

Climate Change & Sandy: What Next?

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- at the BALTIMORE GREEN FORUM
- *a monthly environmental education and discussion forum*
- Sunday, November 25, 2012
- Moderator: Sam Hopkins

BALTIMORE GREEN FORUM

*A monthly environmental education and
discussion forum*

Sunday,

4:00-5:30 PM

Discussion Circle 5:30 – 6:30 PM

Maryland Presbyterian Church

1105 Providence Road, Towson, MD 21286

<http://www.mpchurch.org/About.htm>









Why Wasn't Sandy the Wake-Up Call?

- Well, it wasn't was it?
- Recently, it looked like Sandy (and Global Warming) had our undivided attention
- Currently, it is gun control, speculation over who might be the next Secretary of State, or what might happen in Syria that has captured our interest. News has a very short shelf life!

Paradigms for Climate Change

- Preoccupied
- Denialists
- Skeptics
- Believers
- Look-Outs

The Preoccupied

- May have noticed Global Warming
- Have not thought about it because preoccupied with children, earning money, NASCAR racing, finding shelter or the like.

Denialists

- Don't Accept Global Warming is Occurring
- Or—
- Don't Accept it is Man-Made
- Denialists rely on honest or dishonest skeptics.

Denialists

Deserve our sympathy: **Global Warming contradicts their most strongly held beliefs:**

- The free market will always give the best possible result
- Growth is good
- Government is not needed
- Population increase is good, and
- **God would not do this to us!**

Denialists

- Would rather believe that Sandy was a trial run for the Rapture, than Global Warming
- Are not about to be influenced by mere facts
- **Belief beats facts any day**
- Denialists and the Tea Party are a major portion of our problem
- It is frightening, but **some national politicians may actually believe what they say**
- <http://truth-out.org/news/item/12841-journalist-naomi-klein-on-capitalism-and-climate-change> Naomi Klein video

Honest Skeptics

- Accept Global Warming is Occurring
- Accept that CO₂ has been added to atmosphere
- Doubt Global Warming is due to CO₂
- <http://wattsupwiththat.com/2012/01/01/canadian-senate-testimony-skeptic-side-now-being-heard-in-canadian-politics/>

Honest Skeptics

- The next graph is important to honest skeptics
- It shows temperature (blue) and CO₂ (red) over the last 400,000 years
- They have moved together
- Skeptics believe temperature has led/caused CO₂ changes
- In the up and down segments we have feedback with changed CO₂ leading to a similar change in temperature leading to a similar change in CO₂ and so on. CO₂ causes temp., temp. causes CO₂. No problem.

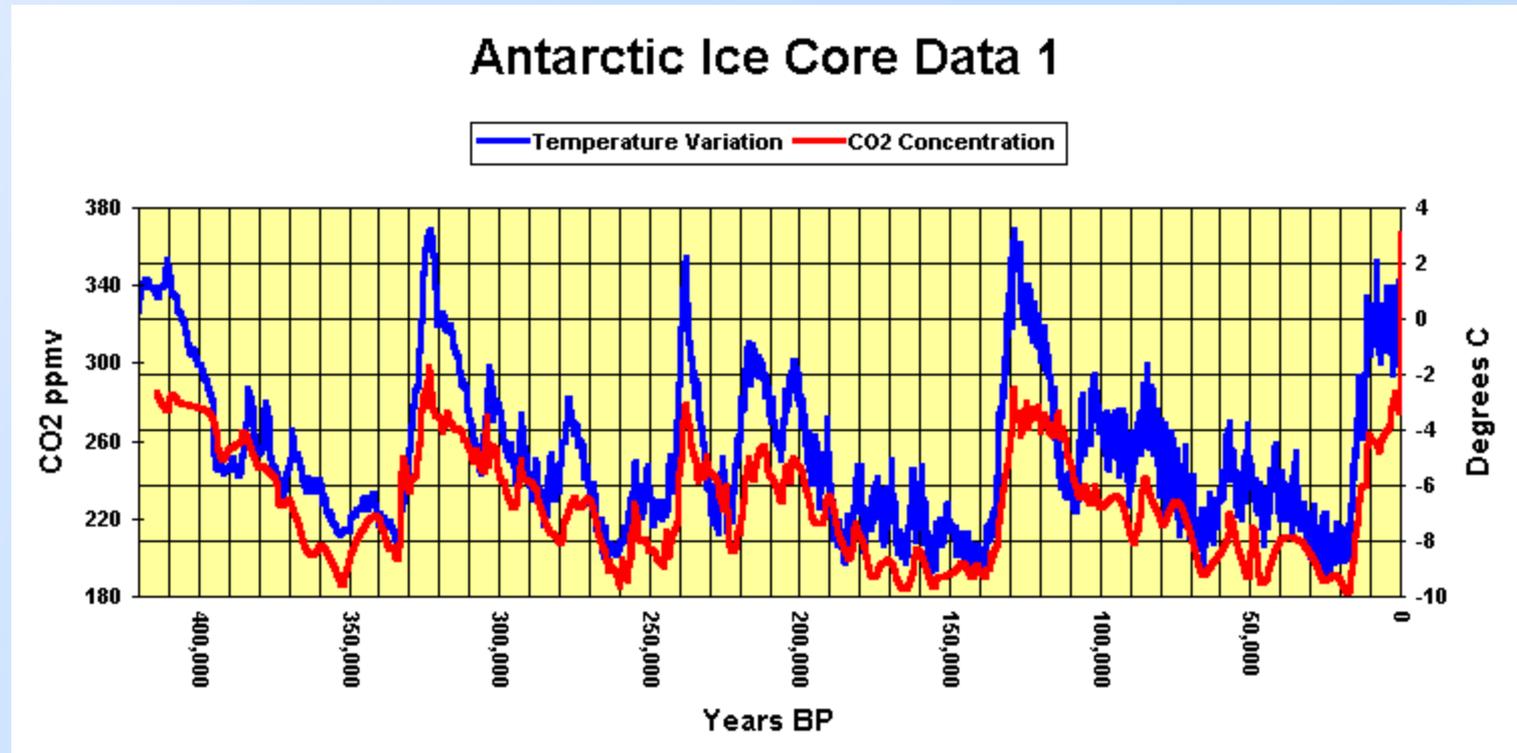
Honest Skeptics

- At the turning points (top and bottom) it appears that temperature has led CO₂
- That is the skeptics argument
- **But what led to temperature change?**
- Quite possibly changes in the radiation coming from the sun
- The Milankovitch Cycles likely play a role:
http://en.wikipedia.org/wiki/Milankovitch_cycles

Honest Skeptics

- Looking at the extreme right of the graph we can see that **the present warming is not “your usual upturn”**
- CO₂ is rising fast when we would expect it to turn down
- We do not have to speculate on what is causing CO₂ to rise: **Fossil fuels**
- Higher CO₂ causes higher temperatures, that will cause higher CO₂
- **Honest skeptics** need to see **the right end of the graph is NOT a repeat of earlier highs.**

In the past, CO₂ concentration has lagged temperature rise:



Clouds and Water Vapor

- Water vapor warms the earth, clouds cool the earth
- Energy reaches the Earth from the Sun as light
- Neither CO₂ nor water vapor stop light
- Water (droplets, as in clouds) reflect, deflect and stops light
- Energy leaves the Earth as infra-red radiation
- John Tyndall discovered (1856) that water vapor and CO₂ reflect, deflect and stop infra-red
- Water vapor is a more powerful GHG than CO₂, thus heating the earth
- Water droplets in clouds (or contrails) cool earth

Reasons for Honest Skepticism

- Water vapor is a much more powerful greenhouse gas than carbon dioxide, and
- The energy imbalance causing global warming is estimated to be about 1.5 watts per square meter, but cloud cover can cause a 30 watt difference in incoming energy. And we have virtually no understanding of the dynamics of global cloud cover. (When con-trails were eliminated following 9/11, temperature rose about 1.0 degree Celsius)

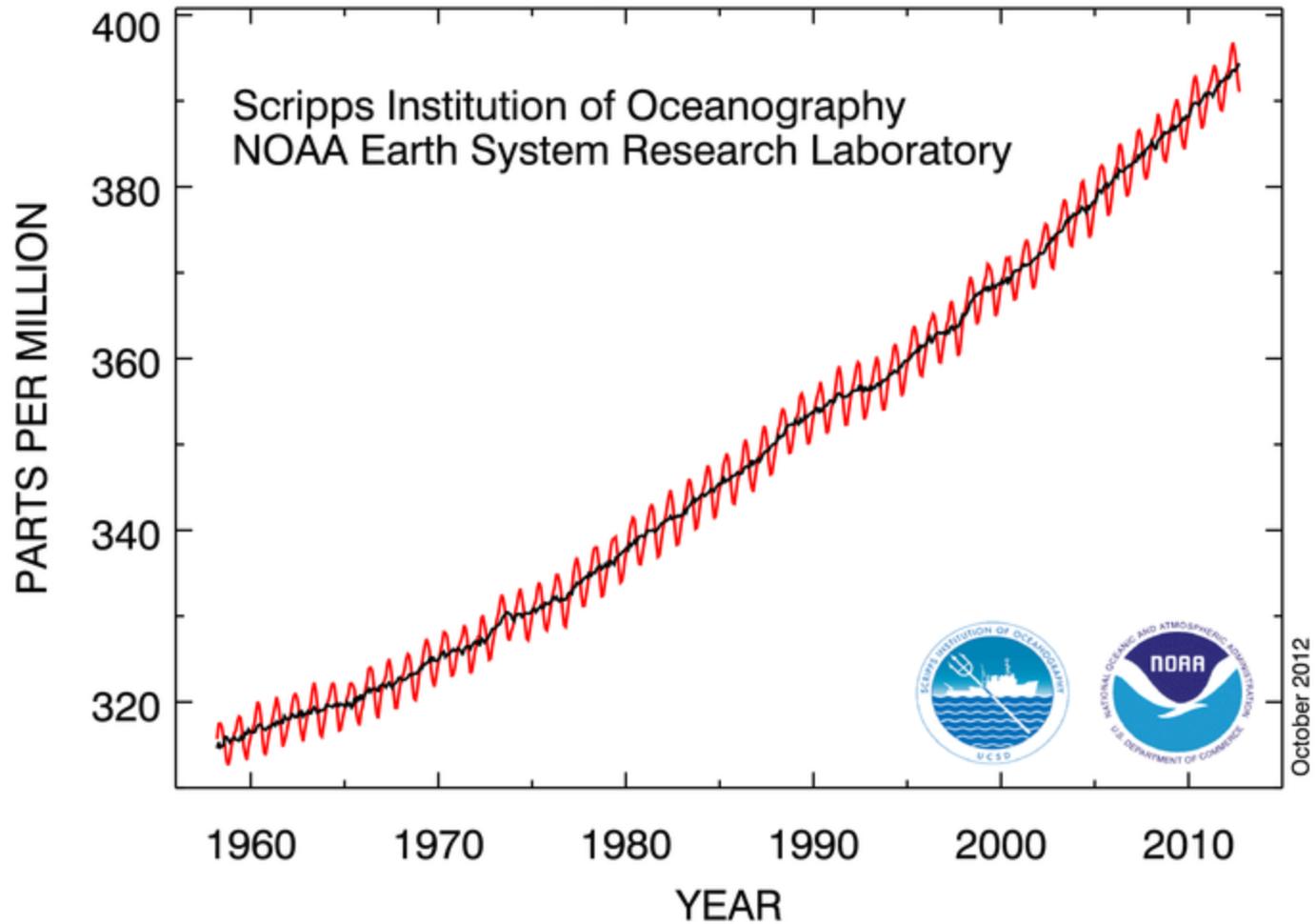
Dishonest Skeptics (the Majority)

- Usually have a financial interest in their “skepticism”
- Often have history of skepticism, as for tobacco, asbestos, lead paint, etc.
- Typically are “scientists” venturing beyond their field of expertise
- Are beneath contempt

Believers

- Accept that Global Warming is Occurring
- Accept that atmospheric CO₂ has increased
- Accept that this is due to use of fossil fuels

Atmospheric CO₂ at Mauna Loa Observatory



Atmospheric CO₂

- The previous slide showed the increase in atmospheric CO₂ (in ppm, parts per million) over time
- The **red** line is monthly data, which declines in northern spring and summer as plants grow withdrawing CO₂ from the atmosphere as plants grow, and declines in fall and winter as they die, rot and are eaten. This CO₂ is **returned** to the air.
- The black line is annual data that increases as fossil carbon is **added** to the atmosphere.

Atmospheric CO₂

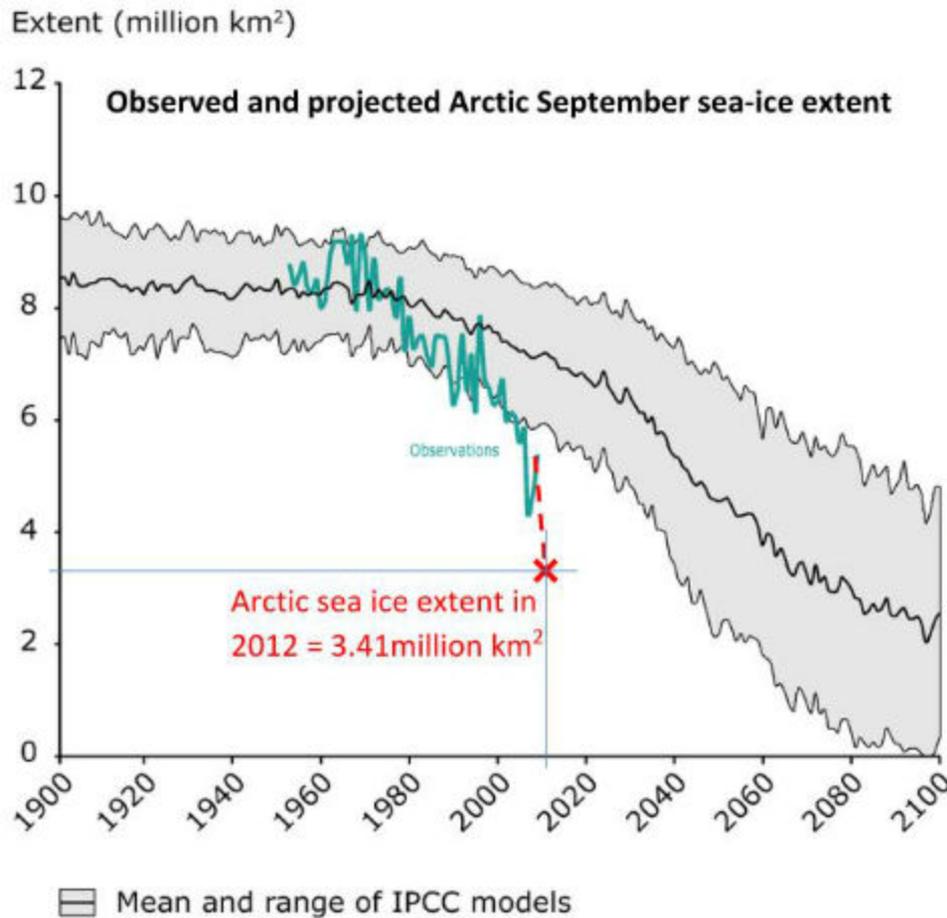
Different lessons from the previous graph:

- We can continue to use fossil fuels until we notice harmful effects (such as Sandy), when we can stop. (Really?) or
- We are changing the composition of the atmosphere, on which all life depends: We should not make any further changes until we understand exactly what we are doing

We Don't Know What We Are Doing

- The next slide shows the decline in the size of the **arctic ice sheet** (square kilometers of ice) that was projected and the actual decline
- The green and red lines trace the actual decline
- The IPCC projected that arctic ice would last at least until 2100
- Actual observation suggests the arctic ocean will be ice free for a day at least by 2020 (and maybe 2015)

September Arctic Sea Ice



Original graph is from the [Europa](#), and shows Arctic sea ice extent observations (blue line) and the IPCC AR4 projections (black line is the mean of the model runs). Arctic sea ice summer minimum extent in 2012 was 3.41 million km², according to [NSIDC](#) and is plotted in red.

Emily Lewis-Brown.
Sept 2012.

www.lewis-brown.net

We Don't Know What We Are Doing

- The IPCC projected sea-level rise of 2 mm per year. The *actual* rate is 3.2
- This is 60% faster than the IPCC's best estimate
- If the increase is linear it means a 1 foot increase in sea level by 2050
- If increase is exponential, it could be much more
- James Hansen has projected 5 ft by 2100, and sea level rising by **6" per year** in 2100
- <http://readersupportednews.org/news-section2/312-16/14803-sea-levels-rising-60-faster-than-expected>
- <http://pubs.giss.nasa.gov/abs/ha05510d.html>

We Don't Know What We Are Doing

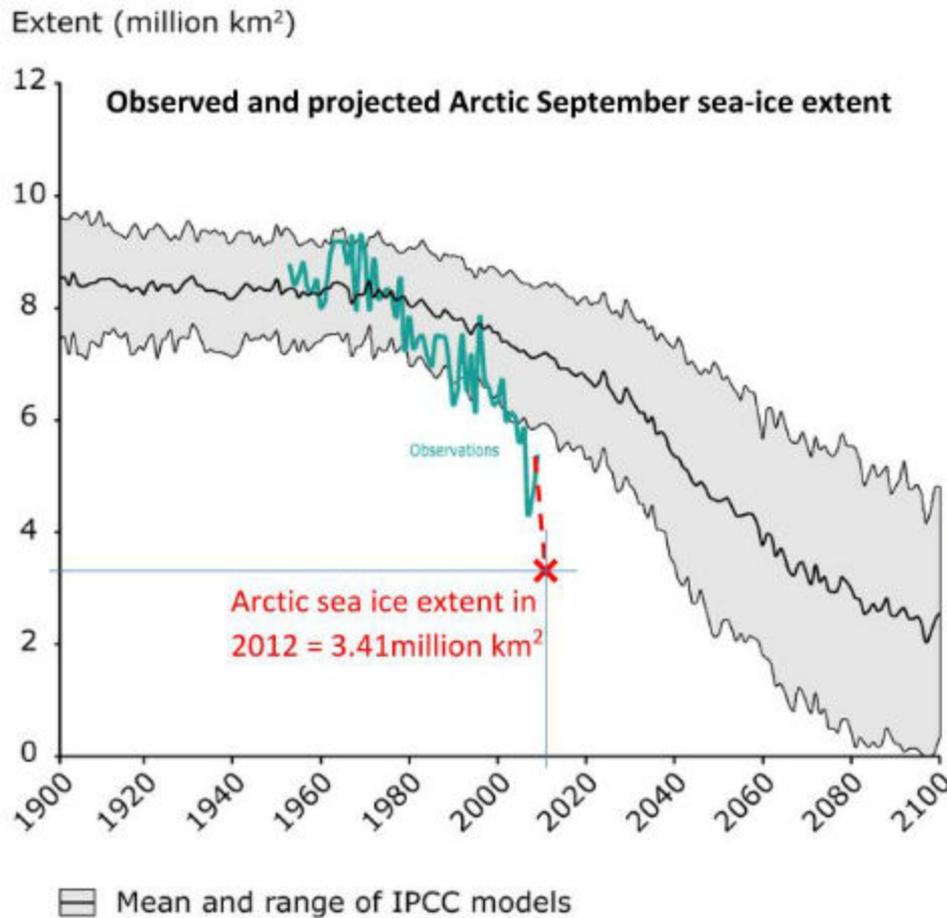
- When all terrestrial ice has melted (in several centuries) **sea level will be 240 feet higher.**
- “The impacts for a 1°C rise are now expected to be as great as those previously assumed for a 2°C rise”, Wikipedia
- http://en.wikipedia.org/wiki/Avoiding_dangerous_climate_change
- Sea level is rising **60% faster** than the IPCC projected
- <http://www.timeslive.co.za/scitech/2012/11/28/seas-rise-60-faster-than-un-forecast-study>
- If we are dealing with an exponential response, sea level increases will be even faster in future.

We Don't Know What We Are Doing

The **next slide** shows IPCC (scientific) estimates of future minimum areas of arctic ice:

- The gray area is a range of IPCC model projections (the black line is the average)
- The green and red lines are actual areas
- The models project arctic ice will continue through 2100
- **We now expect all arctic ice to be gone by 2015 to 2020**

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Believers ... T-Shirt

I am reminded of a T-Shirt motto:

“I want to die in my sleep Like my Dad,
not ‘Wide-eyed, screaming and terrified’
Like his passengers.”

- Believers are either “Dads” or “Passengers”

Dads

Believe that no action is required, since:

- We have already established a target of 80% reduction in emissions by 2050, and
- US emissions have declined significantly (From 2010 to 2012 coal use for electricity dropped from 975 million short tons to 826, due to lower gas prices)

e.g. AEI/Brookings/RFF/IMF recent seminar on a “carbon tax”.

Passengers

- Accept Global Warming is dangerous
- Have no idea what to do about it.
-

Obama, Romney and the IPCC

- In 2008 Obama was a Passenger “Stop oceans rise”
- By 2012 both Obama and Romney were Denialists, “drill to achieve energy independence”
- IPCC is a Passenger, but far too **conservative**: Content to **describe** what would happen **if emissions declined**

Al Gore & Bill McKibben: **Passengers**

- Al Gore famously suggested at the end of an inconvenient truth that we change light bulbs
- Both have occasionally mention that “we need to put a price on carbon”, **without nominating an actual price.**
- McKibben has tried to stop one pipeline, and divest from oil companies, both of which are helpful but inadequate.

Paradigm Shift

- A **paradigm shift**, does not change the facts, but rather the way we look at them
- We urgently need a paradigm shift from the above attitudes to **Look-Out**
- There is a short movie describing such a change at <http://grist.org/list/chasing-ice-changed-this-climate-denying-bill-oreilly-listener-into-a-believer/>
- A trailer for the powerful film she saw is at: <http://www.chasingice.com/see-the-film/trailer/>

Look-Out

- The look-out sits at the top of the mast to look for land, or other ships.
He/she can see further than anyone else.
- But that is not the sense in which I am using it.
My sense is:



Look Out!

- This is what we say when we see something very dangerous and unexpected about to impact someone we care about..... such as our “mother” earth.
- O.K. So why should we “Look Out!”?

Our Belief

- As “believers” we believe that fossil fuel adds CO₂ to the atmosphere that inhibits radiation of energy from earth, and leads to Global Warming.
- Year after year we add small amounts of CO₂, which causes temperature to rise year after year
- This is a linear model and is **wrong. Way wrong.**

Positive Feedback

What really happens is that the CO_2 causes a (slight) temperature rise, but this temperature rise leads more water (a much stronger GHG than CO_2) to evaporate into the atmosphere and raise temperature more (leading to more water in the atmosphere), and polar ice to melt, reducing the reflection of sunlight into space (thus raising temperature) , etc. These are positive feedback loops.

Positive Feedback

Other feedback loops are:

- Arctic methane clathrates.
- Melting and rotting of permafrost
- Forest fires
- Loss (drying-out) of Rainforests
- Loss of terrestrial glaciers

If we stopped adding fossil carbon today, it might be centuries before these feedback loops had come to a new equilibrium

Positive Feedback

Of the long term heating caused by adding fossil CO₂ to the atmosphere, only **15%** is due to the direct infrared blocking by the CO₂, **the other 85% is due to the feedback effects**

<http://www.apollo-gaia.org/Climate%20Sensitivity.pdf> page 11.

Look-Out!

What To Do?

We have to be clear whether we are talking about the small problem (fossil fuels) or the large problem (collapse of the capitalist private profit/growth model, excess population and privatization of the commons).

Fossil Fuels

Clearly we have to **minimize the use** of fossil fuels, and **maximize the withdrawal** of CO₂ from the atmosphere; and **geo-engineering** to cool the planet.

Simple, really!

STOPPING The Use of Fossil Fuels

“Fee and Dividend”:

- Tax/fee of \$250 ton of carbon to double the price of coal-based electricity.
- To be raised regularly
- All revenues returned to consumers on an equal per capita basis (without regard to energy expenditures)
- Collected upstream at mine or wellhead or port of entry
- High tariff on all imports from countries without a similar policy
- A tax on carbon is equivalent to a subsidy to fossil-free energy producers
- No exemptions.

STOPPING The Use of Fossil Fuels

From 2010 to 2012 coal use for electricity dropped from 975 million short tons to 826, due to lower gas prices....

Prices work!

Regulation:

- Ground all private planes
- Construct high-speed electric passenger rail system
- Improve public road transport (busses)
- Close overseas military bases
- One child policy
- No new drilling, fracking or coal mines

STOPPING The Use of Fossil Fuels

Regulation:

- No new detached houses (either town houses or apartments)
- Stop gasoline and diesel car production
- Home delivery of groceries and/or weekly pick up of shoppers
- Restrictions on home heating and cooling
- Ban private electric generators (Vicious circle principle ... Craig Dilworth)

Withdrawing CO₂

- Heavy tax on logging
- Planting new forests
- Sequestration of logged trees
- Ocean fertilization with iron filings and sequestration of resulting phytoplankton

Geo-Engineering

Clearly this is above my pay grade. But a British group “Arctic Methane Emergency Group” (AMEG.me) have argued to a Special Parliamentary Environmental Audit Committee for **artificial cloud production** in polar regions to make up for lost sea ice.

The Bigger Problem

- I would argue that Global Warming is the most **urgent** problem we face.
- However, **we face a bigger problem** with four major parts:
 - End of growth
 - End of Capitalism/Free Markets (i.e. Total failure of Economics)
 - Excess Population
 - Peak Oil
- We would face this problem even if the atmosphere could absorb endless CO₂ and other pollutants

Peak Oil

- Peak oil is something acknowledged by hard-headed businessmen, even those who ignore the atmosphere's limited capacity to absorb more CO₂.
- In the past demand and supply for oil increased more or less together.
- In future the demand for oil will increase while supply declines.
- Demand for oil will be choked off by rapidly increasing prices.

Peak Oil

- Even as the supply of (cheap) oil is declining, China, India and other developing countries will be able to afford an increased proportion of supply
- We will develop more expensive sources of oil, but these too will eventually decline
- We will move closer to work, public transport and services, travel less, reduce the distance goods are transported, etc
- Abandon the suburbs, cut the military, etc

Peak Oil

- We will substitute electricity in cars, high-speed rail, mass-transit and home-heating
- However this leaves food: In developed countries farming is extremely oil intensive
- Food is extremely climate dependent
- We **may not have enough food** to feed our population
- Peak oil is just the first of many resource limits.
<http://www.guardian.co.uk/global/development/2012/jun/24/natural-resources-and-development-china>

Excess Population

- Population in 1850 was **1.25 billion**, today it is **7 billion** and rising
- Too many people: This augments all other problems
- Need a one child policy
(tie mother and father's tubes!)
- Stop all fertility enhancement programs

End of Growth

- Growth cannot continue indefinitely on a finite planet
- From 1830 to 2008 the United Kingdom economy grew at slightly less than 2% (1.97%) yet it **increased 32-fold** at constant prices
- Similarly the US and world economies grew almost (remember the 30's) continuously over the same period
- Peak Oil reminds us that this cannot continue
- Increased atmospheric CO₂ reminds us, too
- We are encountering shortages of fresh water

The End of Growth

- Major fisheries have collapsed
- Readily available mineral sources have been exploited: (energy) costs of mining are rising
- For phosphate and potash known sources are being exhausted
- Not only do we have to **learn how to live without growth**, but we have to **learn how to live using only renewable or recycled resources**.
- It is not sufficient, for instance, to use **no more fossil fuel than last year**, we have to use **NO fossil fuel!**

End of Capitalism

- The problem with capitalism is that it generates growth which, as we have seen, is **fatal on a finite planet**
- Capitalism increases efficiency, and substitution of capital for labor, thus generating **unemployment unless new (growth) employment offers**
- Capitalism **“privatizes the commons”** thus impoverishing the general population

End of Capitalism

- Economics explains capitalism. It shows how the existence of a profit justifies entrepreneurship (either individual or incorporated). Free markets then determine price, as price rises demand for the commodity declines and substitutes are found
- This makes no distinction between renewable and non-renewable resources. It implies a faith that renewable sources can eventually be found for all needs. This may be true, but Capitalism will not find them while non-renewables are cheaper.

End of Capitalism

- The unemployed will be willing to work for a lower wage until it becomes profitable to employ them, **or they will die of starvation**
- **Growth**, and the provision of new jobs, **is thus crucial to the acceptable working of capitalism.**

The Bigger Solution

- **Peak Oil** requires the same response as outlined above for Global Warming
- **Population** requires a “one child” policy, although nature may force a more drastic solution on us.....The world cannot carry more people than it can carry
- It would be helpful to the **End of Growth** to **ban all advertising**
- **Serious recycling**
- But **that's about it!**

Remaining Problem

- We have a **Capitalist** system predicated on **Growth**, which has generated enormous **Inequality** (wealthiest 400 American's have the same total wealth as the bottom 150 million)
- We have a **political system** that is lauded as “**best in the world**” but does not recognize our problems, and is **incapable of resolving** even those problems it recognizes
- We have a huge **undocumented NGO sector**, that defies economic theory
- We have unleashed **storm systems** that can do as much direct damage as 9/11 (Sandy \$50B, Twin Towers \$55B), and can be expected with increased regularity

Remaining Problem

- We need a **world-wide wartime** (real war, not false war on “poverty”, “drugs” or “terrorism”) **mobilization** with substantial **central control**, **without** a clue as to how to bring this about

Fantasy

Gaia could forgive us, as in the following **fantasy**:

- What **we really need** is a **Sandy-type** storm, (but a real Force 5 hurricane, not Force 1) more **tightly focused to totally destroy the Pentagon**, and incidentally Capitol Hill
- Thus demonstrating that **DOD cannot** begin to **defend itself** from **what truly threatens us**.

Fantasy

Still in a land of fantasy:

The surviving generals could then conclude:

- Global Warming is a **real emergency**
- Congress is in **no shape to respond**
- A **world-wide response** is needed
- There is **no world-wide capacity** to respond
- Therefore the **Army must step in** to the vacuum
- Fortunately the US Army is already broken into **geographic Commands**, Central, Southern, U.S., etc.

Fantasy: Legitimacy

The legitimacy of American leadership will naturally be in question. America should immediately consult with China, India, the EU and possibly Russia, Brazil and South Africa. It should encourage these powers to take leadership in their areas, asking only for observer status. However, the U.S. should be willing to act as the default leader.

Fantasy: Leadership

The American stance should be to seek agreement on the seriousness of the problem, and that it is “a global problem” so that “all countries have a legitimate interest in the actions of all others”

America should be open to proposals for other administrative arrangements, provided only that such discussions not delay taking drastic action.

Fantasy: U.S. Command

The task for the U.S. Command would be **relatively simple**:

- See **slides 29 to 33** on for policy changes to combat Global Warming
- Introduction of **one-child policy**
- Military contractors should be re-tooled to provide **fossil-free energy**
- DARPA (the research arm) should be re-focused on fossil-free energy production and, more importantly, **CO₂ sequestration**
- Ban NASCAR and professional sports
- Limit of 3 hours of TV transmission per day

Fantasy: Regional Commands

Regional Commander's task would be much more difficult, since they would be dealing with **formerly sovereign nations**. He/She would:

- Indicate a willingness to work with democracies, mullahs, dictators, military, or **anyone who could speak for national action**.
- Advocate **“Contraction and Convergence”** by which all countries would be encouraged to contract their use of fossil fuels, but only when leading polluters succeeded in lowering their pollution, would others have to keep pace.

What Have We Missed?