

# Science and Politics: Strategies to Address Global Warming

尹, 虎 / Yin, Hu

---

(出版者 / Publisher)

法政大学大学院 国際日本学インスティテュート専攻委員会

(雑誌名 / Journal or Publication Title)

国際日本学論叢 / 国際日本学論叢

(巻 / Volume)

10

(開始ページ / Start Page)

102(25)

(終了ページ / End Page)

87(40)

(発行年 / Year)

2013-03-08

(URL)

<https://doi.org/10.15002/00008965>

## **Science and Politics: Strategies to Address Global Warming**

**Hu Yin**

*Research Center for Japanese Studies, Tsinghua University (China)*

### **I. Introduction**

The effect of greenhouse gases on global warming is, in my opinion, the most important environmental issue facing the world today. Our knowledge of the underlying causes of climate change is growing, but the problem brims with uncertainties, raising serious scientific and ethical questions.

Assessment of strategic options for solving the problem requires knowledge of geophysical constraints and their implications. The geophysical facts practically dictate the general course of action. Fortunately, it is clear that the required course is technically feasible, and it would have great benefits to the public in developing and developed countries. Unfortunately, knowledge and understanding of the situation are not widespread. We need to help more people draw attention to this problem.

Human productive activities have significant effects on the global environment. Policies to foster economic growth, equity, trade, and technological change also have substantial impact on the unfolding of the global environmental scenario, which must therefore be taken into account in evaluating these policies.

## II. Global Warming and Climate Situation

Climate Change, Global Warming and the Greenhouse effect are the biggest issues we face in the world today. This is a quick overview to show why we need to reduce carbon emissions, and change the way we live. The overwhelming majority of scientists now agree that our globe is undergoing major Climate Change. They also agree that the level of carbon dioxide in the atmosphere is rising at a terrifying rate. We must stop burning fossil fuels in our power stations and transport systems. If not, we face the most catastrophic consequences that will affect all who live on our beautiful globe.

### 1. Atmosphere

Our atmosphere is a layer surrounding the earth held in place by gravity and primarily made up of Nitrogen (78%), Oxygen (21%), with water and other gases making up the remainder. This small remainder is made up of the trace gases Argon, Carbon Dioxide, Neon, Helium, Methane, Hydrogen, Nitrous Oxide and Ozone. Scientists now realize that the proportion of these gases has increased significantly over a few hundred years. The real increase in carbon dioxide levels in our atmosphere began around the time of the Industrial Revolution. This is when we began to burn fossil fuels (coal) in large quantities to power our steam engines. The 'Greenhouse Gases', Carbon dioxide, nitrous oxide and methane have all increased exponentially since the 1800s. Today the use of fossil fuel for power and electricity is thousands of times more than what it was in the 1800s (Stephen Ewings 2008).

There have been a number of scientific papers published since 2005 predicting 'tipping points' in the global warming process – that is, critical

thresholds at which anthropogenic forcing cause small perturbations that can precipitate large changes – beyond which the warming process is reinforced by positive feedback mechanisms to the point that global warming takes on a momentum independent of human activities (Lenton *et al.* 2008). If it has not already happened, it is now almost certain that within several years we will have set in motion sufficient feedback mechanisms so that humans will be powerless to stop the Earth's change to a new climate, and possibly a new geological era, which will not be conducive to human life. This will bring with it extreme weather events, rising sea levels, increasing droughts, floods and storms of a magnitude not experienced in human history. Hundreds of millions of people will become refugees (Wang *et al.* 2006).

## 2. Greenhouse Gas

To explain why these gases are termed green house gases, we need to understand that during the day the earth absorbs heat from the sun, although much of this is radiated back out into space. The atmosphere surrounding our earth contains these gases, and acts like a blanket keeping some of the heat in. If there weren't an atmospheric 'blanket' we would freeze during the night, like some of the other planets or our moon. This is where it gets a bit frightening! The fossil fuels we are burning in ever increasing amounts contribute to higher concentrations of methane, carbon dioxide and nitrous dioxide. These gases are called greenhouse gases as they effectively make the blanket around our globe thicker, trapping more heat and turning the globe into a green house (Cong *et al.* 2012).

If the correction of the greenhouse gas externality raised the whole future path of world income substantially, there would be a case for redistributing

## Science and Politics: Strategies to Address Global Warming

this benefit by over compensating the current generation for its reduction in emission of greenhouse gases with other types of consumption. Some degree of overcompensation is probably desirable in any case to allow for errors in the compensation scheme and to create political support for mitigation policy. But it would only be in the context of this second-order adjustment that the questions of intergenerational equity and time-discounting would become relevant.

Since the allocation of welfare between current and future generations is already affected by conventional investment policy, the global warming problem introduces no novel considerations in this discussion. Greenhouse gas emissions in 2010 were reported to have increased to 30.6gigatonnes (Gt) of carbon dioxide, an increase of 1.6 Gt on the previous year, resulting in the highest carbon emissions in history (Harvey 2011). This emissions trajectory means there is a 50 per cent chance that global average temperature will increase by more than 4°C by 2100 and runaway global warming. While most of the increase comes from China and India, much of the developed world's very small amount of reduction in the trajectory of increasing emissions is due to the dependence on high emissions-producing imports from China (Harvey 2011), and all countries are 'eyeing up extraordinary and risky ways to extract the world's last remaining reserves of fossil fuels.

### 3. Global Temperature Increase

The world has warmed 0.6°C in the past hundred years and scientists are clear that the world will get warmer this century due to further increases in greenhouse gas concentrations. Average global surface temperatures are likely to increase by 1.4 to 5.8°C from 1990 to 2100. Major problems remain

with the above assessment. The warming rate in the last three decades is not significantly different from the warming rate in the early 20th century (1915-45). Temperature records are far from perfect and contain biases from urbanization, distribution of measurement stations, instrument changes, time of observation, assorted problems in measuring temperatures in ocean areas, and so on. (Wang *et al* 2006) These factors could introduce a total bias of 0.2-0.3°C, or about one-third of the observed warming. Even if we accept that the warming as real, there is a strong argument that approximately half of the warming—the portion that took place in the early 20th century was a natural recovery from the Little Ice Age. There are many non-greenhouse factors at work on temperature, and it is very difficult to isolate the signal related to the buildup of human produced greenhouse gases. Finally, we need to understand why the trends in surface and lower tropospheric temperature differ to be able to explain the roles of the various climate system forcing. Consequently, strong evidence suggests that there was a systematic underestimation of temperature. In other words, the Earth was probably warmer in the past than our records indicate and, therefore, the change in temperature that we now observe is not as great as it appears (Ewings 2008).

In addition to warming of the Earth's surface, there has been an increase in heat waves, warming of the lower atmosphere and deep oceans. There are fewer frosts, glaciers are retreating and sea ice is decreasing. Sea levels have risen 10–20 cm and there is increased heavy rainfall in some regions, and less in others. The Stern Review tells us that, "The scientific evidence is now overwhelming: climate change is a serious global threat, and it demands an urgent global response." Human induced climate change is another major stress in a world where natural and social systems are already experiencing

## Science and Politics: Strategies to Address Global Warming

pollution, increasing resource demands and unsustainable management practices.

The earth has gone through many natural climatic cycles during its long history. The scary part is we are causing changes to happen at an unbelievable rate, much faster than normal. Our global climate is nearing tipping points. Changes are beginning to appear, and there is a potential for rapid changes with effects that would be irreversible – if we do not promptly slow fossil fuel emissions during the next few decades. Tipping points are fed by amplifying feedbacks. As Arctic sea ice melts, the darker ocean absorbs more sunlight and speeds melting. As tundra melts, methane a strong greenhouse gas, is released, causing more warming. As species are pressured and exterminated by shifting climate zones, ecosystems can collapse, destroying more species (Gao *et al* 2008).

### III. Background history of international responses to global warming

One of the earliest and most influential environmental books, published in 1962, is Rachel Carson's seminal work, *Silent Spring*, which drew attention to the consequences for the environment of indiscriminate use of pesticides and the efforts of corporations to suppress this information. In the 1960s and 1970s, the UK economist Barbara Ward wrote several books in the same vein, including *Only One Earth* (1972), written with René Dubois. That book broadened the popular base of environmentalism and connected ideas of sustainability to economics.

The history of global environmental efforts can be traced back to the UN Conference on the Human Environment in Stockholm in 1972 which in turn

led to several multilateral environmental agreements This was succeeded by the World Commission on Environment and Development (WCED, 1983-85).

The politics of climate change happened in the late 1960s and the early 1970s under NATO and USA President Richard Nixon. 1979 saw the world's first World Climate Conference. 1985 was the year that the Vienna Convention for the Protection of the Ozone Layer was created and two years later in 1987 saw the signing of the Montreal Protocol under the Vienna convention. This model of using a Framework conference followed by Protocols under the Framework was seen as a promising governing structure that could be used as a path towards a functional governance approach that could be used to tackle broad global multi-nation/state challenges like global warming. One year later in 1988 the Intergovernmental Panel on Climate Change was created by the World Meteorological Organization and the United Nations Environment programme to assess the risk of human-induced climate change (Jiao *et al* 2010).

The United Nations Environment Programme (UNEP) and the World Meteorological Organisation (WMO) established the Intergovernmental Panel on Climate Change (IPCC) to investigate climate change from the late 1980s. under this kinds of academic atmosphere, In 1991 saw the publishing of the book *The First Global Revolution* by the Club of Rome report which sought to connect environment, water availability, food production, energy production, materials, population growth and other elements into a blueprint for the twenty-first century: political thinking was evolving to look at the world in terms of an integrated global system not just in terms of weather and climate but in terms of energy needs, food, population, etc. 1992 was the



## Science and Politics: Strategies to Address Global Warming

year that the United Nations Framework Convention on Climate Change (UNFCCC) was agreed at the Earth Summit in Rio de Janeiro and the framework entered into force 21 March 1994. The conference established a yearly meeting, a conference of the parties or COP meeting to be held to continue work on Protocols which would be enforceable treaties.

1995 saw the creation of the phrase preventing dangerous anthropogenic interference with the climate system (also called avoiding dangerous climate change) first appeared in a policy document of a governmental organization, the IPCC's Second Assessment Report: Climate Change 1995 and in 1996 the European Union adopt a goal of limiting temperature rises to a maximum 2°C rise in average global temperature.

1997 saw the creation of the Kyoto Protocol under the United Nations Framework Convention on Climate Change (UNFCCC) in a very similar structure as the Montreal Protocol was under the Vienna Convention for the Protection of the Ozone Layer which would have yearly meetings of the members or CMP meetings. However in the same year, the U.S. Senate passed Byrd–Hagel Resolution rejecting Kyoto without more commitments from developing countries (Byrd-Hagel Resolution 1998).

Since the 1992 UNFCCC treaty, eighteen COP sessions and eight CMP sessions have been held under the existing structure. In that time, global CO<sub>2</sub> emissions have risen significantly and developing countries have grown significantly with China replacing the United States as the largest emitter of greenhouse gases. To some, the UNFCCC has made significant progress in helping the world become aware of the perils of global warming and has moved the world forward in the addressing of the challenge. To others, the UNFCCC process has been a failure due to its inability to control the rise of greenhouse gas emissions. A number of proposals for a Global Climate

Regime are currently discussed, as the Durban Platform for Enhanced Action calls for a comprehensive new agreement in 2015 that includes both Annex-I and Non-Annex-I parties (Weston 2012).

#### **IV. Global Warming Reduction Strategy**

There is considerable uncertainty regarding the amount of warming, its timing, and the regional patterns of change. However, even with the uncertainty, it is prudent to embark on a strategy to reduce greenhouse gas emissions. There are many benefits from a global warming strategy that go beyond greenhouse gas emission reductions. For example, the actions complement other economic and environmental goals: reducing air pollution; providing cost effective electric power and natural gas service; increasing reliance on renewable resources; reducing energy bills for businesses and families; expanding recycling; preventing urban sprawl and traffic congestion; and promoting tree planting. All of these benefits promote economic and environmental goals and enhance the city's livability. The following discussion begins with strategy that is available *now* and ends with others that are promising.

##### **1. Transportation**

Reduce metropolitan area vehicle miles traveled (VMT). This objective calls for meeting the same target as in the State Transportation Planning Rule, earlier than required. Actions include expanding the transit system and completing light rail lines, achieving more compact development, adopting fees to reflect the full cost of driving, making streets bicycle- and pedestrian-friendly, and providing easy access to transit and other

## Science and Politics: Strategies to Address Global Warming

alternatives to people driving alone in their vehicles.

### **2. Energy Efficiency**

Capture significant energy savings and reduce carbon dioxide emissions from electricity, natural gas, and petroleum fuels used by homes, the public sector, businesses, and industry.

### **3. Renewable Resources and Cogeneration**

Increase use of methane from landfills and waste water treatment plants as an energy source. And Promote the use of renewable energy resources(wind power, solar power, and nuclear power), district heating, and waste heat.

### **4. Recycling**

Prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution (from incineration) and water pollution (from land filling) by reducing the need for "conventional" waste disposal, and lower greenhouse gas emissions as compared to plastic production.

### **5. Tree Planting**

It is important that Promote extensive Oregon reforestation efforts by CO2 producing organizations and Promote extensive urban area tree planting and expanded maintenance of existing trees. Because trees remove carbon dioxide from the air as they grow, tree planting can be used as a geo-engineering technique to remove CO2 from the atmosphere.

## **6. Imaginative new technologies:**

The new technologies might arise to address cleaner techniques for generating energy or better ways to conserve it. The general history of technology, and of innovation, virtually guarantees that if the nation does make pursuit of a more energy efficient future a national priority.

While the problems of global warming and the associated climate change are likely to be with us for some time, the fact that evidence strongly indicates that human activity is the primary cause of the current rapid changes means that we are not helpless to mitigate the effects. Several promising Strategies which presented above, some already well developed and available, exist to help us manage our energy resources better while maintaining a healthier environment (Jiao *et al* 2010)

## **V. Concerning the political dimension to address the problem of global warming**

Global warming is a political issue. It is not the first, nor will it be the last, environmental science question with political implications. Almost by definition, any environmental issue generated by mankind's activities has both a science and a political component.

Government involvement with the solution to the problem of climate change is essential, and also why a corresponding education of the public is the only way this is likely to be achieved. Only major dedication by the government to address the problem of climate change aggressively seems likely to stimulate business and industry to move significantly beyond the inertia of established ways today (Jordan 2006).

In addition, we believe that the speed with which the problems of global

## Science and Politics: Strategies to Address Global Warming

warming and climate change can be addressed will be largely determined by what the people want, and how their government responds to these wishes. Given the many opportunities for addressing this major global problem through profitable entrepreneurial activities on many levels, there is no reason why rational politicians of both liberal and conservative orientations cannot find solutions to these problems, if the people will have it. It would seem that we are confronted with a major challenge on two fronts, educational and political. One hopes future generations will say that ours made the right choices.

The politics of global warming are very complex due to numerous factors that arise from the global economy's complex interdependence on carbon dioxide emitting hydrocarbon energy sources and carbon dioxide being directly implicated in global warming making global warming a non-traditional / non-conventional environmental challenge and its politics extremely complex: The possibility of economic misunderstanding by politicians is ever-present, as even a cursory study of economic policy-making will confirm. The resistance to investing in mitigation of global warming is most often expressed on the grounds that the resources diverted to mitigation would reduce "economic growth". The present analysis makes clear that this is simply not true. Mitigation changes the composition, but not the aggregate amount, of investment. It is hard to imagine what measure of economic growth would fail to acknowledge the increase in consumption possibilities for future generations made possible by correcting the greenhouse gas externality, correcting the greenhouse gas externality.

九  
一

One possible misunderstanding is simply that politicians who talk this way are victims of "conventional real GDP illusion", in that they have been so mesmerized by economists' fixation on real GDP growth as currently

measured that they cannot imagine incorporating the benefits of global warming in their economic thinking. The only cure for this type of illusion is for economists to be more careful in explaining the relationship between particular definitions of real GDP and economic growth and welfare.

It is also possible that the political system functions badly on this issue, in that disagreements over the distribution of the net gains from correcting the global warming externality will prevent us from achieving any gain at all. The correct economic analysis of the global warming problem, however, suggests that it is not properly speaking a political issue at all, and that ideology and partisanship have little relevance to it.

## VI. Summary

The analysis presented here suggests that the prospects for actually doing something about the global warming problem are good. We have recognized the issue in time to do something about it, and we have methods and resources to mitigate global warming. Because the reduction of greenhouse gas emissions financed by an economically appropriate reduction in conventional investments can benefit future generations with no reduction in the overall consumption of the current generation, there is appears to be no real insurmountable political obstacle to a world-wide system of mitigation.

Thus I submit that this positivist thinking provides little more than a description of the problem while precluding analysis that might challenge the vested interests seeking to uphold the status quo. The only way of preventing further global warming is to stop emissions of carbon dioxide and other greenhouse gases at the source. That is the biosphere system's imperative for human and other species' survival as we know it. However,

## Science and Politics: Strategies to Address Global Warming

the globalised capitalist economy is dependent on carbon fuel and on growth. For centuries capitalism has flourished but at the expense of building a debt to the biosphere which has left us faced with this massive problem of global warming.

In my opinion, it is still feasible to solve the global warming problem before we pass tipping points that would guarantee disastrous irreversible climate change. But urgent strong actions are needed. These actions would have multiple benefits, providing a helpful economic stimulus, improving public health, and increasing energy independence and national security. Assessment of strategic options for solving the problem requires knowledge of geophysical constraints and their implications. The geophysical facts practically dictate the general course of action. Fortunately, it is clear that the required course is technically feasible, and it would have great benefits to the public in developing and developed countries.

Global Warming is happening right now! The rate of Climate Change is now so fast we are struggling to adapt our philosophies, economics, and lifestyle to slow it down. We must alter the way we live or we will suffer staggering consequences.

### References

- Byrd-Hagel Resolution (S. Res. 1998). <http://www.nationalcenter.org/KyotoSenate.html>. (Accessed on 31<sup>st</sup> January 2013).
- Cong A, Zheng C and Tian Y (2012): Study of the Overall Trend of Global Temperature from 1891 to 2011. *China Science and Technology Information*, 22.
- Ewings S (2008): *Global Warming: What You Can Do*. <http://www.global-greenhouse-warming.com/support-files/whatucandu.pdf> (Accessed on 31<sup>st</sup> January 2013).
- 八 Gao H and Zhou M (2008): The Impact and Provision to the City's Agriculture by Climatic  
九 Warming. *Daqing Social Sciences*, 4.
- Harvey F (2011): "Worst ever carbon emissions leave climate on the brink. Record rise, despite recession, means 2C target almost out of reach". *The Guardian*. 29<sup>th</sup> May

- 2011, <http://www.guardian.co.uk/environment/2011/may/29/carbon-emissionsnuclearpower> (Accessed on 31<sup>st</sup> January 2013).
- Jiao J and Yang T (2010): The Global Warming and the Road to the Ecological Civilization. *Journal of Jiaozuo University* 24(1):
- Jordan SD (2006): *Global Climate Change Triggered By Global Warming*. [http://www.centerforinquiry.net/uploads/attachments/global-climate-change\\_1.pdf](http://www.centerforinquiry.net/uploads/attachments/global-climate-change_1.pdf) (Accessed on 31<sup>st</sup> January 2013).
- Lenton TM, Held H, Kriegler E *et al* (2008): Tipping elements in the Earth's climate system. *Proceedings of the National Academy of Sciences of the United States of America*. 105 (6): 1786-1793.
- Intergovernmental Panel on Climate Change (1995): *Second Assessment Report: Climate change 1995*.
- Mohr N (2005): "A New Global Warming Strategy: How Environmentalists are Overlooking Vegetarianism as the Most Effective Tool Against Climate Change in Our Lifetimes", *Earth Save International Report*. New York: Earth Save International.
- Wang J, Tang W, Li X *et al* (2006): Study on global temperature rising factor-impact of heat dissipation from energy consumption. *Acta Scientiae Circumsantiae*, 26(3): 515-520.
- Weston DE (2012): *The Political Economy of Global Warming*. Faculty of Humanities Curtin University, Doctoral thesis, February 2012.



## Science and Politics: Strategies to Address Global Warming

### Abstract

Global warming poses one of the most serious threats to the global environment ever faced in human history. We have recognized the issue in time to do something about it, and we have methods and resources to mitigate global warming. Every decade we delay in taking action, we are committing the planet to additional warming that future generations have to deal with offer compelling evidence from a large body of information that global climate change caused by global warming is already underway and requires our immediate attention. This paper will also explain many ways by which we can reduce the impacts of Global Warming.

**Keywords:** Global warming, Strategy, Politics