

CO₂ Greenhouse effect calculations

The futility of Man-made Climate Control by limiting CO₂ emissions.¹

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It seems that the UK government is expecting to spend about £32 billion, (~2.2% of UK GDP), according to the Stern Review ², every year for the foreseeable future in order to achieve by the year 2100 at the absolute maximum global temperature reduction of ~0.0019°C, (less than 2 thousandths of a degree Centigrade). This temperature reduction would have to involve the total elimination of all future UK CO₂ emissions. Any lesser goal for reduction as proposed could only be even less effective temperature wise. The Stern review was released in 2006, so as ever with government budgets the sum will have escalated since. If the UK is proposing to spend £32 billion (\$50 billion) per annum to partially influence ~1.7% of world CO₂ emissions, it means that the equivalent global spend could be as much as ~\$3,000 billion per annum for the foreseeable future. At present this would amount to about ~4.5% of the global GDP, (\$69,000 billion) to achieve a reduction in temperature for the whole World of 0.11 °C about 1/10 degree Centigrade, on the basis that all future CO₂ emissions were eliminated.

The exorbitant but truly ineffective UK expenditure is intended as a gesture to persuade other Nations to follow suit in the name of the “common good”. It seems that only a very limited number of European and Antipodean Nations now have any interest in doing so. The rest of the world is rapidly losing interest and at the same time they are increasing their CO₂ emissions.

Of course any such expenditures anticipated in the UK do not include the unilateral economic damage to the UK itself of increasing energy costs on all UK industry and other consumers, the failure of UK competitiveness in the world and the loss of UK energy security. These facts therefore must raise the following QUESTIONS:

Is it possible that the massive efforts and extreme costs already being expended and planned and the immense risks to energy security anticipated for the future could ever be justified to partially reduce the Man-made CO₂ emissions by a limited number of Western Nations for miniscule and probably doubtful effects on world temperature?

Are controls on CO₂ emissions a rational way to save the World?

What precisely is the World being saved from? (a warmer world is probably a better, more productive world, as in the past)

And as the remedies proposed are so vast and so onerous:

- Where are the full cost benefit analyses?
- Where is the due diligence?

Accordingly this document begins to analyse the following points:

- Reviews some recent official statements on CO₂ in the atmosphere.
- Examines the proportions of Greenhouse gases in the atmosphere.
- Transposes those proportions into actual temperature values in °C of the resulting Man-made warming from CO₂.
- Allocates the CO₂ greenhouse effect by Nations both since 1850 and makes estimates onto 2100.

¹ <http://www.energytribune.com/articles.cfm/5961/The-Utter-Futility-of-Reducing-Carbon-Emissions>

² <http://www.guardian.co.uk/politics/2006/oct/30/economy.uk>

- Speculates on the temperature effect of additional CO₂ that will be produced by the developing Nations till 2100.
- Looks at the realpolitik of the Nations who have no intention of damaging their economies by reducing their CO₂ emissions.
- Explains the damage and futility of the gestures that are being undertaken by those governments, adherent to the Catastrophic Anthropogenic Global warming assertion.
- Raises the important questions that require comprehensive answers before any further policy commitments.

Some official views of impact of atmospheric CO₂

Tim Flannery, Climate Commissioner of Australia³:

“If we cut emissions today, global temperatures are not likely to drop for about a thousand years.”

Even the USA Environmental Protection Agency has confirmed that its proposed actions on CO₂ in the USA could only have a miniscule effect on global temperature this century.

Jill Duggan, European Commission’s National Expert on Carbon Markets and Climate Change and past head of Britain’s International Emissions Trading acknowledged in a radio interview that^{4 5}:

“she did not know what the costs of European action on Carbon Dioxide were nor how much effect European efforts would have on world temperature.”

In 2005 Bjorn Lomborg, (the sceptical environmentalist), now much vilified by his by his previous Green colleagues said⁶:

“Even if everyone (including the United States) applied the Kyoto rules and stuck to them throughout the century, the change would be almost immeasurable, postponing warming for a mere six years in 2100 while costing at least \$150 billion a year.”

CO₂ in the atmosphere

There is no difference between Man-made CO₂ molecules and the CO₂ molecules that are generated within the biosphere and occur naturally. Man-made CO₂ molecules are not especially potent in affecting climate and temperature. Photosynthesis is impeded and plant life is stressed at CO₂ levels of less than 200 ppm. Additional atmospheric CO₂ significantly improves all plant growth and thus food production. And extra CO₂ also enhances the drought tolerance of all plant life.

Weight of atmosphere ⁷	~5,148,000,000,000 tonnes
Weight of CO ₂ (in 2007)	~2,996,000,000,000 tonnes
Equals by weight	0.05820% or 582 ppm ^w
Convert weight - volume 0.658	equals 383 ppm ^v
Man-made emissions (in 2009)	~30,400,000,000 tonnes
~50% reabsorbed by oceans and biosphere	~15,200,000,000 tonnes
Equals 0.000295% or 2.95 ppm ^w	

³ <http://www.climatedepot.com/r/10294/Australian-Climate-Commissioner-Flannery-Admits-If-we-cut-emissions-today-global-temperatures-are-not-likely-to-drop-for-about-a-thousand-years>

⁴ http://www.google.fr/search?client=safari&rls=en&q=jill+duggan+andrew+bolt&ie=UTF-8&oe=UTF-8&redir_esc=&ei=VhewTeesHMa08QP1sfXqCw

⁵ <http://johnosullivan.livejournal.com/32823.html>

⁶ <http://www.project-syndicate.org/commentary/lomborg1/English>

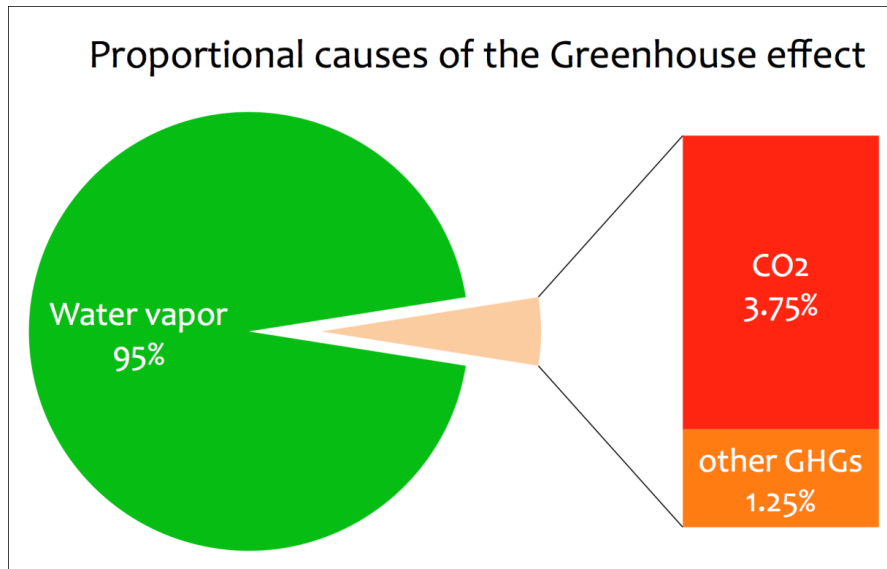
⁷ <http://micpohling.wordpress.com/2007/03/30/math-how-much-co2-by-weight-in-the-atmosphere/>

Convert weight - volume 0.658 equals 1.94 ppm^v
Business as Usual annual Man-made emissions equals ~+1.94 ppm^v per annum
Notes: ppm^v - parts / million by volume : ppm^w - parts / million by weight

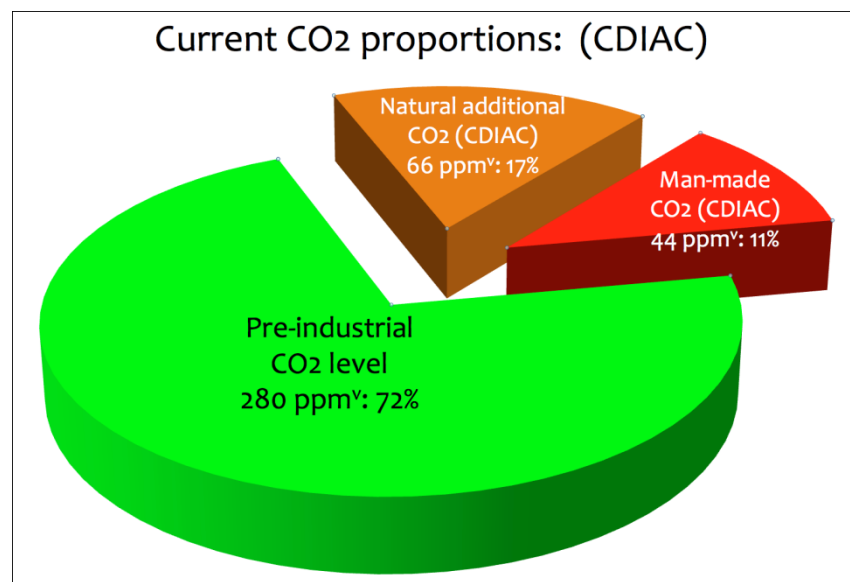
Proportions of current Greenhouse Effect

By far the greatest bulk of the greenhouse effect is caused by water vapour, approximately 95%. Of the remaining 5% Greenhouse effect caused by other Greenhouse Gases only $\frac{3}{4}$ is attributable to CO₂, both Man-made and Naturally occurring⁸.

This differential [$\frac{3}{4}$ CO₂ - $\frac{1}{4}$ other GHGs] accounts for the much greater greenhouse effect of the other lower concentration gases such as Nitrous Oxide and Methane and CFCs.



Man-made additions to CO₂ in the atmosphere are only a part of the overall increase in the level of CO₂. The total additional CO₂ since 1850 is ~110 ppmv, 28% of the current ~390 ppm^v. But according to CDIAC, the Carbon Dioxide Information Analysis Centre of the US Department of Energy, the total Man-made contribution to the level of CO₂ to date should be calculated as only ~40% of the rise in CO₂ since 1850⁹, thus amounting to 11% of the current total of ~390 ppm^v.

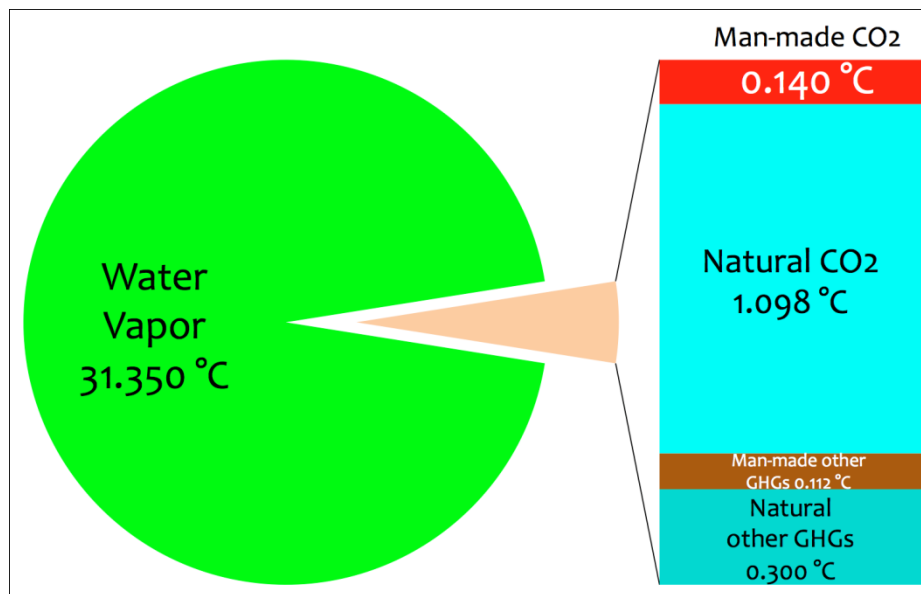


⁸ http://www.geocraft.com/WVFossils/greenhouse_data.html

⁹ <http://cdiac.ornl.gov/faq.html#Q2>

Transposition of Greenhouse Effect into °C

Water Vapour ~95% of effect	~31.35°C
Greenhouse Gases ~5%	~1.65°C
Carbon Dioxide at 390 ppm ~75%	<u>~1.24°C</u>
Natural CO ₂ ~89% (CDIAC)	~1.10°C
Current Worldwide Man-made CO₂ ~11%	~0.14°C
Other Greenhouse gases	~0.42°C
Natural	~0.30°C
Man-made	~0.12°C



CO₂ levels have been increasing naturally. They are augmented by Man-made additions at a rate of about 3.88 ppm^y per year but roughly half of these emissions is reabsorbed by the oceans and biosphere. The value of 0.14°C for the temperature effect of worldwide past emissions has been accepted in correspondence with Professor David MacKay and it has not been contradicted by Professor Judith Curry.

Questions of scale

The climate/weather easily varies at any location by 10-20°C within a single day and by 40-50°C in any year¹⁰. But according to the straightforward calculations set out later, the closure of the World's entire carbon based economies continuing Business as Usual, eliminating their undoubted benefits to mankind, could only ever result in:

- a diminution of Man-made CO₂ based Greenhouse temperature effect of ~+0.25 °C over the 250 years 1850 - 2100,
 - comprising: ~+0.14 °C for the World temperature effect from all CO₂ emissions since 1850 till the present
 - and ~+0.11 °C for all future CO₂ emissions continuing Business as Usual till the year 2100.

¹⁰ http://rps3.com/Pages/Burt_Rutan_on_Climate_Change.htm

This estimate of the Worldwide Man-made CO₂ based temperature effect is equivalent to ~0.1°C per century. This level it is about ~20 millionths of any normal annual temperature variation at any particular location. So the Global Man-made temperature effect is minuscule immeasurable and irrelevant.

Using simple proportions based on a total Greenhouse effect of 33°C

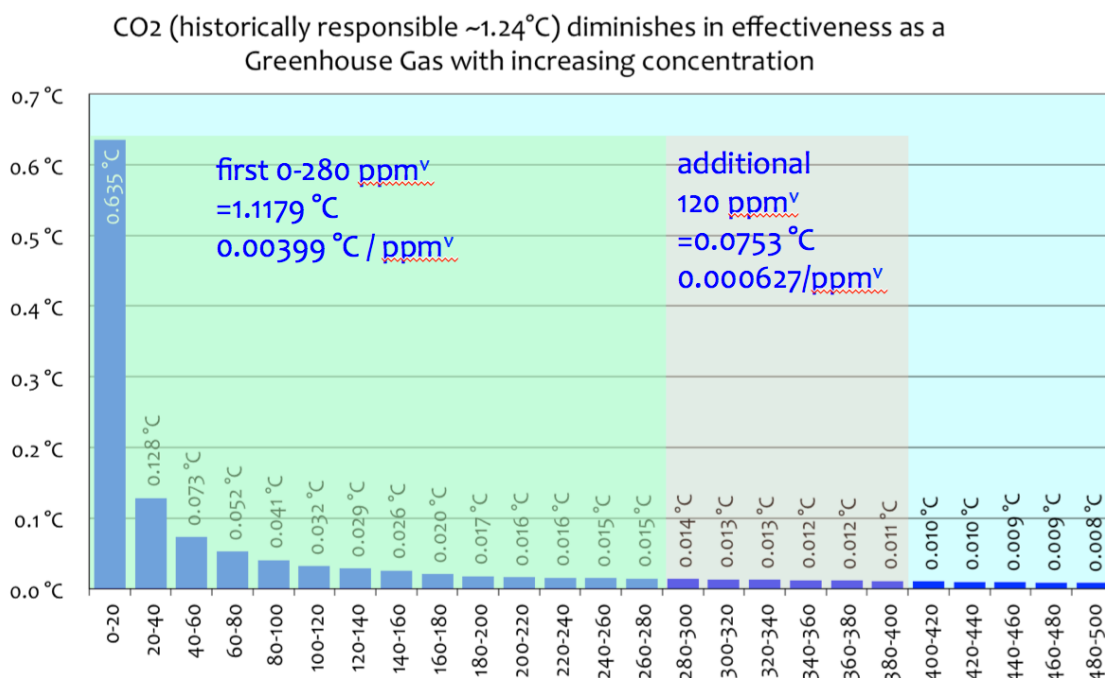
the total CO₂ effect of 1.24°C for 390 ppm^v = 0.00318°C/ppm^v

Man-made Business as Usual emissions of 1.94 ppm^v per year is thus equivalent to warming of 0.00617°C/year

Using this proportional calculation, continuing Business as Usual for the next 90 years could result in a temperature increase of ~+0.56°C till 2100

The Diminishing temperature effect of increasing CO₂ concentrations

But these proportional calculations do not account for the reduced warming effect of CO₂ as a Green House Gas as its concentration rises, because of its diminishing infra-red absorption characteristics^{11 12}.



Of the ~1.24°C warming historically attributable to CO₂ 1850 - to date

CO₂ 0-280 (280) ppm^v equivalent to the first 1.1179 °C ~0.00399°C / ppm^v

CO₂ 0-400 (400) ppm^v equivalent to a total of 1.1932 °C ~0.00298°C / ppm^v

CO₂ 280-400 (120) ppm^v the extra CO₂ emissions occurring since 1850 equivalent only to 0.0753 °C ~0.000627°C / ppm^v

And the temperature effect of continuing rises in CO₂ concentration will continue to reduce marginally as CO₂ concentrations increase.

In this century to 2100 Man-made emissions from continuing Business as Usual gives an estimated increase:

at ~1.94ppm^v/year x 90 = an extra 175 ppm^v

175 x 0.000627 °C = ~+0.11°C.

¹¹ <http://wattsupwiththat.com/2010/03/08/the-logarithmic-effect-of-carbon-dioxide/>

¹² <http://nige.files.wordpress.com/2011/02/saturated-greenhouse-effect-fact.pdf>

World-wide Man-made CO₂ temperature effect continuing Business as Usual to 2100^{13 14} ~ 0.11 °C

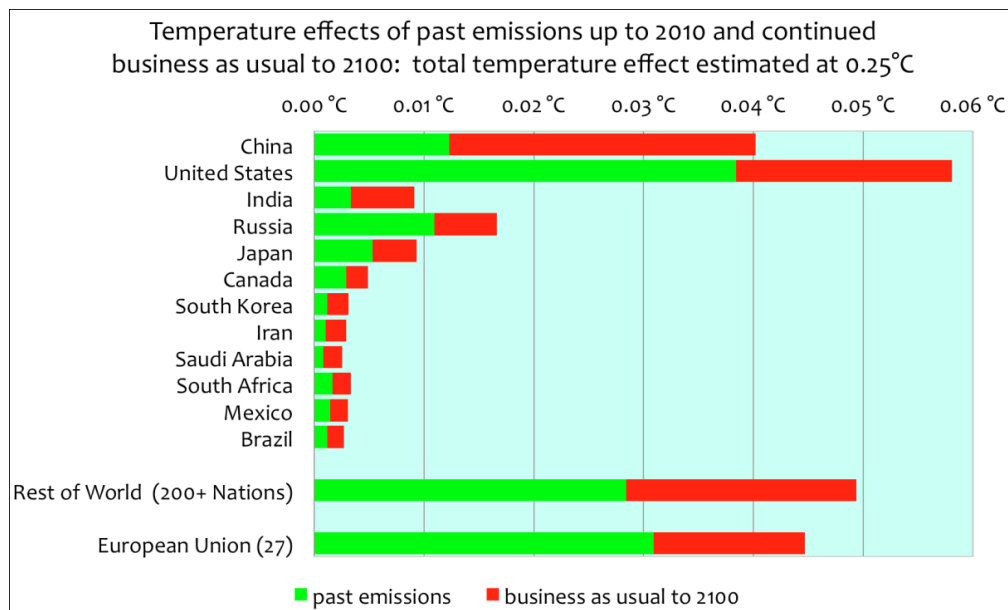
	Past emissions	Future Business as Usual	Total 1850-2100
China	0.0123 °C	0.0279 °C	0.0402 °C
United States	0.0384 °C	0.0196 °C	0.0581 °C
India	0.0033 °C	0.0058 °C	0.0091 °C
Russia	0.0110 °C	0.0057 °C	0.0166 °C
Japan	0.0053 °C	0.0040 °C	0.0093 °C
Germany	0.0088 °C	0.0028 °C	0.0116 °C
Canada	0.0029 °C	0.0020 °C	0.0049 °C
South Korea	0.0012 °C	0.0019 °C	0.0031 °C
Iran	0.0010 °C	0.0019 °C	0.0029 °C
United Kingdom	0.0066 °C	0.0019 °C	0.0085 °C
Saudi Arabia	0.0009 °C	0.0017 °C	0.0026 °C
South Africa	0.0017 °C	0.0016 °C	0.0033 °C
Mexico	0.0015 °C	0.0016 °C	0.0031 °C
Brazil	0.0012 °C	0.0015 °C	0.0027 °C
Australia	0.0015 °C	0.0015 °C	0.0030 °C
Indonesia	0.0008 °C	0.0015 °C	0.0023 °C
Italy	0.0022 °C	0.0015 °C	0.0037 °C
France	0.0034 °C	0.0014 °C	0.0049 °C
Spain	0.0013 °C	0.0012 °C	0.0025 °C
Rest of World (200+ Nations)	0.0346 °C	0.0230 °C	0.0576 °C
World	0.1400 °C	0.1100 °C	0.2500 °C
European Union (27)	0.0309 °C	0.0138 °C	0.0447 °C

This implies that elimination of **all** future CO₂ emissions from the following sources could only ever result in the following reductions in the Greenhouse effect by 2100.

UK	0.0019 °C
European Union (27 Nations, including the UK)	0.0138 °C
Australia	0.0015 °C

¹³ <http://www.guardian.co.uk/news/datablog/2011/jan/31/world-carbon-dioxide-emissions-country-data-co2#data>

¹⁴ <https://spreadsheets.google.com/cc?key=oAonYZs4MzIZbFF1QWooYzOGoyWkZqcUhnNDVISWc&hl=en#gid=1>



The World is Not Joining-in as noted by Prof Richard Muller ¹⁵

China questions the role of Man-made CO₂ in determining climate effects and is now the largest CO₂ emitter, having surpassed the USA in 2006, now by ~40%. China completes a new coal-fired power plant each week¹⁶.

India has set up its own climate institute to re-examine the claims and policy recommendations made by the IPCC and grew its emissions by ~9% in 2009.

Japan has withdrawn support for the Kyoto accord.

Russia, Brazil, Iran, Mexico, South Korea, South Africa and Canada do not support action on Man-made Global Warming.

The remaining “Rest of the World” (200+ Nations), ~19% of world emissions and ~40% of the world population, mainly consist of some 200+ Underdeveloped or Developing Nations, who are not interested in emission reduction, but who are expecting to be the financial beneficiaries at the expense of the Developed Nations of the Western Climate Change process.

Without the USA but including the 200+ developing Nations in the rest of the world, the dissenting Nations already represent about 2/3 of the current world emissions and 85% of the world population.

And with Republican control of Congress, the USA is likely to re-examine:

- the scientific inconsistencies of the Man-made Global Warming assertion
- the reliance of the Environmental Protection Agency on the reports of the UN IPCC
- and thus to terminate any USA response to mitigate Catastrophic Anthropogenic Global Warming.

The USA failure to commit adds a further 18% to the current world emissions not falling under the influence of any CO₂ controls. The withdrawal of the USA would then mean that about 85% of world emissions and 92% of the world population were no longer involved in any action on controlling CO₂.

An opt-out by the USA leaves the European Union, Australia, New Zealand and a few others, isolated in their continuing adherence to the Man-made Global Warming assertion.

¹⁵ <http://www.youtube.com/watch?v=VbRoEPWgkEI&NR=1>

¹⁶ http://www.washingtonpost.com/opinions/hold-the-accolades-on-chinas-green-leap-forward/2011/04/19/AFLdZMEE_story.html

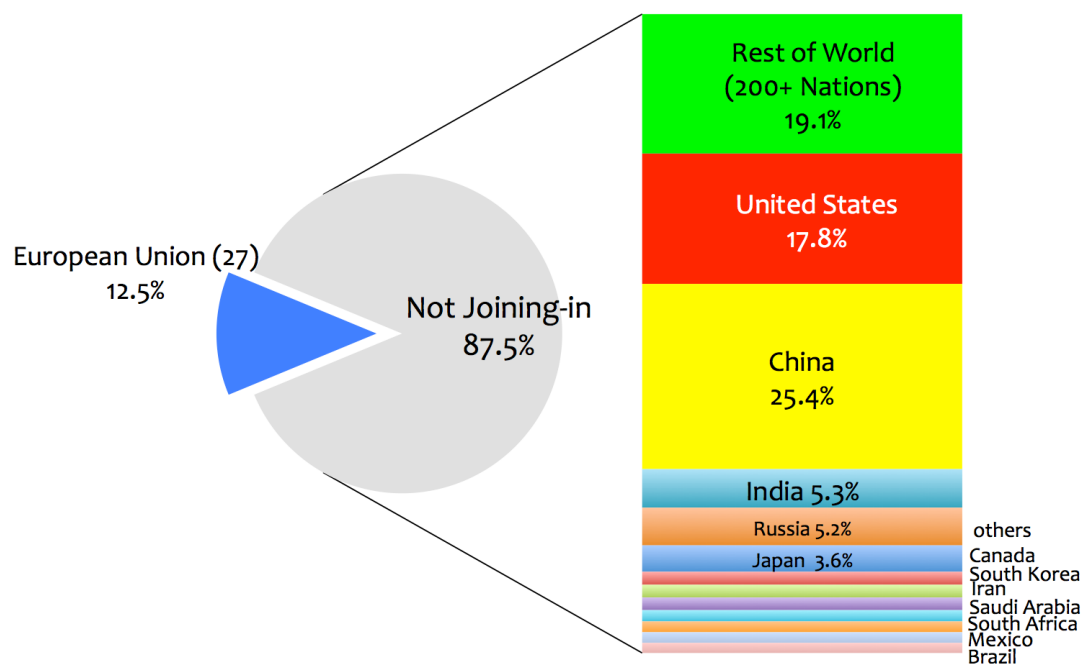
It is only in the EU, (including the UK, ~1.7% of World CO₂ emissions), as well as Australia and New Zealand where their Governments have committed action on CO₂ into legislation. These isolated Nations are about 8% of the World population and some 14% of World CO₂ emissions.

Their actions can only ever achieve virtually undetectable reductions of World temperature.

These EU and Antipodean Nations are isolated in their actions on the basis that it is their duty to show an example to the rest of the world.

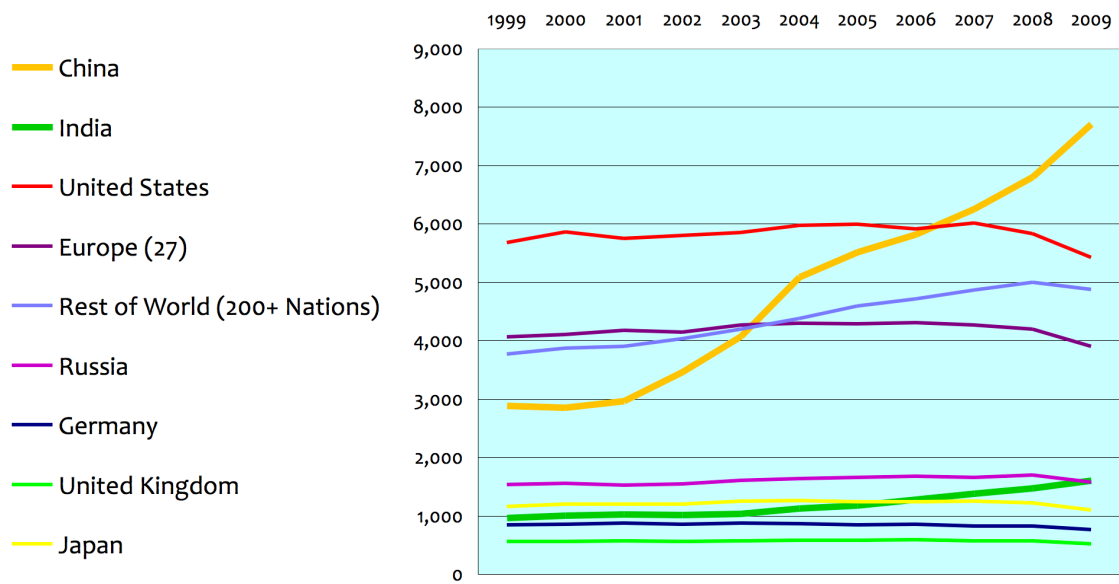
But it is entirely unlikely that all the other dissenting Nations 85% of World CO₂ emissions are going to change their attitudes and damage their economies in the same manner.

Percentage of emissions in 2009: continuing current business as usual to 2100 results in a Man-made CO₂ temperature effect of 0.11°C

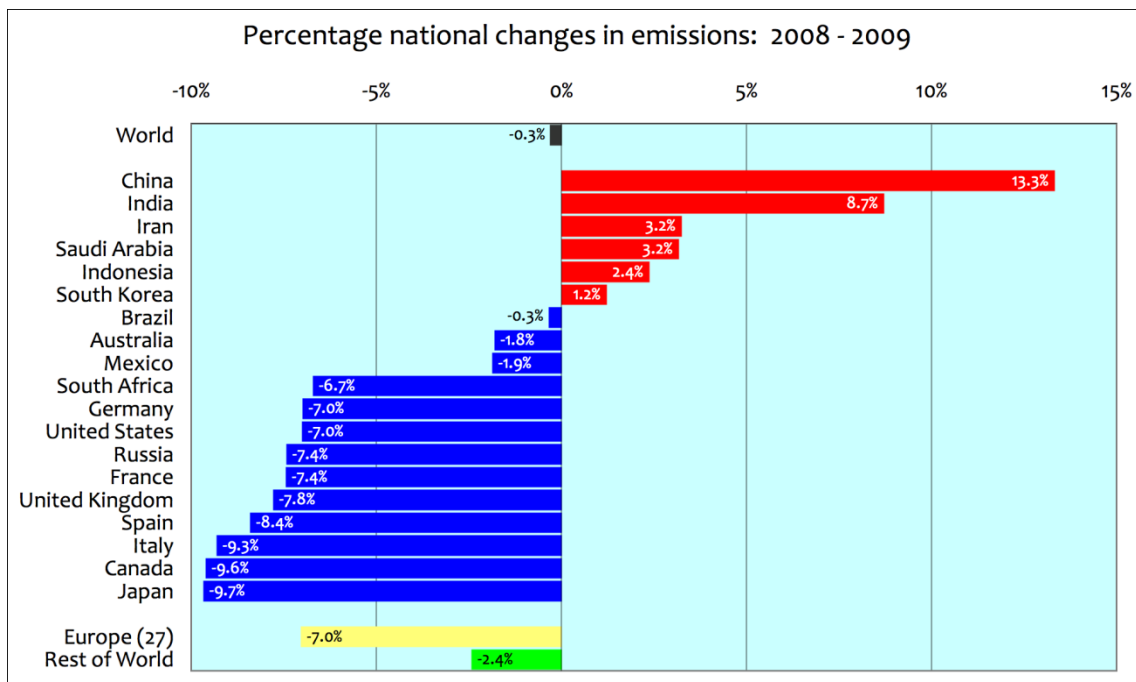


But growth of Emissions from developing countries such as China and India continues, with China predominant and India following but to a much lesser absolute extent.

Emmission changes by Major Nations 1999 - 2009: ('000,000 tonnes)



For the moment overall World emission growth has stabilized because as a result of economic recession the developed countries are seeing a significant reduction of CO₂ emissions: This reduction is all but outweighed by continuing growth in the developing world.



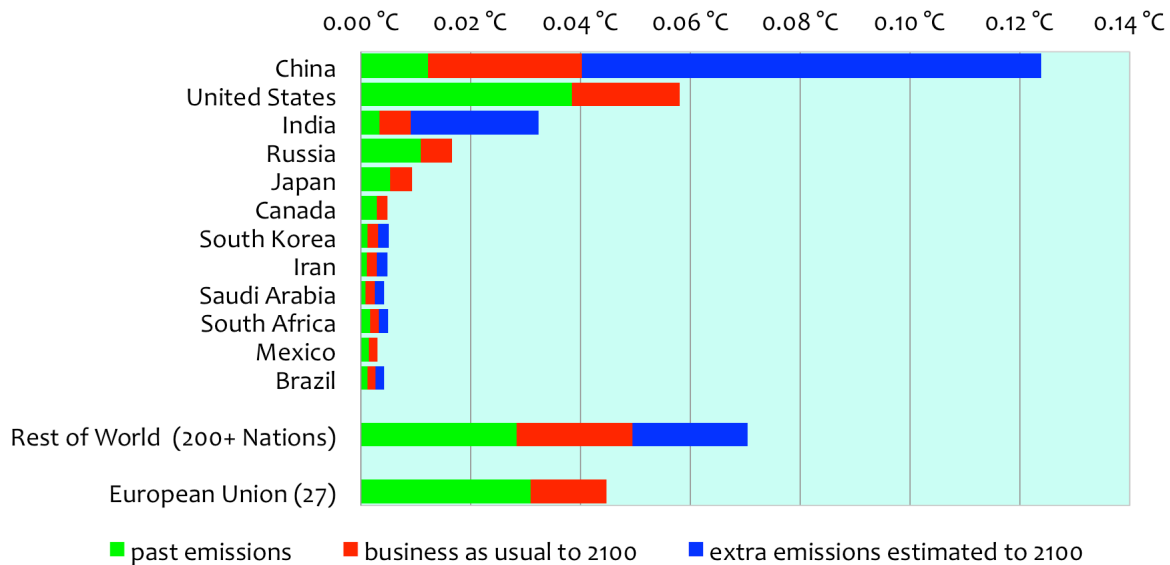
Crude modelling a possible future to 2100

Estimate of the temperature effects of a simple model with extra emissions from developing Nations, based on trivial estimates as follows:

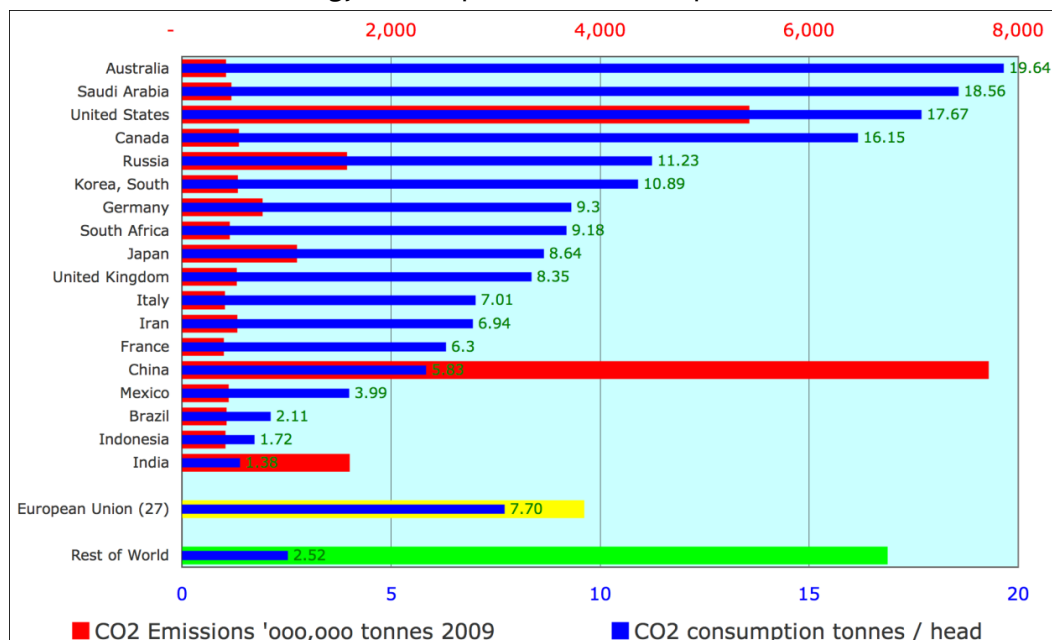
- China: current business x4
- India: current business x5

- South Korea and Iran, Saudi Arabia, South Africa, Brazil, Indonesia and Rest of the World (200+Nations): current business x2
- Developed countries USA, Russia, Japan, Canada, Mexico and the European Union continue with Business as Usual.

Temperature effects of past emission from 1850, business as usual till 2100, plus an estimate of further emissions from developing Nations resulting in a total Man-made temperature effect of 0.387°C



Even with these extra emissions the temperature increase would only amount to ~+0.137°C over the coming 90 years. And even so the emissions per head of both China and India would still not match the current levels of energy consumption in the developed world as shown below.

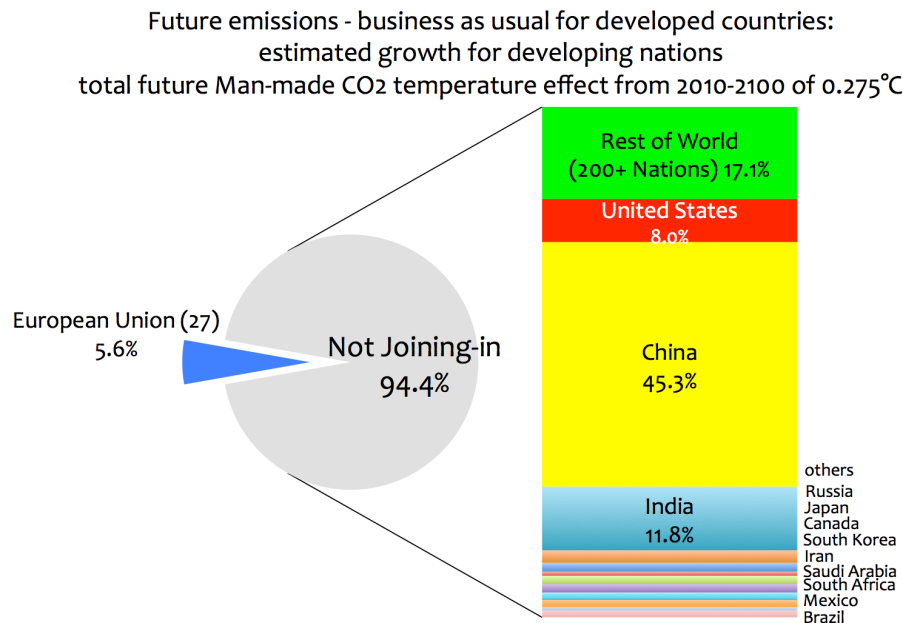


This model underestimates the CO2 increases in the developing world anticipated by Prof Richard Muller.

But whatever their actions they could only ever have minimal effect by making any real commitment to emissions reduction:

- only Nations representing less than 15% of the worlds current emissions (the European Union, Australia and a few others), are making any progress = $\sim 0.0165^{\circ}\text{C}$
- even with massive disruption and damage to their economies all they might achieve is a 30% emissions reduction = $\sim 0.0049^{\circ}\text{C}$

But as the growth in emissions as modelled here is accounted for the part to be played by European Union and Antipodean Nations diminishes even further leaving only $\sim 6\%$ of the world emitters joining-in.



Nonetheless these few European and Antipodean countries seem willing to do fruitless damage:
to their entire economies
to their energy security
to their worldwide competitiveness.
to support the unproven assertion of Catastrophic Man-made Global Warming¹⁷.

Even certain European attitudes are changing

Progressively now, in 2011, it is clear that many of the more rational and financially stretched Nations within the European Union are already reneging on their commitment to renewable energy, with:

reduction of feed-in tariffs

withdrawal of subsidies for wind power and solar energy, etc.

The EU Nations¹⁸ who are reviewing their commitments in opposition the central European Union policy include:

the Netherlands

Germany

Denmark

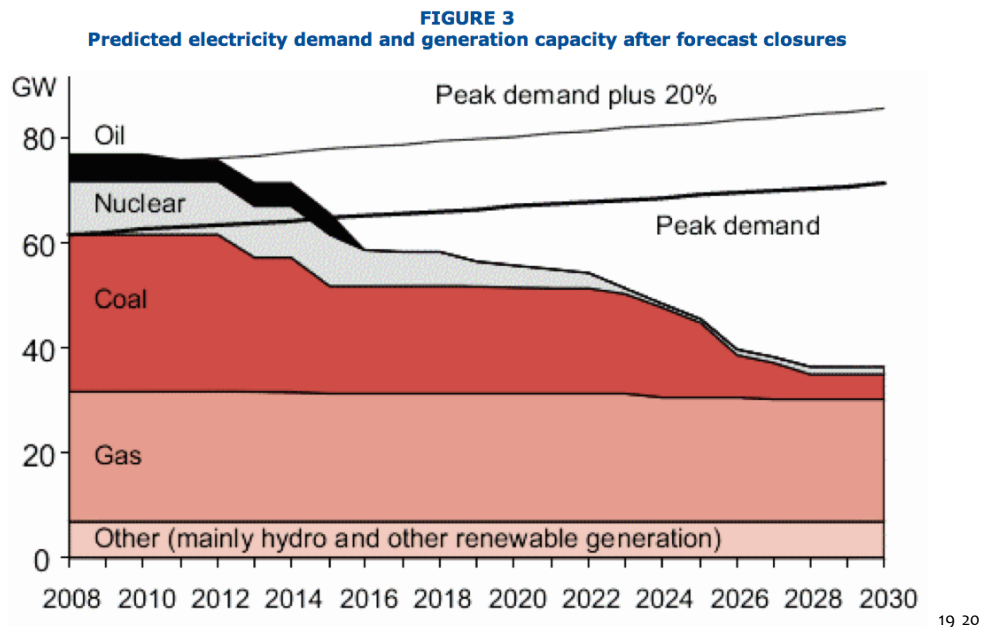
Spain, France and several others.

¹⁷ <http://wattsupwiththat.com/2011/03/13/how-much-would-you-buy/#more-35859>

¹⁸ <http://www.thegwpf.org/uk-news/3059-british-industry-in-rebellion-over-carbon-targets.html>

Unacceptable energy future for the United Kingdom

The United Kingdom, although under similar financial pressures, is still uniquely wedded to its costly policies supporting unreliable and uneconomic renewable energy. Such policies are being pursued regardless of the costs, their ineffectiveness and the massive risk they will cause to UK energy security.



Such an unacceptable energy future includes the concept that electricity in the UK may never again be available as a continuous service on demand, whenever required by the consumer.

¹⁹ <http://www.publications.parliament.uk/pa/ld200708/ldselect/ldconaf/195/19505.htm>

²⁰ <http://www.telegraph.co.uk/comment/8470256/New-figures-show-the-lights-may-go-out-sooner-than-we-thought.html>

Era of constant electricity at home is ending, says power chief

• The days of permanently available electricity may be coming to an end, the head of the power network said yesterday.

Families would have to get used to only using power when it was available, rather than constantly, said Steve Holliday, chief executive of National Grid. Mr Holliday was challenged over how the country would "keep the lights on" when it relied more on wind turbines as supplies of gas dwindled. Electricity provided by wind farms will increase six-fold by 2020 but critics complain they only generate on windy days.

Mr Holliday told Radio 4's *Today* programme that people would have to "change their behaviour". "The grid is going to be a very different system in 2020, 2030," he said. "We keep

thinking that we want it to be there and provide power when we need it. It is going to be much smarter than that.

"We are going to change our own behaviour and consume it when it is available and available cheaply."

Mr Holliday was speaking ahead of a speech last night to the Royal Academy of Engineering, in which he warned that the government was "looking more to communities and individuals to take power into their hands".

He also warned that pylons would still be used to carry power cables across the countryside because it was 10 times more expensive to bury them.

"As a society, we all need to be clear about what we can and cannot afford," he said.

²¹ <http://bishophill.squarespace.com/blog/2011/3/3/the-third-world-ambition-of-the-uk.html>

Ancillary Tables^{22 23}

Percentage emissions past 1850-2009 and current

	Emissions 1900 to 2009	Emissions in 2009
China	8.78%	25.37%
United States	27.46%	17.85%
India	2.38%	5.27%
Russia	7.82%	5.17%
Japan	3.81%	3.61%
Germany	6.31%	2.52%
Canada	2.10%	1.78%
South Korea	0.86%	1.74%
Iran	0.73%	1.73%
United Kingdom	4.72%	1.71%
Saudi Arabia	0.61%	1.55%
South Africa	1.20%	1.48%
Mexico	1.05%	1.46%
Brazil	0.84%	1.38%
Australia	1.08%	1.37%
Indonesia	0.59%	1.36%
Italy	1.57%	1.34%
France	2.46%	1.30%
Spain	0.91%	1.09%
Rest of World (200+ Nations)	19.98%	20.92%
European Union (27)	22.08%	12.51%

²² <http://www.guardian.co.uk/news/datablog/2011/jan/31/world-carbon-dioxide-emissions-country-data-co2#data>

²³ <https://spreadsheets.google.com/cc?key=oAonYZs4MzlZbFF1QWooockYzOGoyWkZqcUhnNDVISWc&hl=en#gid=1>

Historic and current emissions: '000,000 tonnes

	emissions 1900 to 2009	annual emissions in 2009
China	105,295	7,711
United States	329,363	5,425
India	28,514	1,602
Russia	93,814	1,572
Japan	45,721	1,098
Germany	75,683	766
Canada	25,154	541
South Korea	10,270	528
Iran	8,815	527
United Kingdom	56,575	520
Saudi Arabia	7,303	470
South Africa	14,378	450
Mexico	12,546	444
Brazil	10,116	420
Australia	12,955	418
Indonesia	7,116	413
Italy	18,770	408
France	29,555	397
Spain	10,865	330
Rest of World (200+ Nations)	239,587	6,358
European Union (27)	264,767	3,804
World	1,199,345	30,396