

Cooling off a Warming Planet: Analyzing the Tradeoffs in Policies for Climate Change

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Scenario

Senator Fahey put down his glasses and called his administrative assistant to ask Justin Short, his in-house expert on climate change science and policy, to see him *asap*. While waiting, he glanced again at the summary sentences of the latest report from NASA:

“If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm... An initial 350 ppm CO₂ target may be achievable by phasing out coal use except where CO₂ is captured and adopting agricultural and forestry practices that sequester carbon. If the present overshoot of this target CO₂ is not brief, there is a possibility of seeding irreversible catastrophic effects.”⁽¹⁾

The basic facts had already become quite clear to Fahey. With only six percent of the world’s population, the U.S. is currently responsible for about a quarter of total global greenhouse gas emissions (GHGs). The most recent science was sobering. The report in front of him indicated that the best climate scientists were now estimating that the target CO₂ concentration necessary to achieve a stable climate was 100 ppm less than what the Intergovernmental Panel on Climate Change (IPCC) had recommended in its most recent report. Achieving this lower target would mean reducing the rate of GHG emissions by 90% or more by 2050.

Our country needs to act and we need to act quickly, he thought. His own position on climate change had evolved considerably in the past decade. Like many of his fellow senators, he started as a “climate skeptic”; he was skeptical that the earth’s climate was, in fact, changing and skeptical that human activity could be responsible for climate change. But in the last few years, he had become convinced by overwhelming scientific evidence that global climate change is real and that immediate political action is necessary to prevent dire consequences.

However, politics is never straightforward, he pondered. No matter how conclusive the science, opposition to political action among key groups of his own constituency would be substantial. Some members of his electorate were still genuinely skeptical that humans are responsible for climate change and view action on this front as a distraction from more important economic, social, and national security priorities. For example, low-income and minority voters and large corporations were a key constituency for the congressman. His home-state economy was very dependent on coal mining and steelmaking. In addition, the agricultural sector depended on grain farming and feared higher fertilizer prices that might come with legislation that increased the costs of fossil fuels. In recent years, groups representing mining and industry had accounted for a large part of his campaign contributions and believed (perhaps with good reason) that they would suffer economically if action was taken to address climate change. Even among those who *agreed* that climate change was a reality, political views on whether and specifically *how* to address the problem

* Also thanks to Professor Janet Fiskio of Oberlin College and Professor Clark Bullard of University of Illinois for comments and edits.

(1) Hansen, J. and others, 2008. *Target Atmospheric CO₂: Where Should Humanity Aim?* NASA/Goddard Institute for Space Studies, New York.

remained diverse and contentious. The fundamental problem was that any of the possible policy decisions regarding the regulation of greenhouse gas emissions that might be taken would inevitably create winners and losers. The reality was that the Senator must steer a political course that ensured that he addressed the needs and concerns of his constituency.

During the last several years, a variety of comprehensive bills had been introduced in the House of Representatives and Senate with the aim of reducing greenhouse gas emissions, but none had passed. The President ran on a platform that called for legislation that would target an 80% reduction in GHGs by 2050 and there were both Democrats and Republicans who were working diligently to craft climate change policy. However, the current economic crisis was likely to delay immediate action until next year. Between now and then, as the new legislation was being shaped, was the crucial time to influence the content of such legislation. In his heart, Fahey wanted to support a bill that aggressively and meaningfully addressed climate change. In order to do this, he needed to develop a clear policy statement that described the particular components of a climate policy that he was prepared to support. Such a statement must also provide a rationale for his choices that addressed the concerns of his constituents, including skeptics and corporate supporters.

Fahey was calling on his very able staff member, Justin Short, to help him accomplish this task. Specifically, he intended to ask Short to assemble a group of experts to identify the political, economic, and social implications of various policy options and to make recommendations regarding the policy. Using the information he collects, Short's job is to draft a policy statement for Senator Fahey to review. The statement must be in a format that Fahey can provide to constituents requesting information on his position. As soon as the position paper is drafted, the Senator plans to meet privately with some of his largest contributors and with leaders of the African American and Hispanic communities to see if they can support such a position.

Your Task

Your job in this case is to collectively contribute to the development of the policy statement that Justin Short is charged with delivering to Senator Fahey. Each member of your working group will represent one of four different characters briefly described below and then fleshed out in a one-page description for each character. These characters have been designed to embody real facts, points of view, and concerns regarding how to address the economic, environmental, social, and political consequences of climate change legislation.

Prior to class you should carefully read the background material on this page and your assigned character's position. Your objective should be to "get under the skin" of the character you are assigned to represent and to thoroughly familiarize yourself with your character's information and viewpoint. The format in class is as follows. You will start by meeting with the group of students who have the same character as you to strategize on key features your character wishes to see incorporated into the Senator's policy statement. Then, your objective in your working group is to present your character's view in its best possible light, to listen carefully to other viewpoints so that you understand them, and to work with the character representing the senator's legislative aid to synthesize these different views in a recommendation for the Senator. *Stay in your character throughout the process.*

The Characters

- A. *Michelle Jansen* is a climate scientist. Her principal goal is to ensure that Senator Fahey adopts a position that is based on scientific evidence and that the legislation Fahey supports is calibrated with the magnitude of the problem.
- B. *John Gregory* is an economist. His principal goal is to ensure that the economic policy mechanisms employed are efficient and effective in bringing about desired goals, that economic hardship is minimized, and that economic opportunities are maximized.

- C. *Jane Johnson* is a political sociologist. Her expertise focuses on how policy affects different social and economic groups. Her goal in the discussions will be to ensure that the costs and benefits of any legislation are equally borne by different segments of society.
- D. *Justin Short* is Senator Fahey's staff expert on science related policy. His goal is to make certain that Senator Fahey is well informed and that the Senator's own goals are translated into a rational and effective position on the issue that is defensible to core constituencies within his electorate.

Remember that you are expected to carefully review the position statement for your assigned character before the class meets to discuss this case.

The Case Brief

The lead author of your working group (Justin Short⁽²⁾) is charged with producing a crisp, two-page policy statement (limit of 1,300 words strictly adhered to). This policy statement should describe the key features that your group of experts believes Fahey should ensure are incorporated in any climate bill that he supports. This should include a clear rationale that explains the environmental, economic, and social justification for the positions advanced in a way that addresses the likely concerns of the Senator's core constituency. The policy statement should be structured such that it could be mailed with a letter to constituents who write requesting information on the Senator's position (i.e., your audience is an interested member of Fahey's electorate). In your statement, avoid mentioning any of the individual characters by name. The statement must serve the needs of Senator Fahey and therefore it does not need to weigh the positions of the different experts equally. You are required to draw on at least three assigned readings to support your recommendations. You are welcome to do further research if you wish, but this is not necessary or expected. When you cite any outside sources (whether assigned or not), be sure that you follow an established citation format. You are encouraged to be creative in your policy statement, but the point is to produce a credible position that addresses climate change, but is also politically defensible to the Senator's constituency.

(2) It probably makes the most sense for the person in your group who represents Justin Short to coordinate the write-up of the case brief. However, everyone in the group is expected to contribute equally (unless otherwise explained by your instructor).



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A. Climate Scientist – Michelle Jansen

Michelle Jansen received her PhD from Princeton in Meteorology in the early 1990s and has been a key player in the development of climate models used to conduct scenarios that predict future climate conditions given different assumptions about how successfully humans can control greenhouse gas emissions. Together with hundreds of other scientists from around the world, she has been an active participant in the development of the last two major reports on climate change by the Intergovernmental Panel on Climate Change (IPCC). Formed in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Program (UNEP), the IPCC has a mission to assess scientific, technical, and socio-economic information relevant to understanding the scientific basis of human-induced climate change, its potential impacts, and options for adaptation and mitigation. Like many of her scientific colleagues, Michelle Jansen feels increasingly frustrated, and frankly very worried, by the considerable disconnect between the state of scientific knowledge and the state of public concern and political action. She is troubled by the way certain groups with vested interests continue to sponsor biased studies alleging major uncertainties in the science.

The fact is that for more than a decade, the scientific evidence of climate change has been mounting. Legitimate science is published in peer-reviewed journals and there is not a single peer-reviewed paper that discredits climate change.⁽¹⁾ The IPCC Fourth Assessment Report released in 2007 and newer reports from NASA have all reduced the uncertainty of estimates. The Stern Review on the economic impact of climate change released in 2007 is likewise firm in its assessment of the scientific realities. All point to the same conclusions: Climate change is real, global warming is unequivocal, GHGs released by human activities are the principal cause, and a reduction of 80% or more compared to current levels is needed by around 2050 to prevent catastrophic environmental and economic consequences. Like many of her colleagues, Jansen believes we are now approaching a critical threshold beyond which humans may be incapable of preventing catastrophic effects.

Jansen believes that there is a fundamental problem in the way the public and the media in particular have interpreted scientific evidence and the degree of uncertainty related to climate change. They fail to appreciate that the scientific process is inherently conservative in assessing the effects of a disturbance. For example, when scientists test a new drug or assess the effects of a toxin, the basic premise is that overwhelming evidence must be documented before it can be concluded that the drug or toxin is having an effect. As a result, the scientific community has had a tendency to substantially underestimate rather than overestimate the potential effects of the rising concentrations of greenhouse gasses accumulating in the earth's atmosphere. The factors we are currently most uncertain about—for example, positive feedbacks between biological systems and the climate that are not yet incorporated into the climate models—are likely to increase rather than decrease the estimated rate of climate change. The last few years provide many examples of how scientists have underestimated the effects of climate change; atmospheric CO₂ concentrations, global temperatures, and the rate at which polar ice caps are melting have all increased more rapidly than predicted.

Jansen wants to see a strong federal policy to regulate carbon emissions implemented without delay. However, she prefers cap-and-trade policies over a carbon tax. Under a cap-and-trade program, the government would set an overall cap on emissions and issue tradable allowances that grant industries emission rights up to a fixed amount. She feels that the cap-and-trade approach would ensure the achievement of carbon reduction targets at the lowest possible cost. The U.S. has successfully used this approach to control acid rain in the past, which resulted in lower costs than initially predicted. Both cap-and-trade and a carbon tax require monitoring and enforcement—to determine taxable emissions and to guarantee payment in the case of a tax, or to ensure that allowances match overall emissions in the case of cap-and-trade.

Cap-and-trade, however, has some important advantages. For example, some argue that it has greater flexibility for linking national and international initiatives.⁽²⁾ This is beneficial in today's global economy, where companies

(1) Oreskes, N., 2007. The Scientific Consensus on Climate Change: How Do We Know We're Not Wrong? *Science* 2004 306:1686

(2) Chameides, B. 2009. Cap and Trade Part 2: Walking the International Tightrope, THEGREENGROK, June 09, 2009. <http://www.nicholas.duke.edu/thegreengrok/capandtrade2>

operate in multiple countries at once. Cap-and-trade may also allow the “banking” of emission allowances—reducing emissions early and using the saved emission allowances later. But, to Jansen, the key difference between a carbon tax and the cap-and-trade approach is the issue of “certainty.” While a tax provides for greater certainty in costs, cap-and-trade provides for environmental certainty; the total amount of carbon emissions would be fixed by the cap. This cap would be based on the best available scientific evidence to date to protect the climate. In contrast, in response to a carbon tax, many emitters may decide to simply pay the tax rather than reduce their emissions. With the prospects of Alaska and Greenland melting, and with increasing droughts and other weather extremes, Jansen believes that environmental certainty is the more compelling imperative. In addition, taxes are hard to get through Congress. In Jansen’s view we shouldn’t let carbon-tax enthusiasts use false arguments to trash cap-and trade, a politically feasible approach, in favor of one with a snowball’s chance in a warming world.⁽³⁾

(3) Claussen, E. and Greenwald, J., 2007. Handling Climate Change. Pew Center on Global Climate Change.

B. Economist – John Gregory

Trained as an economist at Georgetown University, for the last 10 years John Gregory has worked for a variety of progressive non-profit “think-tanks” in Washington DC that focus on developing and promoting economically sound policies on Capitol Hill. For Gregory, a sound policy is one that takes advantage of market forces to achieve desired policy objectives at the lowest possible cost to society. Gregory believes that if the most efficient economic mechanism is not politically palatable, there exist a variety of alternate tools available to achieve the desired result.

The policy options under consideration on Capitol Hill for reducing GHGs can be roughly divided into two major categories—so called “cap-and-trade” policies and carbon taxes. All cap-and-trade proposals have three elements in common: (1) a cap, or phase-out schedule (i.e., limits on maximum total emissions across all polluters per year); (2) tradable “emission allowances” (entities with excess emission permits can sell their excess allowances to entities with a deficit of allowances); and (3) a formula for initially distributing the emission allowances. Alternately, a tax on carbon emissions imposes a fee that each polluter must pay on every unit of carbon dioxide (or any other GHG) that is emitted into the atmosphere, which in turn provides an incentive for entities to reduce emissions. Both policies aim to reduce emissions by making it costly for firms and individuals to engage in activities that result in GHG being released into the atmosphere.

Like many economists, Gregory favors a tax over cap-and-trade. Under a cap-and-trade policy, the price of an emissions allowance is determined by the market and cannot be precisely predicted in advance. As a result, it is possible that the market price of emissions will be either very high or very low. An excessively high emissions allowance price would be very costly for businesses and households in the short run and could result in higher rates of unemployment if firms are forced to layoff employees. A very low allowance price on the other hand means that firms have very little incentive to reduce their emissions. With a carbon tax, regulators are able to specify the price of emissions, thus eliminating the potential for price fluctuations. Businesses therefore face lower risks associated with long-term investments in pollution reducing technology, making these investments a more feasible alternative. Additionally, a tax on GHG emissions provides virtually unlimited opportunities for innovation as every firm can save money by reducing its emissions. This implies that a carbon tax could potentially lead to reductions greater than those initially targeted. Gregory acknowledges that a problem with the tax approach is that the actual quantity of emissions reductions in response to a tax cannot be precisely predicted in advance and depends on the response of all polluters to the tax rate that is chosen.⁽¹⁾ Still he feels that a tax has a better chance of avoiding excessive costs in the short run than a cap-and-trade policy. If the emissions targets are not being achieved under the tax in a particular period, then the rate of the tax can be increased in the future to ensure that long-term policy objectives are achieved. He understands that politicians often prefer cap-and-trade because anything termed a “tax” is generally considered unpopular.

Two key questions emerge with either cap-and-trade or carbon tax policies that Gregory wants to convey in this meeting. First, the net costs of cap-and-trade or carbon tax policies could be quite small if policy implementation starts immediately.⁽²⁾ On the other hand, the long term costs of inaction, while uncertain, are likely to be considerable. Economist Nicholas Stern, former Chief Economist of the World Bank, argues that by taking advantage of normal turnover rates for buildings, equipment, and vehicles, the cost of transition to a cleaner and more efficient energy future can be about 1% of the global gross domestic product (GDP).⁽³⁾ In addition, certain offsetting benefits may be expected as the external costs of fossil fuel consumption are reduced; for example, increased national security and reduced air pollution. Second, there is the question of how funds raised through the new legislation are distributed. For example, in a cap-and-trade policy the question is whether the permits are given free to existing industries, sold at a fixed price, or auctioned to the highest bidders. There is a strong industrial lobby at work in Washington in favor of

(1) Shammin, M. and Bullard, C., 2009. Impact of Cap-and-trade Policies for Reducing Greenhouse Gas Emissions on U.S. Households. *Ecological Economics* 68: 2432–2438.

(2) Smith, A.E., Ross, M. T. and Montgomery, W. D., 2002. Implications of Trading Implementation Design for Equity-Efficiency Trade-offs in Carbon Permit Allocations, Charles River Associates Working Paper, Washington DC.

(3) Stern, N., 2007. Stern review on the economics of climate change, Cambridge Univ. Press.

distributing emissions allowances free to all companies that emit GHGs—in proportion to historic emissions. Under this scheme, those in the most carbon intensive industries (for example, coal-fired power plants) would initially receive the largest share of the allowances. This option has some political benefits in that it blunts industry opposition to the legislation and reduces the costs of the policies on consumers in areas that rely on carbon intensive fuels. Once an emitting industry receives the allowances, their interests are still to reduce emissions so that they can then profit by selling their excess allowances to others. However, Gregory believes that it is economically inefficient to give up the opportunity to redirect a large revenue stream from polluting industries to new and innovative ventures designed to achieve the desired policy objectives. John Gregory advocates a carbon tax with options to allocate revenues for encouraging renewable technologies, offsetting taxes on labor (e.g., payroll taxes), and addressing equity concerns associated with the policy.

C. Sociologist – Jane Johnson

Dr. Jane Johnson is an academic sociologist and environmental justice activist trained at the University of Michigan, whose past work documented the disproportionate effects of toxic pollutants on lower-income communities in the U.S. Her goal is to encourage Senator Fahey to adopt a policy in which costs and benefits are equitably distributed across sectors of the population. Although GHGs are not directly toxic to people, GHGs are similar to other pollutants in that affluent people are disproportionately responsible for emissions and often live in areas that are less vulnerable to environmental damage associated with the pollutants. At a global scale, this can be seen by the fact that the industrialized countries of the north are responsible for the vast majority of the emissions while the poor countries, which are least able to adapt, will experience the harshest and most immediate effects of climate change. At a national level, the devastation that Katrina brought on the 9th Ward in New Orleans provides an example of how extreme climatic events can disproportionately affect poor people within any country, whether developing or industrialized.

Legislation designed to control climate change has the potential to either hurt or help lower-income communities. There are two social equity concerns related to cap-and-trade or tax policies. First, the desired shift to less polluting (but more expensive) energy sources will inevitably result in higher costs for most goods and services. Johnson is concerned because lower-income families spend a higher percentage of their income on energy—in the U.S. 5% compared to less than 1% for the wealthy.⁽¹⁾ If the policy is not designed to address this fact, the poor will likely be forced to sacrifice daily necessities to cope with increased costs of energy while the affluent will be able to adjust to rising costs by cutting back on luxury spending. Johnson argues that, for policies to be socially just, they should be designed in a way so that the costs of mitigation are borne by the populations largely responsible for the emissions.

Second, there is the question of how revenues from either taxes or the sale of emissions allowances will be distributed. A politically popular idea is to invest the revenues in alternative energy technologies and low-carbon industries, providing businesses with an incentive to enter this new market. Policy makers from states with a competitive advantage to develop renewable energy technologies also favor this mechanism (e.g., Wyoming for wind, mid-western states for biofuels, etc.). Johnson believes that some of the revenues should be directly targeted towards lower-income communities. Further, Johnson argues that these communities should have some say in how the money is used. She therefore believes that decision-making bodies should include representatives drawn from those communities most likely to be affected by climate change, including urban and rural poor, communities of color, migrant workers, and indigenous nations, elderly, disabled, and special-needs families. Further, legislative efforts to control climate change may hurt poor neighborhoods by forcing businesses that cannot cope with higher costs to close. Johnson believes that provisions can and must be incorporated into legislation to ensure that job losses in certain sectors are compensated for and that vulnerable communities don't become refugees of the climate change legislation. Johnson argues that one of the best ways to reduce the negative effects of climate change and facilitate adaptation to these effects is to draw on the local knowledge of community members.

Past experience with cap-and-trade style policies in the U.S. have not addressed issues of social equity. For example, when cap-and-trade policies were implemented to reduce sulfur dioxide emissions and to phase out CFC production, most of the pollution allowances were distributed free to the regulated companies. This left consumers uncompensated for the passed-through costs of the new technologies needed to achieve the required reductions. In these cases, major equity concerns did not arise because the total costs were relatively small. However, since Americans currently spend about \$1 trillion/year on energy,⁽²⁾ social equity concerns could quickly dominate the debate over climate policy.

Johnson does not have a strong preference for a carbon tax or cap-and-trade approach as long as the policy is designed to address equity issues. With a cap-and-trade policy Johnson believes that the polluters should pay the government the fair market price for emissions permits; industries should not be rewarded for prior generation of pollutants.

(1) Shammin, M. and Bullard, C., 2009. Impact of Cap-and-trade Policies for Reducing Greenhouse Gas Emissions on U.S. Households. *Ecological Economics* 68: 2432–2438.

(2) Energy Information Administration, 2006.

She believes that part of the revenues generated from government sale of emissions allowances or from carbon taxes should be allocated in ways that create “green jobs” and to retrain workers who lose jobs in the polluting industries. Johnson also supports the idea of using part of the revenues to provide a flat rebate to individuals and families. Her political argument for per capita (or per household) revenue distribution is based on the idea that a clean and stable atmosphere is a fundamental human right. Every person owns an equal share. Jane believes that in the face of rising energy costs, at least part of the rebate will be spent by households on more efficient products. If the policy makers in Washington are willing to design legislation that returns revenues from taxes or sales of emissions allowances directly to the people, then they will vote with their wallets. We will then see the low income as well as the affluent using market forces to stimulate technological innovation and market efficiency while preserving social equity.

D. Staff Science Policy Analyst – Justin Short

Justin Short realized early on that he was interested in combining his love of science with his desire to participate in bringing about positive political change. Short completed both a Bachelors degree in Environmental Science and a Masters degree in Political Science from the University at Buffalo. While a student he was fortunate to find summer jobs and internships working for a variety of government agencies and legislators. Two years ago, soon after he received his Masters degree, he landed a job with Senator Fahey. The Senator immediately recognized Short's considerable talent for translating scientific findings into recommendations regarding legislation. During the last two years the Senator has increasingly relied on Justin Short's judgment, and Short does not want to let him down on this crucial issue. Short left his meeting with the Senator daunted and at the same time tremendously excited by the task at hand.

Short understands that the policy statement he has been charged with developing needs to strike a careful balance. On the one hand, it is clear that the Senator is eager to support aggressive legislation that will genuinely address the challenges of climate change. On the other hand, it would be political suicide for the Senator (and by extension for Justin Short!) to advocate for legislation that will alienate his political constituents.

Short is confident that he will receive useful ideas from the expert group that he is assembling, but it is important that he communicate to this group the political realities associated with the Senator's constituency so that they can calibrate their recommendations accordingly. Short must convey to the group that Senator Fahey was elected as a political moderate representing a rust belt state in the mid-west. This state's economy has been troubled for many years and is currently based on a mixture of remaining (but considerably reduced) heavy industry, commodity farming, service industries, and a fledgling high-tech sector. Renewable energy resources from solar, wind, and hydro are possible, but are not nearly as concentrated or immediately economically viable as they are in certain other states, while coal resources in the state are relatively plentiful. The Senator's largely working class constituency is concerned about the environment, but they are also anxious for policy initiatives that will protect and create jobs and otherwise alleviate the economic hardships that have befallen the state. The Senator has also had significant support from certain segments of the business community—he needs to “bring home the bacon” for this group as well. Senator Fahey's constituents are ready for leadership, but it must be leadership that they can believe in.

In order to gather information that will allow him to draft a policy statement, there are a number of questions that Short recognizes that he must carefully consider. Among these are the following:

1. What are the key scientific arguments supporting strong federal climate legislation? What are the arguments that will most resonate with the Senator's political constituency?
2. What policy instruments are available? What are their environmental, political, economic, and social tradeoffs?
3. What are the consequences of these policies on the Senator's constituencies?
4. How can he ensure that the policy that he develops for the Senator will address the dire challenges of climate change and at the same time bring prosperity to his region in the long run?
5. Are there ways to craft the legislation that will make it particularly appealing to the business component of the Senator's constituency? Are there policy options that are particularly offensive to this community?
6. How can he make sure that, in the face of rising unemployment and a dwindling industrial base during this time of national economic recession, the climate policy the Senator supports will be equitable?
7. What features of a policy are most likely to be politically palatable or unpalatable within the Senate?

The President was recently elected on a platform that stressed hope, change, and innovation. Given this political climate, Short believes that the Senator and his electorate may be open to new types of policy that are distinct from those employed in the past. Short believes that by carefully considering the expert opinions of the scientist, economist, and sociologist, it may be possible to craft a visionary policy statement that will meet the challenges identified by the scientific community and at the same time be economically efficient, socially just, and politically feasible. The challenges are formidable, but the potential to be involved in creating legislation of such crucial importance is inspiring indeed!