademi University in Finland, author of 200 scientific publications.)

## People Will Feel Deceived When They Find Out the Truth



"[Warming fears are the] worst scientific scandal... When people come to know what the truth is, they will feel deceived by science and scientists."

(UN IPCC Japanese scientist Dr. Kiminori Itoh, an award-winning Ph.D. environmental physical chemist.)

## Not Just a Fringe



"It is a blatant lie put forth in the media that makes it seem there is only a fringe of scientists who don't buy into anthropogenic global warming."

[U.S. government atmospheric scientist Stanley B. Goldenberg of the Hurricane Research Division of National Oceanic and Atmospheric Administration (NOAA).]

## Thinkers and scientists on climate change Cont'd

#### **Political Tool**



"The 'global warming scare' is being used as a political tool to increase government control over American lives, incomes, and decision-making."

(Award-winning NASA astronaut/geologist and moonwalker Jack Schmitt who flew on the Apollo 17 mission, formerly of the Norwegian Geological Survey and the U.S. Geological Survey.)

## Atmospheric Hot Spot Is Missing



"I have yet to see credible proof of carbon dioxide driving climate change, yet alone man-made CO-2 driving it. The atmospheric hot-spot is missing and the ice core data

refute this. When will we collectively awake from this deceptive delusion?"

[Dr. G. LeBlanc Smith, a retired Principal Research Scientist with Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO).]

## **Rejects Alarmist View**



"The Earth's temperature rose by 0.7 per cent in the 20th century, but there was also an increase in piracy. Does that mean piracy causes global warming?"

"There is new work emerging... that shows we can have a very close correlation between the temperatures of the Earth and supernova and solar radiation. We geologists have seen climate change for 4500 million years. Tell us something new."

(Prize-winning geologist Dr. Ian Plimer is a professor of Earth and Environmental Sciences at the University of Adelaide in Australia.)

## **Opaque Verbiage**



"Once one gets past the opaque verbiage... it is clear that most of the negative impacts listed... are overstated, while the positive impacts are understated."

[Indur M. Goklany, Ph.D., who has represented the United States at the International Panel on Climate Change and in the negotiations leading to the United Nations Framework Convention on Climate Change, also scrutinized the UN's IPCC Summary for Policymakers (SPM) released in 2007.]

## The Benefits of Warmth



"I don't argue that we're having global warming, but I find the effects are going to be small."

"Americans in particular will benefit from a warmer climate in many ways, including longer growing seasons and reduced heating costs."

(Global warming author and economist Dr. Thomas Gale Moore is a former professor at Michigan State University, a senior fellow at the Hoover Institute, and author of the book *Climate of Fear: Why We Shouldn't Worry about Global Warming.*)

## Asinine Comments



"After reading [UN IPCC chairman] Pachauri's asinine comment [comparing skeptics to] Flat Earthers, it's hard to remain quiet."

(Climate statistician Dr. William M. Briggs, who specializes in the statistics of forecast evaluation, serves on the American Meteorological Society's Probability and Statistics Committee, and is an Associate Editor of *Monthly Weather Review*.)

## Climate Models Unreliable



"Gore prompted me to start delving into the science again and I quickly found myself solidly in the skeptic camp... Climate models can at best be useful for explain-

ing climate changes after the fact."

(Meteorologist Hajo Smit of Holland, who reversed his belief in man-made warming to become a skeptic, is a former member of the Dutch UN IPCC committee.)

## Natural Circulation



"The quantity of CO-2 we produce is insignificant in terms of the natural circulation between air, water and soil...

"I am doing a detailed assessment of the UN IPCC reports and the Summaries for Policy Makers, identifying the way in which the Summaries have distorted the science."

(South African nuclear physicist and chemical engineer Dr. Philip Lloyd, a UN IPCC co-coordinating lead author who has also authored over 150 refereed publications.)

## Ideology to Promote Social Control



"Creating an ideology pegged to carbon dioxide is a dangerous nonsense."

"The present alarm on climate change is an instru-

ment of social control, a pretext for... political battle. It became an ideology, which is concerning."

(Environmental scientist Delgado Domingos, the founder of the Numerical Weather Forecast group, has more than 150 published articles.)

## It's About Control and Fear



"CO-2 emissions make absolutely no difference one way or another."

"Global warming, as a political vehicle, keeps Europeans

in the driver's seat and developing nations walking barefoot."

(Dr. Takeda Kunihiko, vice-chancellor of the Institute of Science and Technology Research at Chubu University in Japan.)

## Scaremongering



"The [global warming] scaremongering has its justification in the fact that it is something that generates funds."

(Award-winning paleontologist Dr. Eduardo Tonni of the Committee for Scientific Research in Buenos Aires and head of the Paleontology Department at the University of La Plata.)

## Thinkers and scientists on climate change Cont'd

#### A lot of Inaccuracies



Geologist Dr. Don Easterbrook chastised Al Gore for his scientific inaccuracies.

"There are a lot of inaccuracies in the statements we are

seeing, and we have to temper that with real data," Easterbrook said in a *New York Times* article.

"[Easterbrook] hotly disputed Mr. Gore's claim that 'our civilization has never experienced any environmental shift remotely similar to this threatened change.

"Nonsense,' Dr. Easterbrook told the crowded session. He flashed a slide that showed temperature trends for the past 15,000 years. It highlighted 10 large swings, including the medieval warm period.

"These shifts, he said, were up to '20 times greater than the warming in the past century.'

In another interview, Easterbrook said: "The validity of a scientific concept is not a matter of how many people vote for it or against it.

"It's a matter of the evidence upon which it's based. And the truth is there is no real tangible evidence of the connection between CO-2 and global warming."

(Geologist Dr. Don J. Easterbrook, Emeritus Professor at Western Washington University, who has authored eight books and 150 journal publications.)

### There's No Catastrophe Developing



"The climate cannot be predictably managed with such [emission reduction] proposals given the uncertainty of natural variations. For example, to make a 10 percent

dent in CO-2 would require 1000 nuclear power plants and this would still not make a measurable difference on whatever the climate will do anyway."

"I don't see a catastrophe developing from our emissions into the air of what should be correctly identified as 'plant food.""

"I'm full of optimism about the continued growth of wealth and health around the world. This wealth will create cleaner environments even in countries where persistent poverty has destroyed too much habitat and fouled too many rivers."

(Alabama State climatologist Dr. John Christy of the University of Alabama in Huntsville, formerly of NASA, served as a UN IPCC lead author in 2001 for the 3rd assessment report and detailed how he witnessed scientists distorting the science.)

#### Weak Arguments



"Many distinguished scientists refuse to participate in the IPCC process, and others have resigned from it, because in the end the advice that the panel provides to governments is political and not scientific.

### Are You Responsible for Climate Change?

## "Although at least \$50 billion has been spent on climate research, the science arguments for a dangerous human influence on global warming have, if anything, become weaker since the establishment of the IPCC in 1988."

"For more than 90 per cent of recent geological time, the cores show that the earth has been colder than today.

"We modern humans are lucky to live towards the end of the most recent of the intermittent, and welcome, warm interludes. It is a 10,000-year-long period called the Holocene, during which our civilizations have evolved and flourished.

"Similar cores through polar ice reveal, contrary to received wisdom, that past temperature changes were followed not preceded, but followed—by changes in the atmospheric content of carbon dioxide. Yet the public now believes strongly that increasing human carbon dioxide emissions will cause runaway warming."

(Paleoclimate scientist Dr. Bob Carter of Australia's James Cook University and former chairman of the earth science panel of the Australian Research Council.)

## The Misinformation Army



"Al Gore brought me back to the battle and prompted me to do renewed research in the field of climatology. And because of all the misinformation that Gore and

his army have been spreading about climate change I have decided that 'real' climatologists should try to help the public understand the nature of the problem. I hope by writing a book that I have contributed to the effort to combat the 'alarmists' who are trying to harm this country."

(Climatologist Robert Durrenberger, past president of the American Association of State Climatologists.)

## Subverting Public Understanding



"I fear that attempts are being made to purposefully subvert the public understanding of the nature of science in order to achieve political goals."

"Science is not about consensus, and to invoke this raises the hackles of scientists such as myself. The lure of politics and publicity is no doubt seductive, but it nevertheless amazes me that so many scientists have jumped on the bandwagon of consensus science, apparently forgetting or ignoring the sad history of consensus science."

(Space physicist Dr. James Wanliss of Embry-Riddle Aeronautical University received a prestigious award from the National Science Foundation.)

## Climate Fears Are Unfounded



"People should not allow themselves to be deluded by the computer-modeled speculation with which they are bombarded in the news media these days."

(Atmospheric scientist Dr. Augie Auer of the New Zealand Climate Science Coalition, former professor at the University of Wyoming, and former Met Service chief meteorologist.)

## Drumbeats of False Alarm



"In point of fact, the hypothesis that solar variability and not human activity is warming the oceans goes a long way to explain the puzzling idea that the Earth's surface

may be warming while the atmosphere is not. The GHG (greenhouse gas) hypothesis does not do this."

"The public is not well served by this constant drumbeat of false alarms... manipulated by advocates."

(Dr. David Wojick is a UN IPCC expert reviewer who earned his Ph.D. in Philosophy of Science and co-founded the Department of Engineering and Public Policy at Carnegie-Mellon University.)

## Natural Origin



"The temperature increase has a pronounced natural origin and is not determined by the 'greenhouse effect' of greenhouse gases."

"Even if the concentration of 'greenhouse gases' double, man would not perceive the temperature impact."

"The real causes of climate change lie in the unevenness of the sun's radiation, in the precession (amendment of the rotational axis) of the earth, in the instability of the ocean currents in the periodic desalination and salinity of surface waters... The main causes of which are the solar activity and the luminosity. The higher these parameters, the higher the temperature."

[Russian scientist Dr. Oleg Sorochtin (name also sometimes translated to spell Soroktin) of the Insti-

tute of Oceanology at the Russian Academy of Sciences has authored more than 300 studies, nine books, and a paper titled *The Evolution and the Prediction of Global Climate Changes on Earth*. Sorochtin, who made several Antarctic expeditions, rejected man-made climate fears.]

## Scare Tactics



"The best measurements of sea level rise are from satellite instruments called altimeters. Currently they measure 14 inches in 100 years. Everyone agrees that

there is no acceleration. Even the UN IPCC quotes this... If you increase the rate of rise by four times, it will take 146 years to rise to five feet. Sea level rise is the 'scare tactic' for these guys."

(State of Florida climatologist Dr. Jim O'Brien, professor emeritus of Florida State University, who serves as the director of the Center for Ocean-Atmospheric Prediction Studies.)

## It's Politics



"The claims of the IPCC are dangerous unscientific nonsense."

"The [IPCC] 'Summary for Policymakers' might get a

few readers, but the main purpose of the report is to provide a spurious scientific backup for the absurd claims of the worldwide environmentalist lobby that it has been established scientifically that increases in carbon dioxide are harmful to the climate. It just does not matter that this ain't so."

(Dr. Vincent Gray of New Zealand, IPCC reviewer, climate researcher, and scientist.)

#### Are You Responsible for Climate Change?

## Who is Freeman Dyson

F reeman Dyson is a scientist of enormous stature. For more than four decades, he taught theoretical physics at Princeton's Institute for Advanced Study—described by the *New York Times* as "the most rarefied community of scholars" in the U.S.

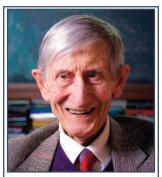
The *Times* says Dyson is "a scientist whose intelligence is revered by other scientists." One colleague

describes him as "infinitely smart." Another says: "You point Freeman at a problem and he'll solve it. He's extraordinarily powerful."

Dyson is also a longstanding member of JASON—"a small government-financed group of the country's finest scientists" that evaluates matters of an often classified nature. At JASON meetings, in which everyone present is considered brilliant, reports the *Times*, someone will idly pose a math question and Dyson will quickly provide an answer, pointing out that "the smallest such number is 18 digits long."

In the words of one of Dyson's colleagues, "When this happened one day at lunch, the table fell silent; nobody had the slightest idea how Freeman could have known such a fact or... could have derived it in about two seconds."

Dyson, who has written several books and received numerous awards (includ-



A former colleague of Einstein's, Freeman Dyson is considered by many to be one of the most brilliant men in the world.

ing 21 honorary degrees), is a big-picture thinker. The *Times* says he's known for his "penetrating ability to grasp the method and significance of what many kinds of scientists do."

For the past four years, Dyson has challenged prevailing ideas about climate change. He thinks the computer-generated climate models are flawed

because scientists have too little information about the variables.

## Dyson on Climate Change

"The idea that global warming is the most important problem facing the world is total nonsense and is doing a lot of harm."

"The average ground temperature of the Earth is impossible to measure since most of the Earth is ocean... So this average ground temperature is a fiction."

"Just because you see pictures of glaciers falling into the ocean doesn't mean anything bad is happening... It's part of the natural cycle of things."

"Computer models of the climate... [are] a very dubious business if you don't have good inputs."

"It makes very little sense to believe the output of the climate models."

"When I listen to the public debates about climate change, I am impressed by... the superficiality of our theories."

Dyson bio from NoConsensus.org

## Grassroots Alberta on Facebook

The following two pages are adapted from Grassroots Alberta's Facebook page

## Hacked Emails

Bill Whittle is a writer, commentator, and journalist who wonders why university professors who champion climate alarmism feel they have to "massage" the way they present what they're doing.

Whittle points to hacked emails from the University of East Anglia in Norwich, England, which is a flagship facility for the proponents of climate change alarm. The story of these hacked emails was reported all over the world, including in the *UK Telegraph*.

Phil Jones, head of the Climatic Research Unit, is a professor from East Anglia featured in the *Telegraph's* report on "hacked" emails. The quotes below and the short commentary following each of the hacked emails are excerpted directly from the *Telegraph* article:

From: Phil Jones. To: Many

"I've just completed Mike's Nature [the science journal] trick of adding in the real temps to each series for the last 20 years (ie, from 1981 onwards) and from 1961 for Keith's to hide the decline." (Critics cite this as evidence that data was manipulated to mask the fact that global temperatures are falling. Prof. Jones claims the meaning of "trick" has been misinterpreted.)

From Phil Jones. To: Michael Mann [Pennsylvania State University]

"I can't see either of these papers being in the next IPCC report. Kevin and I will keep them out somehow — even if we have to redefine what the peer-review literature is!" (The IPCC is the UN body charged with monitoring climate change. The scientists did not want it to consider studies that challenge the view that global warming is genuine and man-made.)

From: Kevin Trenberth [US National Center for Atmospheric Research]. To: Michael Mann

"The fact is that we can't account for the lack of warming at the moment and it is a travesty that we can't... Our observing system is inadequate."



"As it now stands, politicians are throwing money that they do not have... in order to finance solutions that make no difference.

"The time has come to call a halt to this nonsense and focus on real issues that pose real dangers. In a world beset by war, terrorism, and continuing third-world poverty, there are far more important things on which political leaders need to focus."

— Michael Hart

Canadian emeritus professor and author of the book, *Hubris: The Troubling Science, Economics, and Politics of Climate Change* 



Visit us on Facebook

Bill Whittle is a political commentator, director, screenwriter, editor, author, and pilot. He is best known for his PJ Media internet videos and short films.

#### More About Wind Turbines in Ontario

(From Blackburn News, a network of local newsrooms in southwestern and midwestern Ontario)

Former banker Warren Howard reminds landowners to learn more about the [wind turbine] lease before signing. "Make sure you talk to your lawyer and get him to explain the details of the contract.... Don't get surprised on these things. You don't just say, 'Oh yes, that sounds like a good idea,' and sign away the land for 20 years. Which is what happened in Elma Mornington in most cases," says Howard. Howard says farmers who sign leases are essentially surrendering control of their entire farm for the next 20 years to the wind company. He adds



the lease allows them "to enter the farm, any part of the farm... WPD gets to say where the wind turbines go and there's absolutely no consultation with the landowners."

He says the lease is registered on title, which may prevent farmers from using their land to get credit to run the farm operation. Howard says decommissioning a wind turbine is the landowners' problem and can cost upwards of \$1 million. So \$20,000 a year and a \$100,000 letter of credit will not cover it. Howard says once coal was eliminated, Ontario's mostly nuclear- and hydro-based power system was very clean and green. But he says according to the society of professional engineers, the province must increase greenhouse gas-producing natural gas production to back up all wind/solar power added to the system.

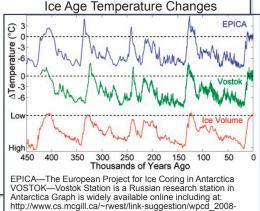
## The Climate Is Always Changing

The climates of the earth have always been changing, and they will doubtless continue to do so in the future. How large these future changes will be, and where and how rapidly they will occur, we do not know.\*

In the more distant past, there have been major shifts in climate, such as the Little Ice Age from 1300 to 1850. Over that period, average temperatures dropped some three degrees. Winters were harsh and summers short in North America, Eurasia, and some regions of the southern temperate zone. In medieval times, a warming from 900 to 1300 led to the Norse settlement of Iceland and Greenland and visits to North America.

\*Statements made by the U.S. National Academy of Sciences, and quoted in the U.S. Congressional Record (Senate) V 149 PT 15.

SOURCE: http://www.cs.mcgill.ca/~rwest/link-suggestion/ wpcd\_2008-09\_augmented/wp/i/Ice\_age.htm



09 augmented/wp/i/Ice age.htm

## If You Are Wondering What the Federal Government Did With the Income Tax You Paid Last Year

Canada committed \$22.6 million to support African scientists on climate change solutions.

Marie-Claude Bibeau, Minister of International Development and La Francophonie, announced on Wednesday, August 31, 2016, that Canada will contribute \$22.6 million over five years to... train African mathematical scientists to develop climate change adaptation and mitigation solutions.



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# NASA's CO-2 stance blasted by 49 scientists and astronauts who worked there

More than one online news story has wondered if NASA is playing fast and loose with climate change science, which has been the contention of a group of 49 former NASA scientists and astronauts.

The group sent a letter to NASA administrator Charles Bolden Jr., blasting the agency for making unwarranted claims about the role of carbon dioxide in global warming, Business Insider reported.

"We believe the claims by NASA and GISS [NASA

Goddard Institute for Space Studies], that man-made carbon dioxide is having a catastrophic impact on global climate change are not substantiated, especially when considering thousands of years of empirical data," the group wrote.

"With hundreds of well-known climate scientists and tens of thousands of other scientists publicly declaring their disbelief in the catastrophic forecasts, coming particularly from the GISS leadership, it is clear that the science is NOT settled."

The group features some marquee names, including Michael F. Collins, Walter Cunningham, and five other Apollo astronauts, as well as two former directors of NASA's Johnson Space Center in Houston.



Image (above): Astronaut Michael F. Collins



The letter included a request for NASA to refrain from mentioning CO-2 as a cause of global warming in future press releases and websites. The agency's "Global Climate Change" web page says, "Humans have increased atmospheric CO-2 concentration by a third since the Industrial Revolution began."

(The letter is online at: WattsUpWithThat.com.)

Image left: Dr. Donald Bogard was a Principal Investigator at NASA's Science Directorate (Johnson Space Center). Other signatories

of the letter included Dr. Christopher Kraft, Director of Johnson Space Center; Dr. Henry Decell, Chief, Theory & Analysis Office; Dr. Phillip Chapman, scientist, astronaut; and Jerry Bostick, Principal Investigator, Science Directorate.



The group sent a letter to NASA administrator Charles Bolden Jr., blasting the agency for making unwarranted claims about the role of carbon dioxide in global warming.

Are You Responsible for Climate Change?

#### Page 17

## The climate models failed miserably

Dr. Roy W. Spencer, Ph.D. (meteorology) is a Principal Research Scientist at the University of Alabama at Huntsville. He was a Senior Scientist for Climate Studies at NASA, where he and Dr. John Christy received NASA's Exceptional Scientific Achievement Medal for their global temperature monitoring work with satellites. Spencer's work with NASA continues as the U.S. Science Team leader for the Advanced Microwave Scanning Radiometer flying on NASA's Aqua satellite. Spencer maintains an informative climate blog. The following is an excerpt:

I'm seeing a lot of wrangling over the recent... pause in global average warming... when did it start, is it a full pause, shouldn't we be taking the longer view, etc. These are all interesting exercises, but they miss the most important point: the climate



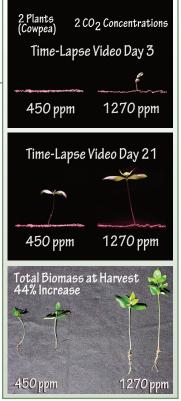
models that governments base policy decisions on have failed miserably.

I've updated our comparison of 90 climate models versus observations for global average surface temperatures through 2013, and we still see that >95% of the models have over-forecast the warming trend since 1979, whether we use their own surface temperature dataset (HadCRUT4), or our satellite dataset of lower tropospheric temperatures (UAH). (See: www.drroyspencer.com)

## The impact of CO-2 on plant growth

R achel Notley claims CO-2 is pollution. In these images, we see the exact impact of Notley's "pollution" (CO-2) on plant growth. As reported elsewhere, prominent scientists like Princeton's Freeman Dyson (a scientist of enormous stature) say if it weren't for slightly elevated levels of CO-2, the world's food supply would be in trouble. In an interview with Paul Mulshine of the *Star Ledger*, Dyson said: "It's certainly true that carbon dioxide is good for vegetation. About 15% of agricultural yields are due to CO-2 we put in the atmosphere. From that point of view, it's a real plus to burn coal and oil."

The photos are from a video produced by the Center for the Study of Carbon Dioxide and Global Change. They reveal comparative growth when exposed to 450 parts per million (PPM) of carbon dioxide compared to 1270 ppm of carbon dioxide. (Actual current CO-2 levels are just over 400 ppm.) The Center's website is accessed at: http://www.co2science.org/index.php



## A climate of fear, cash, and correctitude

E arth's geological, archaeological, and written histories are replete with climate changes: big and small, short and long, benign, beneficial, catastrophic, and everything in between. The Medieval Warm Period (950-1300 AD or CE) was a boon for agriculture, civilization, and Viking settlers in Greenland.

The Little Ice Age that followed (1300-1850) was calamitous, as were the Dust Bowl and the extended droughts that vanquished the Anasazi and Mayan cultures.

Repeated Pleistocene Epoch ice ages covered much of North America, Europe, and Asia under mile-thick ice sheets that denuded continents, stunted plant growth, and dropped ocean levels 400 feet for thousands of years.

Modern environmentalism, coupled with fears first of global cooling and then of global warming, persuaded politicians to launch the Intergovernmental Panel on Climate Change.

Its original goal was to assess possible human influences on global warming and potential risks of human-induced warming. However, it wasn't long before the Panel minimized, ignored, and dismissed non-human factors to such a degree that its posture became the mantra that only humans are now affecting climate. Over the last three decades, five IPCC "assessment reports," dozens of computer models, scores of conferences, and thousands of papers focused almost entirely on human fossil fuel use



Repeated Pleistocene Epoch ice ages covered much of North America, Europe, and Asia under massive ice sheets that denuded continents, stunted plant growth, and dropped ocean levels 400 feet for thousands of years.

and carbon dioxide/greenhouse gas emissions as being responsible for "dangerous" global warming, climate change, climate "disruption," and almost every "extreme" weather or climate event.

Taxpayers alone are providing billions of dollars annually for research focused on human factors, through the EPA [Environmental Protection Agency] and other government agencies. The universities and other institutions routinely take 40% or more off the top for "project management" and "overhead."

None of them wants to derail that gravy train, and all fear that accepting grants to study natural factors... would imperil funding from sources that have ideological, political, or crony corporatist reasons for making grants tied to manmade warming.

Excerpted from "A Climate of Fear, Cash, and Correctitude" by Paul Driessen and Dennis Mitchell, Committee for a Constructive Tomorrow (CFACT). CFACT is a leading source of constructive debate on issues related to the environment, climate, and legislative policies that shape the quality of our lives. See: www.cfact.org.

## The myth of the climate change '97%'

J ohn Cook, an Australia-based blogger, and some of his friends reviewed abstracts of peer-reviewed papers published from 1991 to 2011. Mr. Cook reported that 97% of those who stated a position explicitly or implicitly suggest that human activity is responsible for some warming. His findings were published in Environmental Research Letters.

Cook's work was quickly debunked. In *Science & Education* in August 2013, for example, David Legates (a professor of geography at the University of Delaware and former director of its Center for Climatic Research) and three coauthors reviewed the same papers as Cook and found that only: "0.3 percent



of all 11,944 abstracts or 1.0 percent of the 4,014 expressing an opinion, and not 97.1 percent—had been found to endorse" the claim that human activity is causing most of the current warming.

Excerpted from the *Wall Street Journal*, "The Myth of the Climate Change '97%'" by Joe Bast, president of the Heartland Institute, and Dr. Roy Spencer, a principal research scientist at the University of Alabama, and the U.S. Science Team leader for the Advanced Microwave Scanning Radiometer on NASA's Aqua satellite.

## Who are the real deniers of science



S cience is the language of facts, and when people pretend to be speaking it, they're not only claiming that their preferences are

more than mere opinions, they're also insinuating that anyone who disagrees is a fool for objecting to "settled science."

Scientists are constantly questioning their understanding of things; that is what science does. All the great scientists of history are justly famous for overturning the assumptions of their fields.

The real problem is that in politics, invocations of science are very often marketing techniques masquerading as appeals to irrefutable authority.

I'm not saying that you can't have science in your corner, or that lawmakers shouldn't look to science when making policy. (Legislation that rejects the existence of gravity makes for very silly laws indeed.)

But the real intent behind so many claims to "settled science" is to avoid having to make your case. It's an undemocratic technique for delegitimizing opposing views and saying "shut up" to dissenters.

Excerpted from "Who are the Real Deniers of Science" by Jonah Goldberg, senior editor at *National Review*. See: http://www.nationalreview.com/

## NASA establishes connection between the sun and climate change in old Nile river records

lmost ten years ago, NASA announced that it had found a link between the sun and climate change. The report said that direct measurements of light energy emitted by the sun (taken by satellites and other modern scientific techniques) suggest the sun's activity influences Earth's long-term climate. There were no measured climate records of this type until the relatively recent scientific past.



A group of NASA and university scientists found a convincing link between long-term solar and climate variability in a unique and unexpected source: directly measured ancient water level records of the Nile, Earth's longest river.

According to NASA, scientists have traditionally relied upon indirect data gathering methods to study climate in the Earth's past, such as drilling ice cores in Greenland and Antarctica. Such samples of accumulated snow and ice drilled from deep within ice sheets or glaciers contain trapped air bubbles whose composition can provide a picture of past climate conditions.

Now, however, a group of NASA and university scientists has found a convincing link between long-term solar and climate variability in a unique and unexpected source: directly measured ancient water level records of the Nile, Earth's longest river.

Alexander Ruzmaikin and Joan Feynman of NASA's Jet Propulsion Laboratory, Pasadena, Calif., together with Dr. Yuk Yung of the California Institute of Technology, have analyzed Egyptian records of annual Nile water levels collected between 622 and 1470 A.D. at Rawdah Island in Cairo.

These records were then compared to another well-documented human record from the same time period: observations of the number of auroras reported per decade in the Northern Hemisphere.

Auroras are bright glows in the night sky that happen when mass is rapidly ejected from the sun's corona, or following solar flares. They are an excellent means of tracking variations in the sun's activity.

"Since the time of the pharaohs, the water levels of the Nile were accurately measured, since they were critically important for agriculture and the preservation of temples in Egypt," Feynman said. "These records are highly accurate and were obtained directly, making them a rare and unique resource for climatologists to peer back in time."

NASA says the researchers found clear links between the sun's activity and climate variations. The Nile water levels and aurora records had two somewhat regularly occurring variations in common—one with a period of about 88 years and the second with a period of about 200 years.

The researchers said the findings have climate implications that extend far beyond the Nile River basin.

So what causes these cyclical links between solar variability and the Nile? The authors suggest that variations in the sun's ultraviolet energy cause adjustments in a climate pattern called the Northern Annular Mode, which affects climate in the atmosphere of the Northern Hemisphere during the winter.

At sea level, this mode becomes the North Atlantic Oscillation, a large-scale seesaw in atmospheric mass that affects how air circulates over the Atlantic Ocean.

During periods of high solar activity, the North Atlantic Oscillation's influence extends to the Indian Ocean. These adjustments may affect the distribution of air temperatures.

The original web posting to which this article refers can be seen at: http://www.jpl.nasa.gov/news/ news.php?feature=1319

## Dr. Patrick Moore



Dr. Patrick Moore has been a leader in the international environmental field for over 40 years. He is a cofounder of Greenpeace and served for nine years as president of Greenpeace Canada

and seven years as a director of Greenpeace International. As the leader of many campaigns, Dr. Moore was a driving force shaping policy and direction for 15 years while Greenpeace became the world's largest environmental activist organization.

In recent years, Dr. Moore has focused on the promotion of sustainability and consensus building among competing concerns. He was a member of British Columbia's government-appointed Round Table on the Environment and Economy from 1990-1994. In 1990, Dr. Moore founded and chaired the BC Carbon Project, a group that worked to develop a common understanding of climate change.

I am skeptical humans are the main cause of climate change and that it will be catastrophic in the near future. There is no scientific proof of this hypothesis, yet we are told "the debate is over" and "the science is settled."

Continued on next page

#### Continued from previous page



IPCC has a hopeless conflict of interest. Its mandate is to consider only the human causes of global warming, not the many natural causes changing the climate for billions of years. If the IPCC panelists and members did not find humans were the cause of warming, they'd all be out of a job.

My skepticism begins with the believers' certainty they can predict the global climate with a computer model. The entire basis for the doomsday climate change scenario is the hypothesis increased atmospheric carbon dioxide due to fossil fuel emissions will heat the Earth to unlivable temperatures.

In fact, the Earth has been warming very gradually for 300 years, since the Little Ice Age ended, long before heavy use of fossil fuels. Prior to the Little Ice Age, during the Medieval Warm Period, Vikings colonized Greenland and Newfoundland, when it was warmer there than today. And during Roman times, it was warmer, long before fossil fuels revolutionized civilization.

The idea it would be catastrophic if carbon dioxide were to increase and average global temperature were to rise a few degrees is preposterous.

Recently, the Intergovernmental Panel on Climate Change (IPCC) announced for the umpteenth time we are doomed unless we reduce carbon-dioxide emissions to zero. Effectively this means either reducing the population to zero, or going back 10,000 years before humans began clearing forests for agriculture. This proposed cure is far worse than adapting to a warmer world, if it actually comes about.

## IPCC Conflict of Interest

By its constitution, the IPCC has a hopeless conflict of interest. Its mandate is to consider only the human causes of global warming, not the many natural causes changing the climate for billions of years. We don't understand the natural causes of climate change any more than we know if humans are part of the cause at present. If the IPCC did not find humans were the cause of warming, or if it found warming would be more positive than negative, there would be no need for the IPCC under its present mandate. To survive, it must find on the side of the apocalypse. The IPCC should either have its mandate expanded to include all causes of climate change, or it should be dismantled.

## **Political Powerhouse**

Climate change has become a powerful political force for many reasons. First, it is universal; we are told everything on Earth is threatened. Second, it invokes the two most powerful human motivators: fear and guilt. We fear driving our car will kill our grandchildren, and we feel guilty for doing it.

Third, there is a powerful convergence of interests among key elites that support the climate "narrative." Environmentalists spread fear and raise donations; politicians appear to be saving the Earth from doom; the media has a field day with sensation and conflict; science institutions raise billions in grants, create whole new departments, and stoke a feeding frenzy of scary scenarios; business wants to look green, and get huge public subsidies for projects that would otherwise be economic losers, such as wind farms and solar arrays. Fourth, the Left sees climate change as a perfect means to redistribute wealth from industrial countries to the developing world and the UN bureaucracy.

So we are told carbon dioxide is a "toxic" "pollutant" that must be curtailed, when in fact it is a colorless, odorless, tasteless gas and the most important food for life on earth. Without carbon dioxide above 150 parts per million, all plants would die.

## Human Emissions Saved Planet

Over the past 150 million years, carbon dioxide had been drawn down steadily



"Environmentalists spread fear and raise donations; politicians appear to be saving the Earth from doom; the media has a field day with sensation and conflict; science institutions raise billions in grants, create whole new departments, and stoke a feeding frenzy of scary scenarios." - Patrick Moore

(by plants) from about 3,000 parts per million to about 280 parts per million before the Industrial Revolution. If this trend continued, the carbon dioxide level would have become too low to support life on Earth. Human fossil fuel use and clearing land for crops have boosted carbon dioxide from its lowest level in the history of the Earth back to 400 parts per million today.

At 400 parts per million, all our food crops, forests, and natural ecosystems are still on a starvation diet for carbon dioxide. The optimum level of carbon dioxide for plant growth, given enough water and nutrients, is about 1,500 parts per million, nearly four times higher than today. Greenhouse growers inject carbon dioxide to increase yields. Farms and forests will produce more if carbon dioxide keeps rising.

We have no proof increased carbon dioxide is responsible for the Earth's slight warming over the past 300 years. Carbon dioxide is vital for life on Earth and plants would like more of it. Which should we emphasize to our children?

## Celebrate Carbon Dioxide

The IPCC's followers have given us a vision of a world dying because of carbon-dioxide emissions. I say the Earth would be a lot deader with no carbon dioxide, and more of it will be a very positive factor in feeding the world. Let's celebrate carbon dioxide.

## Carbon Dioxide Is Not a Pollutant

Astute Bloggers is a website that has won many awards. Its byline reads: "Dedicated to exposing disinformation and propaganda." The site addresses the issue of carbon dioxide by stating:

The fact is that CO-2 is not a pollutant. CO-2 is a colorless and odorless gas, exhaled at high concentrations by each of us, and a key component of the biosphere's life cycle. Plants do so much better with more CO-2 that greenhouse operators often increase the CO-2 concentrations by factors of three or four to get better growth.

Although the number of publicly dissenting scientists is growing, many young scientists furtively say that while they have serious doubts about the global-warming message, they are afraid to speak up for fear of not being promoted—or worse.

This is not the way science is supposed to work, but we have seen it before—for example, in the frightening period when Trofim Lysenko hijacked biology in the Soviet Union. Soviet biologists who revealed that they believed in genes, which Lysenko maintained were a bourgeois fiction, were fired from their jobs. Many were sent to the gulag.



Trofim Lysenko rose to dominance after delivering a passionate speech denouncing the deniers of politically approved scientific theories as "reactionary and decadent." He stated that such people were "enemies of the Soviet people." Because

of Lysenko many real scientists and geneticists in Russia were sent to gulags or disappeared.

Printed with permission from the Heartland Institute. The original web posting is available at: https://www.heartland.org/news-opinion/news/whyi-am-a-climate-change-skeptic

## The UN IPCC's competing graphs

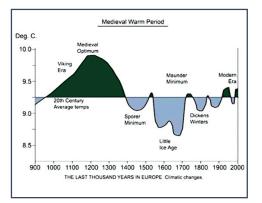
The two graphs on this page and the accompanying text are excerpted from the video Global Warming War, directed by Luke Dillard and released by South House Entertainment and B-EZ Productions.

## Dr. Tim Ball Stated:

This graph [to the right] appeared in the first two Intergovernmental Panel on Climate Change reports, but it created a problem because it contradicted their argument that, "Oh, [it] is warmer [now] than it has ever been."

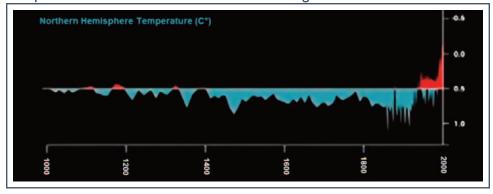
It was warmer [back] when the Vikings were sailing in Arctic waters that are now permanent pack ice—when the Vikings [were] setting up settlements in northern Newfoundland and at L'Anse aux Meadows [on the northernmost tip of the island of Newfoundland] and generally moving around the whole of the northern hemisphere in areas that you can't get into now.

Tim Ball is a retired professor who taught at the Univ. of Winnipeg. His Ph.D. thesis was on climate change in Central Canada (1714-1850).



## Dr. David Deming Stated:

In 1995, I was sitting at my desk and I received what I thought was an astonishing email from a person that I would describe as a major researcher in the area of global warming and climate change, and what he said in the email was (quote) *We have to get rid of the Medieval Warm Period* (end quote). And I was just astonished when I read that because I thought that our job as scientists and researchers was not to alter the historical temperature record [to create] some sort of ideology or political



## Graph that minimizes the Medieval Warming Period

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agenda, but that it was to go out and discover what had actually happened and then tell people.

So what they had to do was exactly what I was told. They had to get rid of the Medieval Warming Period, and a few years after, I was told that is when we first saw the appearance of the infamous hockey stick record, which completely rewrote [the outcome of] all of the scientific articles and research that had been published in the preceding decades on what the temperature record in the last thousand years was, and all of a sudden now it was completely flat for defining temperature up into the 20th century when it shot up like a spike, and thus the name, "hockey stick," because the graph [now] resembled the shape of a hockey stick. [See "the adjusted graph" at the bottom of the previous page.]

Dr. David Deming is an associate professor at the University of Oklahoma. He graduated in 1983 with a degree in geology, and received a Ph.D. in geophysics in 1988. Prior to his arrival at the University of Oklahoma in 1992, Deming held a National Research Council postdoctoral fellowship at the U.S. Geological Survey in California.

As a geophysicist, Deming has written numerous articles skeptical of global warming. He has stated that weather and climate change are natural processes beyond human control, and that to argue otherwise is to deny factual evidence.

## Archaeologists discover 13,800-year-old underwater site at Haida Gwaii

(More evidence of naturally occurring climate change and shifting sea levels.)

N ot long ago, just off the Canadian west coast at Haida Gwaii (formerly known as the Queen Charlotte Islands), under 400 feet of water, is a recently discovered Haida site where early Canadians lived and worked and thrived. In other words, evidence that climate change and shifting sea levels have been going on for a long, long time.

According to one news report, this puts the earliest habitation in Canada at around 13,800 years ago. Scientists believe that area was at sea level 14,000 years ago. The area has been submerged by 120 metres of water since the last Ice Age. The oldest artifact in Canada prior to this discovery came from Gwaii Haanas National Park Reserve and Haida Heritage Site—it was dated to 12,700 years old.



Off Canada's west coast, using an underwater vessel, researchers recently discovered a Haida historic site where early Canadians lived and worked. It's under 400 feet of ocean and estimated to be almost 14,000 years old. Its existence is evidence of the fact that climate change affecting sea level is an historic fact and has been going on for eons.

## Doggerland: Sloping hills and wooded valleys

At One Time, Britain Wasn't an Island

In a report on changing sea levels, *National Geographic* explains that at one time, Britain wasn't an island. It only became an island due to naturally occurring climate change that melted vast sheets of ice that covered great stretches of the planet.

The report says if you look at the area between mainland Europe and the coast of Great Britain, you probably wouldn't guess that Great Britain had been anything but an island. The fact is that roughly 12,000 years ago, as the last major ice age was reaching its end, the area was very different. Instead of the North Sea, the area was a series of gently sloping hills, marshland, and heavily wooded valleys known as Doggerland.

*National Geographic* says people used to live on Doggerland, which today is under water. Doggerlanders were hunter-gatherers who migrated with the seasons, fishing, hunting, and gathering food such as hazelnuts and berries. Over time, climate change meant the Doggerlanders were slowly flooded out of their seasonal hunting grounds.

Water locked away in glaciers and ice sheets began to melt, drowning Doggerland. Around 6,000 years ago, the people living there were forced onto higher ground in what is today England and the Netherlands.

Evidence of Doggerland's early residents can be found on the seafloor.

Modern fishermen often find ancient bones and tools that date to about 9,000 years ago.

Using sophisticated seismic survey data acquired mainly by oil companies drilling in the North Sea, scientists have been able to reconstruct a digital model of nearly 46,620 square kilometres (18,000 square miles) of what Doggerland looked like before it was flooded by climate change.



Image: Fossil bones and tools from Doggerland that have been pulled to the surface by trawling British fishermen.

Evidence of Doggerland's early residents can be found on the seafloor. Modern fishermen often find ancient bones and tools that date to about 9,000 years ago.

## Doggerland: Changing sea levels

A ccording to *Science Daily*, global sea level rose by more than 120 metres (400 feet) as the vast ice sheets of the last Ice Age melted. This meltback lasted a long time.

Rice University says it's estimated that the ice sheets at their greatest extent required the evaporation of 50-60 million cubic kilometres from the oceans, and further says that the resulting decrease in sea level was approximately 121 m (400 feet). This reduction in sea level would expose extensive continental shelves, including a land bridge between present-day Alaska and Siberia. Doggerland would also have been exposed.

Doggerland is an area of land now lying underneath the North Sea that connected Great Britain to mainland Europe during and after the last Ice Age. It was gradually flooded by rising sea levels.

Geological surveys have suggested that Doggerland ensured a solid land base



According to *Science Daily*, global sea level rose more than 120 metres (400 feet) as the vast ice sheets of the last Ice Age melted back. The rising sea level covered Doggerland, turning Britain into an island.

from Britain's east coast all the way to the Netherlands, the western coast of Germany, and to the Jutland peninsula. Many scientists believe Doggerland was probably a rich habitat with human habitation in what is referred to as the Mesolithic period.



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## Respected thinkers and scientists who reject climate change alarmism



Physicist Freeman Dyson has been a giant in his field for decades. The British-born, Princeton-based professor acknowledges the mecha-

nism by which human action can influence the climate, yet indicates the computer models can't capture what's really going on. Dyson has also written and commented widely about the benefits of CO-2 on the planet—something few scientists have yet to do.



Myron Ebell may be Enemy #1 to the current climate change community. Ebell works for the Competitive Enterprise Institute and chairs the Cooler

Heads Coalition, which comprises many groups that question global warming alarmism.



Bjorn Lomborg is a Danish scientist famous for his book *The Skeptical Environmentalist.* Like Dyson, he's not an outright denier, but rather, he thinks

the current approach to global warming is misguided and that the costs of drastic, short-term action are too high. He thinks people should focus on becoming more adaptable.



Japanese scientist Kiminori Itoh is the author of *Lies and Traps in the Global Warming Affair*. Itoh does not reject the notion of global warming entirely,

but instead claims that the causes are far more complex than the anti-carbon crowd would have you believe.

"Let's be clear: the work of science has nothing whatsoever to do with consensus. Consensus is the business of politics. Science, on the contrary, requires only one investigator who happens to be right."

— Author Michael Crichton



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### Grassroots Alberta

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Will Happer is a highly respected physicist out of Princeton. He compares the anti-CO-2 crowd to the prohibitionists prior to the passage of the

18th Amendment. He thinks the influence of CO-2 is vastly overstated, and that the benefits of a modest reduction in it will be negligible.



Australian professor Ian Plimer is the author of *Heaven & Earth*, a book that purports to debunk all of the major global warming "myths."



Alan Carlin is an EPA (Environmental Protection Agency) economist who wrote a paper calling global warming a "hoax."

He's become a celebrity over the understanding that he was censored by the EPA for being a heretic.



Patrick Michaels is a CATO scholar and a George Mason University professor.

Michaels is widely quoted as a global

warming skeptic. His basic belief is that we're in a long-term warming trend and that carbon dioxide has little to do with it, as each additional greenhouse gas molecule has less and less of an effect.



The famous author Michael Crichton has passed away, but through his fiction and nonfiction writings, he remains an important popularizer of sci-

entific ideas. Here's what he said about scientific consensus:

"Let's be clear: the work of science has nothing whatever to do with consensus. Consensus is the business of politics. Science, on the contrary, requires only one investigator who happens to be right."



Ivar Giaever is a climate skeptic with a Nobel Prize. He says that climate change orthodoxy has become a "new religion" for some, and that the

data isn't nearly as compelling as it should be to get the kind of conformity that's being sought.

This list of the world's "10 Most-Respected Global Warming Skeptics" was compiled by *Business Insider*. See: www.businessinsider.com/the-ten-most-important-climate-change-skeptics-2009-7





# UN official reveals real reason behind warming scare

Logither the sector of the UN's Framework

Convention on Climate Change. At a Brussel's news conference, the editorial indicated, Figueres admitted that the goal of environmental activists is not to save the world from ecological calamity, but to destroy capitalism.

"The only economic model in the last 150 years that has ever worked at all is capitalism."

- Investor's Business Daily

this year, she added: "This is probably the most difficult task we have ever given ourselves, which is to intentionally transform the economic development model for the first

Referring to a new international treaty

environmentalists hope will be adopted at

the Paris climate change conference later

*Investor's Business Daily* points out that

time in human history."

"This is the first time in the history of mankind that we are setting ourselves the task of intentionally, within a defined period of time, to change the economic development model that has been reigning for at least 150 years, since the Industrial Revolution," she said.

talism. The evidence is beyond dispute: The countries that have embraced free market capitalism have enjoyed a system in which output has increased dozens of times over, workdays have been halved, and lifespans doubled.

the only economic model in the last 150

years that has ever worked at all is capi-

More Background: *Investor's Business Daily* (www.investors.com/politics/editorials/climate-change-care-tool-to-destroy-capitalism/)

Former Canadian Environment Minister Christine Stewart explaining that climate change policy is the road to realized leftwing ideology.



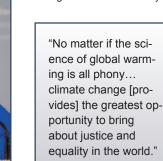
Former UN climate chief Christiana Figueres

said: "This is probably the most difficult task we

have ever given ourselves, which is to intention-

ally transform the economic development model

for the first time in human history."





## Yellow Brick Road to climate change

The Wizard Behind the Green Curtain

N ot long ago, *Quadrant* online did a profile of Maurice Strong, the man who, more than any other, redefined a trace gas as the meal ticket for tens of thousands of climate functionaries. The article was written by John Izzard.

Like Dorothy, Lion, Tin Man, and Scarecrow in *The Wizard of Oz*, Izzard said, we've all been dancing down the Yellow Brick Road of "settled science" in search of answers from the Emerald City, only to find what we suspected all along—the Wizard has been telling us fibs.

Izzard asks: "But who exactly is the Wizard? And where did this seemingmadness all begin?"

Answering his own question, Izzard says the man behind the green curtain the man who managed to get the climate industry to where it is today—is a mildmannered character by the name of Maurice Strong.

Maurice Strong, a self-confessed socialist, was the man who put the United Nations into the climate and environmental business. He was the shadowy figure behind the UN Secretaries General from U Thant to Kofi Annan. His reign of influence in world affairs lasted from 1962 to 2005.

In 1972, he organized for [UN Secretary General] U Thant the first Earth Summit, the Stockholm Conference on the Human Environment. This led to the

## Maurice Strong's Earth Council



According to Maurice Strong's own account, the Earth Council was established to better facilitate Agenda 21 as something that could easily be accepted and

embraced at the local level—towns, cities, and provinces.

Strong wrote: "The Earth Council undertook to help set up many National Councils for Sustainable Development, whose task was to help governments and civil society to co-operate in implementing the Earth Summit Agenda. Another important endeavour was to encourage support for a body called the International Council for Local Environmental Initiatives (ICLEI), whose purpose was to help cities and towns throughout the world develop their own Local Agenda 21, based on Rio's global agenda."

## What Is Sustainable Development

The term "sustainable development" was first introduced in a report produced by the United Nations World Commission on Environment and Development (also called the Brundtland Commission). The report was authored by Gro Harlem Brundtland, VP of the World Socialist Party. The term "sustainable development" was then offered as official UN policy in 1992 in a document called UN Sustainable Development Agenda 21. Subsequently, the term "sustainable development" has increasingly become a phrase that many committed socialists use to refer to their overall economic agenda.

#### Are You Responsible for Climate Change?

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formation of UN Environment Program (UNEP) with Strong at its head.

Later, as the UNEP boss, Strong organized the first international expert group meeting on climate change.

This led to exotic UN-sponsored organizations such as Earth Council and Earth Charter, the World Resources Institute, the World Wildlife Fund, and later the Commission for World Governance and the UN's University for Peace.

Izzard says Strong was the driving force behind the idea of world governance by the United Nations.

Strong wanted a world tax on monetary transactions of 0.5%, which would have given the UN an annual income exceeding \$1 trillion.

Strong also founded the Earth Council Institute in 1992. He recruited world luminaries. In 2000, Earth Charter was formed as a further push by Strong to create a world governing body.

## Maurice Strong Speaking at the Rio Earth Summit

"This Conference must establish the foundations for effecting the transition to sustainable development. This can only be done through fundamental changes in our economic life and in international economic relations, particularly as between industrialized and developing countries. Environment must be integrated into every aspect of our economic policy and decision-making as well as the culture and value systems which motivate economic behaviour."

> - Maurice Strong, speaking at the Rio Earth Summit (June 1992)

It is apparent from the above quote that when Maurice Strong spoke of "sustainable development" at the Rio Earth Summit, he was referring to "fundamental changes" in the economic affairs of individual lives, and of a "fundamental change" in international economic relations. He's speaking about a form of government rather than an approach to economic development.

When global socialists use the phrase "sustainable development," they are not speaking of property rights and economic incentives. Instead, the term usually refers to their overall global agenda for the world.

"Global warming has become a new religion. We frequently hear about the number of scientists who support it. But the number is not important; only whether they are correct is important.

"The facts are that in the last 100 years... temperatures [have] gone up 0.8 degrees C and everything in the world has gotten better. So how can [we] say it's going to get worse when we have the evidence? We live longer, [have] better health, and better everything. But if it goes up another 0.8 degrees C we are going to die, I guess."

— Nobel Laureate Scientist Ivar Giaever



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## Dr. Tim Ball on global governance



Dr. Tim Ball is a retired professor who taught at the University of Winnipeg from 1971 until 1996. He rejects the notion of man-made climate

change, stating that carbon dioxide is not a dangerous greenhouse gas.

Dr. Ball has worked with the Friends of Science and the Natural Resources Stewardship Project, and is a research fellow at the Frontier Centre for Public Policy.

In his book *The Deliberate Corruption* of *Climate Science*, Ball wrote: "In the political climate [of radical] environmentalism and its exploitation, some demand a new world order and they be-



"When we allow science to become political then we are lost. We will enter the internet version of the Dark Ages, an era of stifling fears and wild prejudices, transmitted to people who don't know any better."

- Dr. Tim Ball

lieve this can be achieved by shutting down the industrialized nations. It was a major theme of the Club of Rome, driven by studies like *The Limits to Growth* and Paul Ehrlich's book *The Population Bomb.*"

Ball refers to a report by the Club of Rome called *The First Global Revolution*. At one point that report states:

"In searching for a common enemy against whom we can unite, we came up with the idea that pollution, the threat of global warming, water shortages, famine and the like, would fit the bill."

The full text of that section from the Club of Rome Report is below.

#### The common enemy of humanity is Man

Page 75

In searching for a common enemy against whom we can unite, we came up with the idea that pollution, the threat of global warming, water shortages, famine and the like, would fit the bill. In their totality and their interactions these phenomena do constitute a common threat which must be confronted by everyone together. But in designating these dangers as the enemy, we fall into the trap, which we have already warned readers about, namely mistaking symptoms for causes. All these dangers are caused by human intervention in natural processes, and it is only through changed attitudes and behaviour that they can be overcome. The real enemy then is humanity itself.

- Report by the Council of the Club of Rome

### Are You Responsible for Climate Change?

## Climate change: Edmonton was a lake; Saskatoon was under a mile of ice by Kevin Avram

C limate change and sea level adjustments have been going on for millennia. During the most recent ice age, global sea levels were hundreds of feet lower than today. Russia and Alaska were connected by a landmass that according to *Scientific American*, may have been hundreds of miles wide. People lived on that land. At the same time, Britain was once solidly attached to mainland Europe by an immense territory (now under water) called Doggerland.

During the last ice age, Ontario and Quebec were totally icecovered; in places, that ice was two miles (3 km) thick. Saskatoon

was under a mile of ice. Modernday Chicago and New York were icecovered. An 18,000-ton rock from Mount Edith Cavell near Jasper sits a few kilometres west of Okotoks today. It's referred to as a glacial erratic because it was moved there by melting ice.

The ground upon which the Alberta legislature sits was a lake bottom, walled by solid ice. The valley just south of the legislature was cut by rushing water as the massive ice sheets turned to water.

## The Benefits of CO-2

Few politicians mention the beneficial impact of CO-2 on plants and the world's food supply. Botanists tell us



The ground upon which the Alberta legislature sits was a lake bottom, walled by solid ice. The valley just south of the legislature was cut by rushing water as the massive ice sheets turned to water.

that CO-2 sparks agricultural production and healthier forests.

The governments of Alberta and Ontario—despite their war on CO-2—employ people and maintain websites that carefully explain how to accelerate CO-2 release in greenhouses to improve the health, growth, and production of plants.

Freeman Dyson, the brilliant scientist who was a colleague of Einstein's, says if it wasn't for current CO-2 levels, the world's food supply would be suffering. Still others point out that long before the Industrial Revolution, indications are that global CO-2 was many times higher than today.

#### Grassroots Alberta

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## A Costly Political War

At a recent U.S. Congressional hearing, it was pointed out that if the U.S. terminated every one of its coal-fired electrical plants—which generate nearly 40% of U.S. power—"the total reduction of CO-2 in the globe would only be two-tenths of 1%." One Congressman asked why the U.S. would want to destroy its economy for such a thing.

In Germany, due to that nation's political war on CO-2—and the resulting runaway electrical rates—it's reported that hundreds of thousands have been forced off the electrical grid.

The Manhattan Institute says German residential electrical rates have climbed to 40 cents per kilowatt-hour (compared with average U.S. residential prices of about 12.5 cents).

In Canada, European-style electrical policies have already resulted in Ontario overpaying for electricity by \$37 billion. That number is expected to reach \$170 billion by 2032.

In Alberta, Rachel Notley and her colleagues are working to outlaw coal-fired electricity, in essence, working to ensure that Albertans get to experience firsthand the same economic calamity that these others have come to know. A recent Global news story says Alberta's electrical rates could triple by 2021. Regardless of a person's viewpoint, the odd thing about it all is that while Alberta shuts down its low-cost coal plants, others are building them. This spring, Indonesia is said to have broken



The Times (London, UK)

ground for a new \$4-billion 2,000megawatt coal-fired power station. And a December report in the *Times* (London, UK), says that 2,400 coal-fired power stations are currently under construction or being planned worldwide.

### Notes to the Preceding Article

With respect to the German experience, "Energy Policies and Electricity Prices: Cautionary Tales from the EU" by the Manhattan Institute can be seen at: http://economics21.org/html/energy-policies-and-electricity-prices-cautionary-tales-eu-1729.html

The U.S. Energy Administration has published a chart of residential electrical rates in Europe and the United States. The highest-priced European nations are Denmark and Germany. That chart can be seen at: https://www.eia.gov/todayinenergy/detail.cf m?id=18851

The *Times* of London story, "2,500 new coal plants will thwart any Paris pledges," can be seen at: http://www.thetimes.co.uk/tto/environment/article4629455.ece

A short video excerpt of the U.S. Congressional hearing that is directly quoted and referenced in this piece can be seen at: https://www.youtube.com/watch?v=G3frFmSmHdw

The story of Edmonton at the bottom of a lake is sourced to the book *In Search of Ancient Alberta*, page 246, published by Heartland Publications.

## An inteview with Freeman Dyson

A t the Library of Economics & Liberty, there is a discussion (audio and partial transcript) between Freeman Dyson of the Institute for Advanced Study at Princeton, and EconTalk's host Russ Roberts.

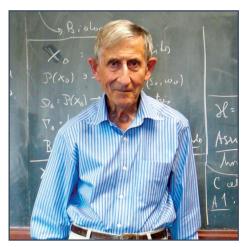
The two men discuss climate change, science, Dyson's career, and the future. Dyson defends the importance of challenging the scientific dogmas of the day. He also says that the knowledge of climate science is incomplete. Yet many scientists and others treat it as if it were totally understood.

**ROBERTS**: Is consensus a meaningful way to think about how science moves forward?

**DYSON**: No... when large numbers of people agree about something, that's a consensus. But it's not something you necessarily believe in. Consensus may be right or it may be wrong.... In the example of climate science, where this is an acute problem, the whole subject has become political, which makes it a much more dubious undertaking, because so many people are in it for political reasons, and then, of course, consensus becomes politically important. That distorts the science in an unfortunate way.

**ROBERTS**: What do you mean when you say it's political?

**DYSON**: Well, that there's a very large political fight going on about climate change—strong passions involved on both sides, and large amounts of money.



Freeman Dyson (*see page 13*) taught theoretical physics at Princeton's Institute for Advanced Study. According to the *New York Times*, he is "a scientist whose intelligence is revered" even by scientists.

Very big economic question, what to do about climate change. Very large numbers of people whose livelihood depends on keeping the public alarmed. That's unhealthy.

**ROBERTS**: So how does the layperson, a non-expert, evaluate those sides?

**DYSON:** I would say: Keep an open mind as long as you can. That's true whether you are a scientist or not. Always be skeptical; don't necessarily believe because somebody's an expert he knows what is true. Experts are usually experts in a very narrow field, so they don't have a good view of the whole story.

### **DYSON (QUOTED BY ROBERTS):**

"When I listen to the public debates about climate change, I am impressed by the enormous gaps in our knowledge,

the sparseness of our observations and the superficiality of our theories. Many of the basic processes of planetary ecology are poorly understood. They must be better understood before we can reach an accurate diagnosis of the present condition of our planet. When we are trying to take care of a planet,

just as when we are taking care of a human patient, diseases must be diagnosed before they can be cured. We need to observe and measure what is going on in the biosphere, rather than relying on computer models."

"It could very well be that the welfare of the planet would be damaged by reducing carbon dioxide. We just don't know."

- Freeman Dyson

reduce our risk and respond to it as best we can, even if we don't understand it perfectly; if we wait till then, it will be too late?"

**DYSON**: No, that's not the choice you have. Everything you do is risky....Just by trying to reduce burning fossil fuels doesn't mean you've got rid of the risk.

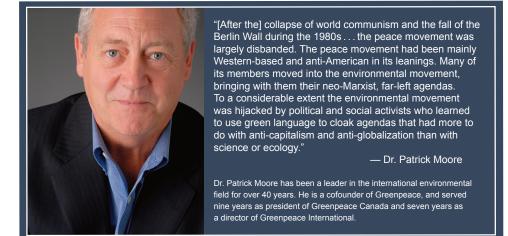
[It] merely means you are taking different kinds of risk. They could be worse. It could very well be that the welfare of the planet would be damaged by reducing carbon dioxide. We just don't know.

**ROBERTS**: So what do you advise?

**ROBERTS**: Have your views changed since you [first] wrote that?

DYSON: No. I would stick with that.

**ROBERTS**: How would you respond to the people who say: "There's a threat, and the natural, healthy thing to do is to **DYSON**: I advise just waiting to see what the processes are, so we understand well enough to take action where we know what the results will be. There are certain things you can do, of course, which make sense, undoubtedly a lot of the actions we could take—using less energy, using energy in a less



#### Are You Responsible for Climate Change?

wasteful fashion—that's good no matter what. There's a great deal you can do.

But the real question is whether you put a price on carbon, which makes the poor people poorer and enriches the people who have solar panels on their roofs. That kind of thing, to my mind, is likely to be counterproductive.

**ROBERTS**: You've proposed a lot of creative ideas—tree planning, topsoil— as have some other scientists. Does anybody take those seriously? Do they get a hearing?

**DYSON**: Yes, I think some of us do. I make a distinction between what they call geo-engineering—which is big, colossal schemes for changing the whole planet in some big fashion—and land management, which is doing it on a local basis, much more conservative fashion.

Those two are very different, but the public doesn't make much of a distinction. So, on the whole, big geo-engineering schemes don't make sense, but land management on a local level does make sense and it could be quite effective.

Just reading an interesting piece called "Growing Cows on Grass," about the ecological benefits of growing cows on grass as opposed to growing corn and feeding the corn to the cows in feedlots. That actually could make a big difference. Some farmers in Minnesota are actually doing it on grass and some doing very well. That's the sort of thing I believe does make sense. Might taste better. Might be more consistent with our evolutionary insides. The main



Freeman Dyson says: "Put[ting] a price on carbon, which makes the poor people poorer and enriches the people who have solar panels on their roofs...is likely to be counterproductive."

point is you can make mistakes and it's not catastrophic.

**ROBERTS**: Your politics are generally described as left of centre [and]...you probably have the highest IQ of any climate skeptic. This has caused a great deal of consternation in the scientific community and in the activist community—that you are unwilling to be on the bandwagon of climate change. What have been some of the costs to you?

**DYSON**: Really very little. I'm not suffering from this.... My friends think I'm maybe going a little bit gaga, but I don't suffer from that.

**ROBERTS**: One more question on climate change: Do you think we are going to come to a different viewpoint? A different evolution on how we consider this issue? More data will come in?

**DYSON**: Oh, yes. I've seen it change so many times in my own lifetime. Certainly, bound to change. All sorts of things will happen that are unexpected.

Original interview at http://www.econtalk.org/ archives/2011/03/dyson\_on\_heresy.html#highlights

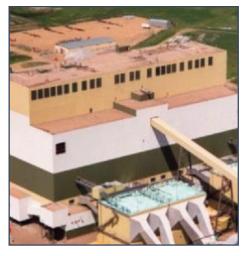
# The ideology, preaching, and cost of climate change

Using the set of the s

Growing numbers in Ontario say they can't afford to stay in their homes because of excessive power bills. Manufacturers are fleeing. They can't afford Ontario's power. Tens of thousands of jobs have been lost.

In a 2016 news report, Toronto Hydro said consumption has dropped by nearly 25% over ten years. Even so, electrical bills are in a steep climb. Individuals and even some businesses have stopped using A/C, complaining that electrical bills are in runaway mode.

According to the Climate Science Coalition, Ontario electrical prices have increased more than 300% over the early part of the previous decade, producing one of the highest rates in North America. It says an important cause for this staggering rise is that the Ontario government deliberately shut down all its coal plants, which formerly provided about 25% of Ontario's electricity. The province then shifted in many cases to expensive and heavily subsidized renewables. The government claims its policies are based on the "settled science" of global warming.



SHEERNESS COAL PLANT. Ontario shut down low-cost and increasingly efficient coal plants, only to see electrical prices increase 300+% over the previous decade. Alberta is now following in Ontario's tracks.

## Notley's Carbon Tax on Albertans

Type of Fuel	Alberta Carbon Levy*
Aviation gas	7.47 ¢/L
Aviation jet fuel	7.75 ¢/L
Bunker fuel	9.55 ¢/L
Butane	5.34 ¢/L
Coal coke	\$95.39 /tonne
Coke oven gas	2.10 ¢/m³
Diesel	8.03 ¢/L
Ethane	3.06 ¢/L
Gas liquids	4.99 ¢/L
Gasoline	6.73 ¢/L
Heating distillate oil	8.27 ¢/L
Heavy fuel oil	9.53 ¢/L
High-heat value coal	\$66.56 /tonne
Kerosene	7.71 ¢/L
Locomotive diesel	8.90 ¢/L
Low -heat value coal	\$53.09 /tonne
Methanol	3.26 ¢/L
Naphtha	6.73 ¢/L
Natural gas	\$1.517 /GJ
Raw gas	\$1.72 /GJ

\* Alberta annual carbon tax levy, after provisions of the Notley government's Bill 20 are established.

By	Kevin	Avram
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