

TAKING THE LEGISLATIVE TEMPERATURE: WHICH FEDERAL CLIMATE CHANGE LEGISLATIVE PROPOSAL IS “BEST”?

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INTRODUCTION

The United States will almost certainly enact federal legislation designed to reduce emissions of greenhouse gases within the next two years. It is uncertain what final form this legislation will take and what variables will be in play in the discussion. At this stage, even the ultimate target in greenhouse gas reductions is not yet known. The legislation could have economy-wide effects, or could only affect certain industries. It might allow the use of offsets or not. It may integrate with existing pollution-control regimes or stand on its own. It will likely create new wealth for certain segments of the economy, but may put others out of business. How these and other policy choices are resolved could turn out to be the most important legislative question that our country addresses in the foreseeable future.¹

As of October 17, 2007, there were at least ten legislative proposals in Congress that address climate change.² As identified by their primary spon-

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¹ The Congressional Budget Office estimates that the value of carbon allocations in a U.S. cap and trade system could approach hundreds of billions of dollars. See TERRY DINAN, CONG. BUDGET OFFICE, TRADE-OFFS IN ALLOCATING ALLOWANCES FOR CO₂ EMISSIONS 1 (2007), <http://www.cbo.gov/ftpdoc.cfm?index=8027&type=1> (link). The cost of avoided harm by controlling climate change is more uncertain, but has been estimated in the trillions. Robert Peston, *Report’s Stark Warning on Climate*, BBC NEWS, Oct. 29, 2006, <http://news.bbc.co.uk/2/hi/business/6096594.stm> (link).

² See Resources for the Future, *July 2007 Climate Change Bills in Congress*, www.rff.org/climatechangelegislation (Oct. 31, 2007) (link) [hereinafter *July 2007 Climate Change Bills*]; RESOURCES FOR THE FUTURE, SUMMARY OF MARKET-BASED CLIMATE CHANGE BILLS

sors, these include Bingaman-Specter, Udall-Petri, Lieberman-McCain, Kerry-Snowe, Waxman, Sanders-Boxer, Feinstein-Carper, Alexander-Lieberman, Stark, and Larson. In addition, other politicians, such as John Dingell, have announced “plans” for legislation, announced their own goals for climate change, and/or endorsed various components of the filed bills.³ Although there has been politicking on both sides of this issue, we have not yet defined a suitable framework for evaluating the legislation. In the case of climate change, it is particularly difficult to come up with a workable framework because of the scope and unusual complexity of the issue. In fact, because of its connection to so many different parts of the economy, the impact of climate change regulation is present in issues not necessarily characterized as climate change, such as automobile efficiency and other energy legislation. Nevertheless, the more comprehensively we address climate change, the better.⁴

It may seem difficult to propose a framework to judge the effectiveness of climate change proposals when there is no agreement on the standards with which we judge legislation generally.⁵ Our legislative process is not transparent, which increases the likelihood of rent seeking⁶ and renders it

INTRODUCED IN THE 110TH CONGRESS (2007), <http://www.rff.org/rff/News/Releases/2007Releases/July2007ClimateChangeBillsinCongress.cfm> (follow “Summary of Climate Change Bills Introduced in the 110th Congress” hyperlink) (link) [hereinafter SUMMARY OF BILLS] (mentioning the Udall-Petri bill, which is a draft that has not been introduced but retains elements of prior Udall and Petri bills in the 109th Congress; discussion of this bill is based on an analysis of what is currently expected to be proposed). A specific date is noted due to ongoing alterations in proposed legislation. Legislation cited in this essay refer to the bills in their form as of October 17, 2007.

³ See Darren Samuelsohn, *Democratic Leaders Want ‘Strong Bill’ on Global Warming*, *Waxman Says*, ENV’T & ENERGY DAILY, Mar. 21, 2007 (link).

⁴ See Darren Samuelsohn & Ben Geman, *Boucher Would Delay Energy Conference for Cap-and-Trade Package*, ENV’T & ENERGY DAILY, Sept. 7, 2007 (noting that Boucher argues that combining climate change legislation with energy legislation into one package is optimal) (link).

⁵ The mechanics of legislation are well known. Why laws take a particular form is far more difficult to exactly explain or predict. “Public choice” theory, one of the dominant theories of legislation, has been explained by Professor Edward Rubin:

Public Choice analysis has recently emerged as a leading approach to the study of the legislative process. Its grim landscape of vote-maximizing legislators, rent-seeking interest groups, budget-aggrandizing bureaucrats, and free-riding citizens has now become familiar territory. Proponents of public choice assert that it constitutes a comprehensive theory, and they level the dread charge of idealism and naïveté against those who seek broader vistas and more cheerful prospects.

Edward L. Rubin, *Beyond Public Choice: Comprehensive Rationality in the Writing and Reading of Statutes*, 66 N.Y.U. L. REV. 1, 1–2 (1991). He goes on to explain the theoretical bases behind public choice, noting that its tenets should spring from the assumption that “all political participants are rational, egoistic utility maximizers,” which he claims is not in the public interest. *Id.* at 5. This can be contrasted with those who view individual utility maximizers as simply the best way to get to over all societal welfare, as measured by Kaldor-Hicks efficiency. See, e.g., Herbert Hovenkamp, *Legislation, Well-Being, and Public Choice*, 57 U. CHI. L. REV. 63, 64 (1990).

⁶ “Rent seeking” is when persons seek to capture all benefits produced by efficiencies of the market or legislation for themselves. For instance, if a new law will increase the market value of a product, to

difficult to hold the normative discussions necessary to inform the public so that it can demand the particular kinds of consideration it desires. Political power-games add another dimension that makes the discussion even more complex.⁷

I will not attempt to devise a comprehensive framework with which to analyze the desirability of all legislation. But with respect to climate change, there are certain policy choices that must be debated. An analysis of these policy choices and their importance creates a common framework for discussion. We may not all agree that rising temperatures in Alaska are bad, but knowing the outcome of a particular policy choice provides a basis for understanding the popular will and opinion regarding the choice.⁸ Therefore, this Colloquy Essay specifies: 1) the most important policy choices at stake in climate change legislation, 2) why they are important, 3) the best resolution of these issues, and 4) how the current legislative proposals deal with them.

Legislation is a dynamic and iterative process. The legislative proposals analyzed in this Essay may be dropped or changed and other legislation may be proposed before comprehensive climate change legislation is passed.⁹ Indeed, this Essay and the comments that follow will hopefully provide impetus for changing legislative proposals in response to a consideration of issues herein. Nevertheless, the scientific underpinnings of climate change, including the range of remaining uncertainties, are well enough understood that the analytical principles associated with climate change issues will not change in the immediate future. Therefore, the analysis of the policy choices herein should inform any forthcoming climate change legislation and also serve as a resource for examining inevitable shortcomings and possible amendments in climate change legislation of the future.

This analysis is divided into two parts. The first part will analyze the goals or purposes of climate change legislation, and the second part will

“rent seek” would be to try and steer the legislation so that the rent seeker would receive the greatest percentage of the increase in value.

⁷ No one could have watched the Senate hearings on climate change featuring testy exchanges between former Vice-President Al Gore and Senator James Inhofe, or hear newspaper commentators refer derisively to “Al Gore’s movie,” without realizing that personal egos, likes, and dislikes may play at least as large a role as dispassionate science in what climate change legislation the United States passes. See, e.g., *CNN: Boxer Tells Inhofe Who the Boss is Now*, a <http://www.youtube.com/watch?v=UWpkBcWsAME> (last visited on Dec. 1, 2007) (link).

⁸ While I hesitate to bring up another variable, it is also important to note how information can change preferences or even persuade them (which is the basis of advertising). Government has even used this as an overt policy tool, usually by the moniker of “information and education.” But if this is a possible result of transparency, it too can be transparent and be considered in the choice itself.

⁹ On October 16, 2007, it was announced that Senators Lieberman and Warner would propose a bill that would alter two key areas in prior legislation and ideas floated by the two senators. See Darren Samuelsohn, *Lieberman-Warner Plan Tightens Emissions Cap, Limits Credits*, GREENWIRE, Oct. 16, 2007 (link).

look at the policy choices associated with reaching these goals.¹⁰ The method of accomplishing these goals would be considered “best” if it reaches and accomplishes all of the goals in the most efficient way possible.¹¹

I. WHAT IS THE GOAL OF CLIMATE CHANGE LEGISLATION?

To a casual observer, the goal of climate change legislation might seem to be simple—to stop climate change. But one quickly sees that expense, cost allocation, and harm distribution are equally important. Moreover, some amount of climate change might be tolerable or even preferred by certain groups. Without properly determining goals at this step, these choices will be made at another time, with high transaction costs due either to incomplete information or failure to determine goals.¹² Furthermore, the failure to identify explicit goals may work in favor of some interest groups who can exploit this opacity to address other issues *sub rosa*.¹³

A. *What Climate Change Effects are we Trying to Avoid?*

A climate change legislative goal must, at a minimum, address the harmful effects that it seeks to avoid—the “effects target.” An effects target will guide how much we want to avoid temperature rise and other associated effects of climate change. This goal must also specify how that change can be translated into actual reductions of carbon dioxide (“CO₂”) or other gases that affect climate change. This requires us to determine how much harm we are willing to endure, whose harm we are concerned about, and how much we are willing to pay to avoid this harm.

Because CO₂ is the primary gas that contributes to the greenhouse effect, which is driving a rise in temperatures and other associated climate change effects, most discussion of climate change avoidance has focused,

¹⁰ Separating out the discussion of goals and ways of reaching the goals helps clarify the issues and avoid the masking of goal choices as policy implementation choices. See Victor B. Flatt, *Saving the Lost Sheep: Bringing Environmental Values Back into the Fold with a New EPA Decisionmaking Paradigm*, 74 WASH. L. REV. 1, 20 (1999).

¹¹ Note this statement is only true if all true goals are included and are addressed. For instance, with climate change, while the main goal may be to reduce CO₂ emissions, another goal may be to do so in a way that is fair or that does not impose costs on the poor. It is only with respect to all goals that we can use the term “efficient.” Efficiency in CO₂ reductions alone might run counter to other goals that are important. See Victor B. Flatt, *Should the Circle be Unbroken?*, 24 ENVTL. L. 1707, 1713 (1994) (reviewing STEPHEN BREYER, *BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION* (1993)) (“[A]ctual policy choices [may] reflect societal values other than the explicit reduction of risk to human life.”).

¹² See Flatt, *supra* note 10, at 20.

¹³ For instance, if there is concern about other air pollutants in addition to carbon dioxide, a push to eliminate all other anthropogenic greenhouse gases could be made for purposes of other kinds of health protection. This may not be a bad thing per se, but without an explicit policy goal it is hard to evaluate whether the resulting policy is a good one.

since its inception, on the amount of annual reductions in the emission of CO₂ (and CO₂ equivalents)¹⁴ that we will need to avoid the harms that are associated with climate change. The Rio Framework on Climate Change and the later Kyoto protocol focused on the reductions in CO₂ emissions of industrialized countries in a relatively short time frame, as a first step towards later reductions.¹⁵ Recent new targets in reductions have been proposed and offered by countries around the world as the next step in fighting climate change.¹⁶

However, the apparent simplicity of such percentage-gauged reductions masks huge complications in estimating the actual effects of these reductions. A reduction in atmospheric CO₂ lags the greenhouse effects of the gas by forty years or more, meaning that temperatures will rise even if all greenhouse gas emissions were stopped now.¹⁷ Reductions in one jurisdiction must be compared to reductions or increases in others to ascertain the worldwide reductions that will occur. Moreover, targets may not translate into actual reductions. With these caveats, however, there is some scientific consensus about the effects of CO₂ concentrations on temperature change and associated climate change effects. Moreover, there is some consensus on what reductions from historic emissions must occur worldwide to avoid the worst climate change harms.

Current CO₂ concentrations are at about 377 parts per million (ppm) (higher than pre-industrial levels by 40%) and projections indicate that CO₂ concentrations will grow by between 63% to 235% by 2050, depending on programs to reduce CO₂.¹⁸ There is consensus that if average global

¹⁴ CO₂ provides about 70% of the heat retention associated with the anthropogenic greenhouse effects at play in the Earth's atmosphere. Other gases such as methane, water vapor, and HCFCs also have greenhouse forcing capabilities. Generally, when greenhouse gas amelioration is discussed, it is done with respect to CO₂ reductions. Nevertheless, it is clearly recognized that reductions in other greenhouse gases may have the same effect as a different amount of CO₂ reduction, and therefore many discussion of greenhouse gas reductions are in terms of CO₂ or amounts of other gases that would be equivalent to an amount of CO₂ reduction. These equivalent gases are very important in any climate change legislation and will be considered explicitly, *infra* Part II. However, for ease of discussion I will drop the parenthetical regarding CO₂ equivalents, and one should assume that discussion of CO₂ reductions may include reduction of other gases that can be equated to CO₂ reductions.

¹⁵ See Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22 (1998), available at <http://unfccc.int/resource/docs/convkp/kpeng.html> (link).

¹⁶ See, e.g., The EU's Contribution to Shaping a Future Global Climate Change Regime, http://ec.europa.eu/environment/climat/future_action.htm (link) (last visited Nov. 16, 2007); Darren Samuelsohn, *Congress Has Its Eye on Int'l Warming Talks*, ENV'T & ENERGY DAILY, Sept. 24, 2007 (link).

¹⁷ See SIR NICHOLAS STERN, STERN REVIEW ON THE ECONOMICS OF CLIMATE CHANGE 11–13 (2006), http://www.hm-treasury.gov.uk/media/3/6/Chapter_1_The_Science_of_Climate_Change.pdf (link). Although many of the economic assumptions of the Stern Report have been criticized and challenged, its discussion of the scientific basis of climate change and the effects resulting from that are widely accepted).

¹⁸ See T.J. Blasing & Carmen Smith, Carbon Dioxide Information Analysis Center, Recent Greenhouse Gas Concentrations (July 2006), http://cdiac.ornl.gov/pns/current_ghg.html (link); KEVIN

warming is kept lower than two degrees Celsius, the effects of that temperature rise, while harmful, would not be catastrophic.¹⁹ There is also consensus that CO₂ emissions must be reduced by 50–80% of 1990 CO₂ production levels to achieve this lower level of warming.²⁰

It is from these scientific analyses that we choose reduction targets, and it is with these scientific analyses that we compare our choices. The variance of legislative CO₂ reduction targets result from the uncertainty in the science of these predictions, the degree of warming that is acceptable (with respect to the entire world, a nation, or some identified group), the technological changes that may exist in the future to address energy production or climate change harms, and the costs a given jurisdiction is willing to accept. While uncertainty exists as to the effects of average temperature rise, most nations have embraced the notion that reductions in annual output of CO₂ must be made to stabilize the atmospheric concentrations at a level to keep average global temperature rise under two degrees Celsius.

In keeping with the above consensus, most of the legislative proposals analyzed in this Essay target a temperature rise no greater than two degrees Celsius (3.8 degrees Fahrenheit). Most then translate this temperature rise limitation into goals for reductions in annual CO₂ emissions²¹ Nine of the current legislative proposals—Bingaman-Specter, Udall-Petri, Lieberman-McCain, Kerry-Snowe, Sanders-Boxer, Waxman, Feinstein-Carper, Alexander-Lieberman, and Stark—include either CO₂ reduction targets or estimates of CO₂ reductions in a specified time frame.²² The reductions are made in comparison to historical emissions data and are at least theoretically designed to limit all or most U.S. emissions by this percentage in the time frame specified.²³ The Larson proposal, one of the tax proposals,²⁴ does not reference a specified reduction goal in greenhouse gas emissions.

BAUMART ET AL., PEW CENTER ON GLOBAL CLIMATE CHANGE, CLIMATE DATA: INSIGHTS AND OBSERVATIONS 15 (2004), <http://www.pewclimate.org/docUploads/Climate%20Data%20new.pdf> (link).

¹⁹ Raymond Colitt, *World Must Fix Climate in Less than 10 Years*, REUTERS, Nov. 27, 2007, http://www.reuters.com/article/idUSN19489506_CH_2400 (link). The irreversible melting of the Greenland and Antarctic ice sheets is considered catastrophic and may occur with temperature rise above two degrees Celsius. Other impacts have also been described as catastrophic.

²⁰ PEW CENTER ON GLOBAL CLIMATE CHANGE, CLIMATE CHANGE 101: THE SCIENCE AND IMPACTS 7 (2007), http://www.pewclimate.org/docUploads/101_Science_Impacts.pdf (link).

²¹ See, e.g., Global Warming Pollution Reduction Act, S. 309, 110th Cong. (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s309is.txt (link).

²² See SUMMARY OF BILLS, *supra* note 2.

²³ *Id.* The legislative proposals vary in what percentage of sources the CO₂ emissions reductions will apply to. The Lieberman-Warner proposal will only affect 80% of US CO₂ sources, and doesn't cover residential or commercial buildings, or the agricultural sector. See Samuelsohn, *supra* note 9. Similarly, the current legislative proposals do not address all CO₂ or other greenhouse gas reductions despite many being touted as economy wide.

²⁴ See *infra* Part II.

Most of the economy-wide CO₂ reductions target at least a 50% reduction in CO₂ from 1990 levels by mid-century, though there are some outliers.²⁵ The largest reduction, 80%, is anticipated to come from the Waxman and Boxer-Sanders proposals.²⁶

While each of the proposed statutes reference the importance of avoiding climate change harm, these percentage reductions are not defined with respect to what variables could affect such a choice, such as what community is considered, the allocation of costs and benefits, and the expectations of other reductions or future technological changes or solutions. From the press releases of the legislative sponsors, it appears that all believe that their reductions are just enough to avoid the worst harm, while inflicting minimal damage on the economy. Though these “Goldilocks” targets all claim to be “just right,” they lack valid supporting studies that prove these targets accomplish the climate change mitigation that the legislative sponsors claim. Even the scientists themselves may not be sure of the probability of temperature rise associated with certain reductions or the distribution and effects of that rise, but failure to be more specific leaves the focus on direct economic impacts to the detriment of the other concerns.

Moreover, detailing what sectors the percentage reductions cover may be critical; lack of reductions in certain areas will reduce the supposed overall reduction and thus the possibility of avoiding the worst climate change harms. Thus, bills that target a 50% reduction in CO₂ from 1990 levels by mid-century, which are qualified by exceptions, such as the Lieberman-McCain proposal, may be less “costly” to the economy in one sense. However, the costs associated with too many exceptions means that such a bill may in fact be more costly to our society and economy in the long run than the Waxman or Boxer-Sanders bills, which target an 80% reduction in CO₂ from 1990 levels by mid-century. As proposed in the Boxer-Sanders legislation, it is possible to revisit reduction targets as new scientific information comes in, but this same strategy has not worked well in revisiting human health effects and residual risk in the Clean Air Act’s control of hazardous air pollutants.²⁷

B. Whom Are We Trying to Protect?

To analyze whether the legislative goals are sufficient, we must also know whom the legislation intends to protect. Whether our legislation seeks to avoid the worst harms only in this country or works to prevent

²⁵ Direct comparison is difficult in the text since some proposals refer to reductions from CO₂ amounts produced in years other than 1990. Note also that some sectors may not be covered. A graphical representation that takes some of this into account has been published by Resources for the Future, comparing reductions across proposals. See SUMMARY OF BILLS, *supra* note 2.

²⁶ *Id.*

²⁷ Victor B. Flatt, *Gasping for Breath: The Administrative Flaws of Federal Hazardous Air Pollution Regulation and What We Can Learn from the States*, 34 *ECOLOGY L. Q.* 107, 118 (2007).

them worldwide is an important consideration. The U.S. will probably suffer fewer effects from climate change than many equatorial countries, and because it is a developed country, it may have the resources to mitigate some of the worst harms. But, that does not mean that only purely domestic considerations should underlie any climate change legislation. Addressing whether our goals of climate change reduction and mitigation extend worldwide is important both practically and morally.

Practically speaking, failure to set goals which reflect the interests of other countries means that our ability to control domestic impacts is lessened. The Bush Administration's approach to climate change, which focuses almost exclusively on the U.S., has drawn criticism and potential non-cooperation from developing countries.²⁸ Without controls on greenhouse gas production in developing countries, the U.S.'s best efforts at avoiding harm may be undermined by the failure of other countries to take action.

This practical concern in turn inevitably brings up issues of social justice and fairness since the lack of consideration of such issues by the U.S. and other developed nations is ostensibly the biggest barrier to developing country cooperation in any worldwide system.²⁹ The European Union, which is similar to the U.S. in terms of government, economics, and market, recognizes this. When imposing internal climate change regulations, the E.U. is careful to note its historic contribution and world-wide responsibility to take action to reduce harms, aside from effects they currently feel or will feel in the future.³⁰ Most international discussions about climate change regulation are likewise about responsibility to the world as a whole.³¹ Unless we wish our legislative efforts in climate change to come to naught, we must adopt this stance. The explicit acknowledgement of this goal also simplifies many other policy issues.

First, the ultimate question becomes what the "fair" share of reductions should be, not what an overall reduction that is equivalent from country to

²⁸ Up to this time, the U.S. response to climate change has exclusively focused on the effects to the U.S. President Bush's first climate change initiatives focused on adapting to climate change harm, rather than mitigating future harm, under the assumption that it was less costly to adjust to the upcoming higher temperatures than to prevent them coming, *at least as far as the United States was concerned*. Andrew C. Revkin, *Climate Talks Shift Focus to How to Adapt to Changes*, N.Y. TIMES, Nov. 3, 2002, <http://www.globalpolicy.org/soecon/envronmt/2002/1103delhi.htm> (link). One of the proffered reasons for not acceding to the Kyoto protocol, given by President Bush, is that it did not set binding limits on developing countries. Eric Pianin, *U.S. Aims to Pull out of Global Warming Treaty*, ALBANY TIMES UNION, Mar. 28, 2001 at A3.

²⁹ See, e.g., *Greenland Growing Season Extended Due to Warming/Indonesian President Asks Other Developing Nations to Press Developed World Over Emissions*, GREENWIRE, Oct. 29, 2007 (link [hereinafter *Greenland Growing Season*]).

³⁰ See Statement by Ambassador John Bruton on Climate Change, No. 17/05 (Feb. 16, 2005), available at <http://www.eurunion.org/news/press/2005/2005017.htm> (link).

³¹ See European Commission President Barroso's Remarks at the UN High Level Meeting on Climate Change, No. 99/07 (Sept. 24, 2007), available at <http://www.eurunion.org/News/press/2007/2007099.htm> (link).

country should be. The question of whether legislation should avoid mandatory domestic CO₂ cuts until there are commitments from developing countries almost disappears. As long as we are producing over four times the per capita CO₂ output as China, it might not matter if the Chinese total exceeds that of the U.S. Even if our production per capita were equal to China's, the historic CO₂ contributions stemming from earlier U.S. economic growth, and the benefit we retain from that growth, may imply that we should allow other countries to follow a similar development mechanism or that we should bear a disproportionate burden in the cost of reduction.

Additionally, the CO₂ growth in other countries may be indirectly connected to our own benefit and economic growth. Our market is the largest in the world and is the ultimate destination of many Chinese goods whose manufacture is driving much of the CO₂ growth in China. Putting a tariff or limits on goods made in countries without binding CO₂ controls, as proposed by the Bingaman-Specter and Udall-Petri legislation, is one method of addressing the U.S. market's role in climate change, but not necessarily the best one.

The most effective way to be in congruence with climate change concerns and efforts by other countries is to set a domestic legislative reduction target based on international agreement. The Kyoto Protocol was not meant to be the final agreement in climate change control, since its anticipated reductions only buy time before other reductions are required. There is an increasing push right now for agreement on second generation reductions, and the framework for a new protocol is expected to be established in Bali in December.³² Any such agreement will grapple with the overall worldwide target reduction and how that reduction should be allocated between the developing world and the developed world. The most recent meeting of countries on the issue included proposals for a 50% cut from current emission levels to a 50% cut from 1990 levels (representing greater reductions), and also addressed the need for binding reductions in developing countries.³³ While the expected disagreements materialized, some consensus on reductions and addressing the role of developing countries gives hope that this forum can provide for consideration of international as well as domestic interests.³⁴

A possible successor to the Kyoto Protocol that sets binding targets for all countries, even if the targets are lower for developing countries, would

³² Dean Scott & Mike Ferullo, *Meeting of Major Economies Concludes with Countries Divided on Emissions Goal*, [2007] Daily Env't Rep. (BNA) No. 189 (Oct. 1, 2007); Press Release, General Assembly, Actions on Climate Change Will Define Global Legacy Left for Future Generations, Says Secretary-General, As High-Level Event Continues, U.N. Doc. GA/10618 (Sept. 24, 2007), <http://www.un.org/News/Press/docs/2007/ga10618.doc.htm> (link) [hereinafter *Actions on Climate Change*].

³³ *Actions on Climate Change*, *supra* note 32.

³⁴ *Id.*

ensure that all signatory countries have agreed on how much reduction is needed, who bears the responsibility for the cost of the reductions, and that the protection is worldwide. International compliance with such a shared agreement is more likely, meaning that U.S. efforts will not be dragged down by lack of action in other countries. In order for legislation to proceed while international discussions are still ongoing, a reduction target that accommodates current international goals and proposals should be used. Current international discussions about the relative roles of the developed and developing countries in reducing the effects of climate change suggest that the U.S. (and the E.U.) may need to take a higher share of reductions than developing countries.³⁵ Thus, domestic legislation that either acknowledges this fact or implicitly targets a range that could be seen as accommodating international agreement is best. This takes into account some international responsibility and is more congruent with an expected international outcome.

Many of the legislative proposals note the U.S. share of international emissions compared to its share of world population, and two of the proposals (Kerry-Snowe and Waxman, which are similar in tone) acknowledge the need for international agreement on climate change. The only other discussion of the relationship between U.S. CO₂ reductions and the rest of the world are in the context of whether the current proposals should require CO₂ reductions in developing countries, or whether they should protect the competitiveness of American businesses.³⁶

None of the proposals specify what factors should govern the relationship of U.S. emissions to other countries. The expected CO₂ reductions in some of the U.S. legislative proposals (such as the Waxman and Boxer-Sanders proposals) are in agreement with the emission cuts called for by the E.U. in the new international discussions, which indicate that international protection may be part of the overall goal in some of these proposals. However, this goal should be made more specific as it lets the American public understand what tradeoffs are being made, and also allows for ease in future climate change legislation targets as more information about worldwide effects becomes available. There may be no “right” answer regarding the burden our country should shoulder for international responsibilities, but failure to consider and discuss this will hamper the effectiveness of any legislative efforts.

C. Should Compensation be a Legislative Goal?

Our measure of responsibility for harm is related to the question of whether we should assist individuals dealing with adapting to existing harm

³⁵ See *Greenland Growing Season*, *supra* note 29.

³⁶ See, e.g., Darren Samuelsohn, *Coleman Signs on to Cap-and-Trade Plan*, ENV'T & ENERGY DAILY, May 22, 2007, (discussing the possibility of reviewing legislation if other countries do not sign on or if poverty and unemployment increase) (link).

and expected future harm. Climate change has arguably already caused harm to a large group of persons, both within our own country and elsewhere.

Many tort suits have been filed seeking redress for such harms, but the chance of success at this time seems small.³⁷ The fact that climate change harms are not best dealt with under traditional tort systems prompts whether federal legislation should have a compensation system as one of its goals. With respect to other situations wherein tort recovery was difficult because of the complexity of environmental harms, federal legislation has intervened in two distinct ways. With respect to hazardous waste, the Comprehensive Environmental Response Compensation and Liability Act (“CERCLA”) provided recovery of damages to natural resources but did not provide compensation for prior impacts to human health.³⁸ However, it did not preclude common law actions for damages to persons.³⁹ On the other hand, compensation for human health impacts were implemented for black lung disease and considered, but never implemented for asbestosis.⁴⁰

This suggests two possible routes to alleviate existing climate change harms. In this instance, climate change is more like hazardous waste exposure than black lung disease. Those exposed to black lung were an easily identifiable group, and causation could be easily established, making compensation for human health harms feasible. Harm from hazardous waste has been more difficult to prove and entangled with other issues, just as climate change has been. Thus, federal legislation should not seek to legislatively compensate persons or institutions that have been harmed by climate change. This is a practical consideration rather than a moral one. Where causation is difficult to prove, federal legislation will not help in awarding damages. Where causation is more evident, traditional tort law can step in to assist in compensation.

The examples of hazardous waste and black lung suggest a different approach for future harms, however. In both hazardous waste and black lung instances, future harm was essentially completely dealt with because of the related remedial measures for clean-up and abatement that had already occurred with respect to the issue. Climate change is different. Most harm has yet to occur, and no legislative action can completely remediate all possible future harm. Nevertheless, legislation can authorize funds to

³⁷ The high profile California suit against auto manufacturers was recently thrown out, but many other possibilities remain. Carolyn Whetzel, *Federal Court Tosses Out Nuisance Claim Filed Against Six Automakers by California*, [2007] Daily Env’t Rep. (BNA) No. 2,036 (Sept. 21, 2007).

³⁸ See 42 U.S.C. § 9607(a)(4) (2006).

³⁹ 42 U.S.C. § 9614 (a) (2006).

⁴⁰ See ALAN DERICKSON, *BLACK LUNG: ANATOMY OF A PUBLIC HEALTH DISASTER* 143–82 (1998); Paul D. Carrington, *Asbestos Lessons, the Consequences of Asbestos Litigation*, 26 REV. LITIG. 583, 596 (2007).

abate as many future harms as possible, and should do so.⁴¹ Just as CERCLA evidences a choice through remediation to effectively insulate people from future harm,⁴² climate change legislation should spend money to abate as many future effects of climate change as possible. This is consistent with our common law principles of fairness,⁴³ particularly if the legislation might have any preemptive effect.

Initially, when businesses first began to support the idea of comprehensive climate change legislation, it was with the hope that federal legislation would preempt the patchwork of state and local initiatives that were being enacted.⁴⁴ However, many environmental organizations oppose the preemption of local initiatives,⁴⁵ and point to past environmental laws as examples of cooperative federalism that allow a national floor for emissions but permit the states to go above that floor.⁴⁶ This is why a comparison to principle in prior laws is so important: explicit preemption seems particularly at odds with fairness concerns evident in prior environmental laws such as CERCLA.⁴⁷

Legislation should also take care to avoid implicit preemption if some compensation or protection scheme is not enacted. None of the current bills explicitly preempt state programs or state common law, and Senator Boxer has gone on record as opposing any state preemption provisions.⁴⁸ However, the Bingaman-Specter bill includes a provision for financial assistance to those specifically affected by climate change, with particular provisions governing the state of Alaska, and it is possible that implicit preemption of common law might be read into this.

The issue of compensation for harms or adaptation has not been addressed in the goals section of the proposed statutes, though the Lieberman-McCain bill would require a study on effects of climate change on the poor worldwide,⁴⁹ and the Bingaman-Specter bill proposes financial assistance for coastal areas, natural resources, and Alaskan villages harmed by climate

⁴¹ While controversial for other reasons, dikes and levees may lessen some of the harm for rising sea levels, while relocation of persons to areas less affected by extreme weather could also be done.

⁴² Victor B. Flatt, *This Land is Your Land: Our Right to the Environment.*, 107 W. VA. L. REV. 1 (2004).

⁴³ *Id.*

⁴⁴ Economist.com, *Business Calls for Carbon Caps*, posting to Democracy in America, http://www.economist.com/blogs/democracyinamerica/2007/03/business_calls_for_carbon_caps.cfm (Mar. 20, 2007, 21:30 GMT) (link).

⁴⁵ *Congressional Bill Would Wipe out California Warming Law, Officials Claim*, GREENWIRE, June 6, 2007 (link).

⁴⁶ Though inconsistent common law actions may be prohibited by statutory schemes, the major statutes do allow the states themselves to set higher standards. See ROBERT C. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 101–103 (5th ed. 2006).

⁴⁷ Flatt, *supra* note 42, at 21.

⁴⁸ Debra Kahn, *California Regulators Say Cap-and-Trade Should Limit Free Credits*, ENV'T & ENERGY DAILY, Oct. 9, 2007 (link).

⁴⁹ S. 280, 110th Cong. § 402 (2007).

change.⁵⁰ The Bingaman-Specter bill is a good start, but any bill should be more specific about compensation rules and preemption, and should also address international assistance, even if it is simply to deny it. One possible model for compensation for harms that can be specifically tied to climate change (such as the sinking of Alaskan villages) would be to empower a special master, who could award funds based on specific criteria, similar to the special master that awarded compensation from the September 11th Fund.⁵¹

II. WHAT IS THE BEST METHOD OF REACHING OUR GOAL?

The next question that must be addressed is how to best reach the goal that we have set. Professor Rose discussed four broad methods to implement policy goals in environmental legislation, which she colloquially refers to as “do-nothing,” “keepout,” “rightway,” and “property.”⁵² “Rightway” has sometimes been characterized as command and control and “property” may also be identified as market mechanisms; moreover, other thinkers and writers may further divide and clarify policy implementation devices, such as feasibility or education.⁵³ The pluses and minuses of each of these methods have been explored and debated, and sometimes they are linked to what the ultimate goal of the regulation should be.⁵⁴

A. *Is A Market-Based System Best?*

Interestingly all of the climate change legislative proposals would be considered market-based control regimes, with Bingaman-Specter, Udall-Petri, Lieberman-McCain, Kerry-Snowe, Waxman, Feinstein-Carper, and Alexander-Lieberman, all envisioning a cap-and-trade scheme for CO₂, and Stark and Larson proposing an economy wide tax.

A tax system can control pollution by setting a tax on emissions (such as for CO₂) at a high enough level to discourage such emissions. For instance, one could presumably set a tax on CO₂ emissions (or energy production associated with CO₂ emissions) that would discourage emissions enough to reach a CO₂ reduction target. Cap-and-trade systems adopt the target first and then allocate the overall amount allowed by the target to par-

⁵⁰ S. 1766, 110th Cong. § 402 (2007).

⁵¹ See James Harris, Comment, *Why the September 11th Victim Compensation Fund Provides the Case for a New Zealand-Style Comprehensive Social Insurance Plan in the United States*, 100 NW. U. L. REV. 1367, 1400 (2006) (link).

⁵² Carol M. Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 DUKE L.J. 1, 9 (1991).

⁵³ For example, Professor Driesen has been quite successful in noting that “feasibility” is a policy implementation mechanism separate from others. See David M. Driesen, *Distributing the Costs of Environmental, Health, and Safety Protection: The Feasibility Principle, Cost-Benefit Analysis, and Regulatory Reform*, 32 B.C. ENVTL. AFF. L. REV. 1 (2005).

⁵⁴ See Rose, *supra* note 52.

ties in the market to use, sell, or buy (trade) as they please. Cap-and-trade can be an efficient pollution reduction mechanism because the trading allows the private sector to control emissions at the lowest possible cost (to the private sector) and also encourages innovation.

Currently, none of our environmental laws attempt to control pollution through a tax and we have only one cap and trade system, the one for sulfur dioxide (“SO₂”) to control acid rain that was passed in 1990.⁵⁵ That all of the climate change legislative proposals embrace a tax or cap-and-trade system shows just how much these systems have gained in respectability in the last seventeen years. But there are disadvantages to such a system that indicate the issue must be examined more closely.

There are several good critiques of market-based systems to control pollution and comparisons of market based regimes, command and control regimes, and other regimes. The primary critiques of market-based systems are that they may create hot-spots of pollution which hurt specific groups, usually the poor or politically powerless; that they are not fair because they do not necessarily penalize a polluter with the money to purchase pollution rights; that they send the wrong moral signals; and that they are difficult to enforce.⁵⁶

Of these criticisms, three do not appear to be of much concern when addressing the regulation of CO₂ specifically. Because CO₂'s harm is worldwide and dispersed, there are no “hotspots” for concern.⁵⁷ Moreover, concerns over moral signals seem lessened with CO₂ as compared to almost any other pollutant because CO₂ historically has not been seen as a “bad” thing, so producers are not said to have historically engaged in a bad behavior. Fairness is not as large a concern since all high-energy sector use usually has direct benefit to the general public.

The enforcement issue, however, could be more important than the others for the regulation of CO₂. One of the unique features of the cap-and-trade market in SO₂, is that only large coal-fired power plants are involved in the market. These are relatively limited in number, and already regulated.⁵⁸ Therefore, the enforcement and administration costs as well as the possibility of costs from regulatory failure are relatively low for the benefit that can be derived from the system.⁵⁹ CO₂ regulation would be a different animal altogether. First, CO₂ and other greenhouse gases are not limited to coal-fired power plants, though they are a major source. Mobile sources

⁵⁵ See 42 U.S.C. §§ 7651c–7651m (2006).

⁵⁶ See CRAIG N. JOHNSTON, WILLIAM F. FUNK & VICTOR B. FLATT, LEGAL PROTECTION OF THE ENVIRONMENT 390 (2d ed. 2007); Victor B. Flatt, *The Enron Story and Environmental Policy*, 33 ENVTL. L. REP. 10485, 10493 (2003) [hereinafter *Enron*].

⁵⁷ Though collateral pollutants, such as mercury from coal-fired plants, will be affected by any change in demand and concentration of coal-fired power, and thus cap-and-trade systems could have collateral localized effects.

⁵⁸ See *Enron*, *supra* note 56, at 10,494.

⁵⁹ *Id.*

play a large role, and if a system were to include offsets (see discussion, *infra*), the entities that must be monitored and regulated mushroom exponentially.

None of the legislative cap-and-trade proposals would subject every CO₂ source to the market mechanism, but in such cases, significant sources that are left out of the system must still be regulated. For instance Corporate Average Fuel Efficiency (or CAFE) standards for automobiles, which require an automotive seller's fleet to have a certain fuel efficiency (which in turn reduces CO₂ emissions) is an effective way of controlling CO₂ from automobiles. These have been debated in the related energy bill and should be part of the climate change solution. Consideration of CAFE standards (or other method to control CO₂ from cars, such as a tax) needs to occur at the same time as a consideration of any cap and trade proposal to see how much the relative reductions would cost and how the cost would be allocated.

Even if CO₂ met all of the criteria necessary for the efficient use of cap and trade, some kinds of command and control, particularly those that mandate the adoption of some market standard in certain sectors, can overcome commons problems and "split actor" problems⁶⁰ and bring reductions at lower cost because of the ease of enforcement. For instance, the EU consideration on the ban of incandescent light bulb sales⁶¹ seems a very cost-effective way to increase energy efficiency and thereby reduce the production of CO₂. Thus, efficient reduction of climate-changing emissions might be accompanied by command and control systems, at least in some arenas, such as automobile design.

In addition, a major nationwide survey demonstrated that a majority of the American public would actually prefer a command and control system rather than a market system to control climate change.⁶² The fact that this has not had a major impact on the legislative proposals to date suggests either that the parties proposing the laws have a better sense of what regulation will be effective, or those who propose the laws realize that market systems may not be as fair and effective but may benefit a particular favored industry or constituency—or some combination of the two.

The difficulty with cap-and-trade enforcement may be why two of the proposals (Feinstein-Carper and Alexander-Lieberman) only apply to the electricity sector. It has already been demonstrated that this sector can be efficiently regulated in a cap-and-trade system. However, limiting the law

⁶⁰ Split actor problems refer to those situations in which a cost structure is set up so that the person who makes the buying decision is not penalized by the cost, e.g. the landlord who purchases the cheap-stove, even if its energy use is high and costs tenants more.

⁶¹ See Helena Spungenberg, *EU Could Ban Incandescent Bulbs*, BUSINESSWEEK, June 22, 2007 (link).

⁶² See Peter Aldous, *Exclusive Global Warming Poll: The Buck Stops Here*, NEW SCIENTIST, June 23, 2007, at 16–19 (link). There is also a preference for a tax system to a cap-and-trade system. *Id.*

to this one sector means that overall emissions reductions cannot be as large.⁶³ Moreover, it raises fairness concerns. While most Americans use electricity and would presumably share the cost of increases, the public at large will not see equitable distribution of costs to the extent that power plants have their rates set by inconsistent state regulation.⁶⁴

Feinstein-Carper and Alexander-Lieberman could be seen as compromise proposals that anticipate further legislation in other sectors, but propose the electricity generation sector first because of the ease of regulation. Nevertheless, the very concept of proceeding in sectors raises concern. First, there is no guarantee that future legislation will occur after one sector passes. Moreover, as discussed above, experience with cap-and-trade in the electricity generating sector may not be applicable to all industries, requiring individual sector systems in any future legislation. Sector-by-sector regulation might reduce cheating because trading within sectors will likely be easier to monitor, but the lack of inter-sector trading or offsets would defeat many of the benefits of a market system in the first place. Economy-wide proposals may be considered the most efficient and the most fair, but this consideration must be balanced against the enforceability of economy-wide limits.⁶⁵

The enforcement problems inherent to a cap-and-trade system should spur a closer look at the legislative proposals that embrace taxation of CO₂ content. Such taxes are easier to enforce than cap and trade because they are picked up at product and service origination and added to final prices. Economists generally favor a tax because it internalizes any efficiencies of a trading system (if the price of producing carbon is not recouped in one sector, it will cease production) without having to monitor a complicated trading system.

The main objection to a tax system seems to be the belief that the American public abhors any “tax” and will punish any legislator who proposes or votes for one, even if the tax is incorporated into final prices.⁶⁶ Representative Dingell has recently challenged this assumption⁶⁷, and I leave it to political scientists to further analyze this question and educate the public. There is also some concern that the appropriate level of “tax” will not be selected to reach the intended reduction target, a problem that one need not worry about in cap-and-trade. This is considered an economic science problem, but a general aversion to taxes may mean that this “target” gets set by other considerations than the most efficient production of CO₂.

⁶³ See SUMMARY OF BILLS, *supra* note 2.

⁶⁴ See David Cay Johnston, *A New Push to Regulate Power Costs*, N.Y. TIMES, Sept. 4, 2007, at C1.

⁶⁵ See Darren Samuelsohn, *Sanders Shifts Warming Debate With Power Plant-Only Bills*, ENV'T & ENERGY DAILY, April 25, 2007 (explaining that Senator Carper notes that some accomplishment in one sector is better than a stalled bill covering all sectors).

⁶⁶ David Leonhart, *Auto's Friend Shifts Tune on Climate*, N.Y. TIMES, Sept. 5, 2007, at C1.

⁶⁷ *Id.*

Nevertheless, because of ease of administration, a tax system is probably superior with respect to enforcement and fairness and could be tweaked to provide relief for the poor or others whom we feel deserve relief from regulatory impacts.

B. How Should Cap-And-Trade Allocations Be Made?

If a cap-and-trade system is chosen, legislators must choose how to best distribute the initial allocations that will be subject to trade. Allocations for the right to emit carbon dioxide and equivalent greenhouse gases will be very valuable.⁶⁸ There is already much jockeying for this windfall. Whether allocations are auctioned or given away will have little effect on the ultimate economic efficiency of the policy, since trade will efficiently allocate the allotments.⁶⁹ But, this decision will have a large effect on the United States treasury, consumer prices, and distribution of costs.

If a cap-and-trade system is ultimately chosen, it is imperative that CO₂ allocations be auctioned or sold, rather than given away. Current industrial infrastructure has developed under a different legal regime, meaning that additional costs will fall heavily on sectors that rely largely on coal-fired power or utilize other fossil fuel generation, but the additional costs are not so large that they will completely disrupt an industry sector. Electricity costs will rise in the South and Midwest, which depend heavily on coal-fired power, but according to auction advocates, it should not increase more than 15%.⁷⁰ Some of the money raised through an auction could be set aside to help low income persons who are hit especially hard by a price increase in electricity or other staples of survival (shelter, food, and clothing), meeting the legislative goals of equity.

If the right to emit CO₂ is auctioned off, it will generate money for the US Treasury which could be used for spurring low carbon technology or other purposes. However, this means that the cost of producing energy (at least for those whose energy production emits large amounts of CO₂) would rise. That likely will cost consumers more.

Like a tax system, a cap-and-trade system that features allocation auctions sends a better market signal and encourages all users to efficiently price the externalities of CO₂. It imposes the price hike more specifically on the industries that produce the CO₂, which should send an economic sig-

⁶⁸ The Congressional Budget Office estimates that the value of carbon allocations in a US cap and trade system could approach hundreds of billions of dollars. See CONG. BUDGET OFFICE, TRADE-OFFS IN ALLOCATING ALLOWANCES FOR CO₂ EMISSIONS 1 (2007), available at http://www.cbo.gov/ftpdocs/80xx/doc8027/04-25-Cap_Trade.pdf (link).

⁶⁹ See John O. McGinnis & Michael B. Rappaport, *Majority and Supermajority Rules: Three Views of the Capitol*, 85 TEX. L. REV. 1115, 1124 (2007) (link).

⁷⁰ CLEAN AIR WATCH, SHOULD BIG POLLUTERS OWN THE SKY? THE DISTRIBUTION OF EMISSIONS PERMITS UNDER A FEDERAL GREENHOUSE GAS CAP-AND-TRADE PROGRAM (2007) (link).

nal to produce less of it. An auction also avoids the need to decide whether to allocate credits based on CO₂ production or based on energy output.

If CO₂ credits are not sold or auctioned, legislators must decide whether to allocate the credits based on energy output or historic CO₂ output. Between the two, allocation based on energy output is preferable since it more accurately prices the externalities of CO₂ producing activities and would tilt energy usage towards renewables and efficiency. An allocation based on energy output would reward those who produce non-CO₂ based power production but still cost consumers of CO₂ intensive energy more, even without money going to the U.S. treasury. An allocation based on historic CO₂ production, on the other hand, means that CO₂ intensive energy producers will still be able to produce energy for the same cost structure as they have always done, which means that at least theoretically prices would not disproportionately rise in the CO₂ intensive areas. However, since CO₂ would still be rationed, the price of energy would still eventually go up overall. It just wouldn't rise as much in the CO₂ intensive areas and wouldn't affect the bottom line as much as those who sell CO₂ intensive products (such as coal-fired electricity).

As expected, the electric utilities that already consider themselves energy efficient, or those that produce power without fossil fuels, would prefer either a carbon tax or an allocation based on energy production.⁷¹ Doing this imposes the cost of reducing CO₂ on the largest producers of CO₂ and puts the producers (and, by extension, the consumers) of non-CO₂ generating energy or more efficiently produced energy at an advantage. Those that have high CO₂ production, such as coal-fired power plants, would prefer that allocations be distributed based on historic CO₂ production.⁷² These producers cite the historic precedent with SO₂ and the costs that would fall on the consumer if allocations are not "given" to coal producers.⁷³

Determining how to award allocations also implicates the difficulties of ascertaining information about CO₂ production and energy production and setting a time baseline for making the allocations. The time period the allocations are based on influences how we deal with prior CO₂ cutbacks. For instance, credits awarded based on CO₂ production in a time past (like 1997) would temper the unfairness to producers who made voluntary reductions since that time—this would award them allocations that they can then sell. This would also penalize producers who have created new CO₂

⁷¹ See *Examining Global Warming Issues in the Power Plant Sector: Before the S. Comm. on Environment & Public Works*, 110th Cong. 2–4 (2007) (testimony of Lewis Hay III, Chairman, CEO, FPL Group), available at http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=ac3ec28a-a579-4ef1-b840-faba432d7c11 (link).

⁷² See *Examining Global Warming Issues in the Power Plant Sector: Before the S. Comm. on Environment & Public Works*, 110th Cong. 8 (2007) (testimony of James E. Rogers, Chairman, President, and CEO Duke Energy Corporation), available at http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=96b0a903-32fc-47f8-9a36-b4ddd9805e2b (link).

⁷³ *Id.* at 9.

sources for the sole purpose of capturing possible cap-and-trade allocation benefits.

The economy-wide cap-and-trade legislative proposals seem to take a “cut the baby in half” approach to the question of allocation of credits, where some allowances are auctioned and others are awarded for free based on historic CO₂ or energy output.⁷⁴ The Bingaman-Specter bill, for instance, initially gives out 53% of the allocations free to industry CO₂ producers (with reductions in later years), and reserves the rest to encourage low carbon coal development and for auction.⁷⁵ Udall-Petri only gives away 20% of the credits, while the other economy-wide cap-and-trade proposals (Lieberman-McCain, Kerry-Snowe, Waxman, and Sanders) leave the allocation decision to the EPA (with Lieberman-McCain providing some guidance on this decision).

With respect to whether any free allocations will be based on historic CO₂ production or energy output, the proposals currently tilt towards the historic CO₂ production. The Bingaman-Specter bill and the Udall-Petri bill (the only ones to address this legislatively of the economy wide bills) primarily allocate based on historic CO₂ output.⁷⁶ This is also followed in the Alexander-Lieberman bill, which only applies to the electricity sector.⁷⁷ The Feinstein-Carper bill, on the other hand, primarily allocates its credits based on energy output rather than historic CO₂ production.⁷⁸

Many of the legislative proposals which envision a CO₂ allocation do recognize the need to reward early reducers, with Lieberman-McCain basing allocations on 1990 production (the year of the Clean Air Act’s last major amendment), while Boxer-Sanders and Bingaman-Specter choose 1992 (the year of the Rio conference).⁷⁹ The Kerry-Snowe proposal describes “reward[ing] early reductions” as a legislative goal, but does not specify a method to do this.⁸⁰

⁷⁴ See *July 2007 Climate Change Bills*, *supra* note 2.

⁷⁵ See S. 1766, 110th Cong. § 201(a)(1) (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s1766is.txt.pdf (link) [hereinafter Bingaman-Specter Bill].

⁷⁶ *Id.* at § 202(a)(1) & 202(a)(2).

⁷⁷ See S. 1168, 110th Cong. § 705(c) (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s1168is.txt.pdf (link) [hereinafter Alexander-Lieberman Bill].

⁷⁸ See S. 317, 110th Cong. § 716(b)(2) (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s317is.txt.pdf (link) [hereinafter Feinstein-Carper Bill].

⁷⁹ See S. 280, 110th Cong. § 103(c)(2) (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s280is.txt.pdf (link) [hereinafter Lieberman-McCain Bill]; S. 309, 110th Cong. § 704(f)(2)(B)(ii) (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s309is.txt.pdf (link) [hereinafter Boxer-Sanders Bill]; Bingaman-Specter Bill, *supra* note 75, at § 206(c)(2).

⁸⁰ See S. 485, 110th Cong. § 702(a)(2)(f) (2007) available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s485is.txt.pdf (link) [hereinafter Kerry-Snowe Bill].

It is surprising that whether allocation should be based on energy output or historic CO₂ output has not received more attention. In many of the bills, it is difficult to determine which method is being used (some use terms such as “heat output” rather than CO₂ or energy output), and the legislative press reports do not focus on this distinction. Even major environmental organizations have been more likely to focus on the “safety valve” issue as the environmental bugaboo rather than the impact that allocation of credits based on historic CO₂ emissions might have on encouraging clean energy.⁸¹ However, since this decision alone is worth billions of dollars to certain segments of the economy and since the initial distribution will have a large impact on how quickly consumers and industry turn to energy with lower CO₂ production, this is a very important point. Part of the tendency to award based on historic CO₂ production may be a hold over from the use of the SO₂ system as a model or a holdover from what was at one time believed to be politically feasible. Closer examination of the costs and benefits of the different allocation systems may push the American public towards a different conclusion.

C. Offsets

Any cap-and-trade system for CO₂ must also address the question of offsets. An offset is anything that will actually reduce CO₂ production (or sometimes future CO₂ production) at one location, which can then be credited against CO₂ production at another location. For instance, if a party has 100 credits which allow the production of 100 tons of CO₂, but wishes to emit 110 tons, instead of buying 10 more credits under the cap-and-trade system, that person might “offset” the extra ten tons of CO₂ by eliminating ten tons of CO₂ production elsewhere. This could be done through retiring a source, creating a physical system to absorb CO₂, or (more controversially) avoiding an increase in future CO₂ production by providing alternate methods of energy that do not produce CO₂. This is essentially a “purchase” of offsets that takes place outside a cap-and-trade system.

Offsets are very complex, but would add greatly to the efficiency of a system, allowing for faster and cheaper reductions. They are also a mechanism for transferring some of the benefits of compliance to developing countries. The main concern with offsets is which ones should be allowed. Presumably, we wish offsets to actually do what they are intended to do. This means that any offsets will require proper measurement systems, verification systems, scientific consensus and consideration of possible unintended consequences. With respect to verification, the current state of the

⁸¹ See Press Release, Environmental Defense, Bingaman Proposal Reflects Growing Support for Mandatory Climate Change Policy (July 10, 2007), available at <http://www.environmentaldefense.org/pressrelease.cfm?ContentID=6606> (link).

CO₂ trading system in the EU is under critical evaluation.⁸² The EU has recently discovered that its initial CO₂ allocations and some offsets were improperly reported by the CO₂ producers, which inflated the number of credits in the system. Because the EU did not have any mechanism in place to verify what sources were actually producing, the system was improperly designed.

Some proposals for carbon offsets may be scientifically suspect. Biological carbon sinks, which—theoretically, at least—absorb CO₂, are under increased scientific scrutiny and criticism⁸³ because some, such as tree planting in the far northern hemisphere, may contribute to warming rather than offsetting it.⁸⁴ Others, such as a plan to seed the ocean with iron filings near the Galapagos Islands to spur plankton, have been blasted as not being based on sound science, harmful, and motivated by nothing but profit.⁸⁵ Lastly, offsets purchased in developing countries under the Kyoto Protocol's Clean Development Mechanism ("CDM") are not required to be sustainable or environmentally beneficial, and may only enrich the traders themselves.⁸⁶

Moreover, verifying trades and offsets can be a daunting problem. It is difficult to track small sources, such as the CO₂ from the 300 million automobiles in the United States,⁸⁷ meaning that mobile source usage intensity will not be a reliable offset. Offsets in foreign countries present particular difficulties. The Kyoto Protocol's CDM program which allows the purchase of offsets in foreign countries,⁸⁸ has been roundly criticized for the questionable validity of the offsets purchased.⁸⁹ Creating an independent international agency to vet international offsets, perhaps in conjunction with

⁸² See *Question Marks Over EU CO₂ Trading Scheme*, EURACTIVE.COM, June 29, 2007, <http://www.euractiv.com/en/sustainability/question-marks-eu-co2-trading-scheme/article-155349> (link).

⁸³ See *Critics Attack Offsetting Plan Near Galapagos Islands*, GREENWIRE, Aug. 17, 2007, (link).

⁸⁴ See S.G. Gibbard, K. Caldeira, G. Bala, T.J. Phillips, & M. Wicket, *Climate Effects of Global Land Cover Change*, in *GEOPHYSICAL RES. LETTERS* (Lawrence Livermore Nat'l Lab. 2005), available at <http://www.llnl.gov/tid/lof/documents/pdf/324200.pdf> (link); see also Gustavo A. B. da Fonseca, Carlos Manuel Rodriguez, Guy Midgley, Jonah Busch, Lee Hannah & Russell A. Mittermeier, *No Forest Left Behind*, 5 PUB. LIBR. OF SCI. BIOLOGY 1645 (2007), available at http://biology.plosjournals.org/archive/1545-7885/5/8/pdf/10.1371_journal.pbio.0050216-L.pdf (link).

⁸⁵ See *Upset About an Offset*, <http://blogs.wsj.com/energy/2007/08/16/upset-about-an-offset/> (Aug. 16, 2007, 16:37 EST).

⁸⁶ *London Profits, While Africa Awaits Kyoto Benefits*, REUTERS, August 13, 2007, available at <http://www.reuters.com/article/environmentNews/idUSL137011320070813> (link).

⁸⁷ *Trading Foes Hail EPA Region IX Report Criticizing RECLAIM Program*, INSIDE EPA, Nov. 22, 2002, at 7.

⁸⁸ UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, CLEAN DEVELOPMENT MECHANISM, http://unfccc.int/kyoto_protocol/mechanisms/clean_development_mechanism/items/2718.php (link) (last visited Nov. 20, 2007).

⁸⁹ Press Release, Dag Hammarskjold Foundation, *New Book Exposes Scandal of Carbon Trading*, available at http://www.dhf.uu.se/documents/Press_release_carbon_trading.pdf (link).

the EU, may help ease international offset enforcement. With respect to both international and domestic offsets, choosing limited, but heavily vetted offset possibilities, while having a mechanism to approve new offsets that “are in the public interest” is appropriate. This legislative choice will drive lobbying and rent seeking for pet projects, but this may be the best alternative.

Seven of the current legislative proposals, Bingaman-Specter, Udall-Petri, Lieberman-McCain, Kerry-Snowe, Sanders-Boxer, Feinstein-Carper, and Alexander-Lieberman, specifically allow the use of offsets.⁹⁰ The Waxman proposal does not specify the validity of particular offsets, but does state that the goals of a GHG reduction program should encompass “enhanced sequestration of carbon in the forest and agricultural sectors.”⁹¹ The Stark and Larson tax system proposals do not allow offsets per se but do propose tax credits (which can be seen as an “offset” in taxes) for certain sequestration or GHG destruction projects.⁹² Therefore all of the proposals trigger the issues of concern with offsets.

The Waxman proposal may have the virtue of simplicity, but simply encouraging “sequestration” in the “biological and agricultural sectors” pins the EPA, which would administer the program, into a system in which most of its research money would be spent in an area that is currently seen as less promising than originally thought, and which might thus be an inefficient way to reduce CO₂.⁹³ The Kerry-Snowe proposal has the same problem, as it tracks much of the language of the Waxman proposal, including investment in forest and agricultural sequestration (though it adds some other offsetting goals as well).⁹⁴ Focusing on a few offsets means that economic interests associated with those offsets may be benefited while we fail to receive efficiency gains from other offsets that are not favored in the statute. For instance, the Udall-Petri proposal embraces “unlimited” geological sequestration offsets. Though promising,⁹⁵ these offsets, which anticipate using spent oil and gas fields to store CO₂ underground, have not been fully tested, nor has the legality of title and usage (a traditionally state issue) been considered. Lieberman-McCain addresses this issue by requiring that any credited sequestration be re-verified every five years, which is one way

⁹⁰ See SUMMARY OF BILLS, *supra* note 2.

⁹¹ Safe Climate Act of 2007, H.R. 1590, 110th Cong. § 704(e)(5), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h1590ih.txt (link).

⁹² See SUMMARY OF BILLS, *supra* note 2.

⁹³ Press Release, Lawrence Livermore National Laboratory, Plant a Tree and Save the Earth? (Dec. 11, 2006), available at https://publicaffairs.llnl.gov/news/news_releases/2006/NR-06-12-02.html (link).

⁹⁴ Global Warming Reduction Act of 2007, S. 485, 110th Cong. § 702(a)(2)(E) (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s485is.txt (link).

⁹⁵ Darren Samuelsohn, *DOE Finds Sequestration Capacity for 900 Years of CO₂ Emissions*, GREENWIRE, Mar. 28, 2007, (link).

to put a check on the system, but that bill also focuses too much on sequestration to the exclusion of other offset possibilities.⁹⁶

Since many potential offset sources have an economic interest in having their offset approved either by law or regulation, we should be particularly concerned with rent-seeking which is already part of the lobbying effort. Sanders-Boxer leaves the determination of allowable offsets solely to regulatory decisionmakers.⁹⁷ While this allows more flexibility with possible offsets and would also allow a system to recognize promising future offsets, simply putting the decision in regulatory hands does not always avoid undue pressure for approval of pet projects. In fact, at the regulatory level, scrutiny of these choices might decrease.

Most of the proposals that address offsets anticipate that any U.S. trading system will allow trading internationally. Apparently because of the difficulty of enforcement in this arena, several of the legislative proposals (Bingaman-Specter, Lieberman-McCain, Feinstein-Carper, and Alexander-Lieberman) cap the percentage of foreign offsets that any one producer can purchase. Additionally, some (such as Lieberman-McCain and Bingaman-Specter) have some system for verification of foreign offsets as well.

D. Other Issues (Safety Nets, Research Grants, CO₂ Equivalents, and Integration with Other Systems)

1. *Safety Nets*—Another important consideration is whether legislation would have a mechanism for avoiding large increases in cost for CO₂ allotments. Bingaman-Specter and Udall-Petri currently propose a “safety net” to protect American businesses from economic dislocation associated with introduction of a cap-and-trade system.⁹⁸ CO₂ safety nets usually set a maximum price for allocations in a cap-and-trade system. David Montgomery, vice-president of CRA International and former Deputy Assistant Secretary for Policy at the Department of Energy, suggests such a maximum price will protect those who are hit particularly hard by the newly internalized cost of CO₂ production, and protect business from wild economic disruptions.⁹⁹ Though controversial, safety nets have been proposed in some of the legislation, presumably to assist in legislative passage.¹⁰⁰ How-

⁹⁶ Climate Stewardship and Innovation Act of 2007, S. 280, 110th Cong. § 144(c)(5) (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s280is.txt (link).

⁹⁷ Global Warming Pollution Reduction Act, S. 309, 110th Cong. § 704(b)(1) (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s309is.txt (link).

⁹⁸ See SUMMARY OF BILLS, *supra* note 2.

⁹⁹ CRA's David Montgomery Talks Economics of Calif. Policy, Says Safety Valve Positive Tool, ENV'T & ENERGY DAILY News PM, June 19, 2007 (link).

¹⁰⁰ Katherine Ling, *Bingaman Calls His CO₂ Allocation a First Attempt*, ENV'T & ENERGY DAILY, July 17, 2007 (link); Darren Samuelsohn, *Lieberman, Warner Eye New Cost Proposal, Shy Away from*

ever, there is also criticism of such safety nets as undercutting the effectiveness of any cap-and-trade system.¹⁰¹ In addition to undercutting the efficiency of a cap-and-trade system, such safety nets create another opportunity for certain industries to seek special favors in legislation. Senator Boxer, chair of the Senate Environmental Committee, has indicated that she would not support any legislation that included such a safety net. For their part, Bingaman and Specter have indicated a willingness to look at other options,¹⁰² and Lieberman and Warner have said they will not agree to add a safety net to their legislative proposal.¹⁰³ However, many legislators seem predisposed to favor business relief as the cost of passing climate change legislation.¹⁰⁴

Bingaman-Specter and Udall-Petri also include provisions to offset “unfair” competition from countries, particularly developing countries, that do not limit CO₂ production. There has been less attention paid to these provisions, and it is possible that they could be seen as encouraging foreign governments to implement binding cuts. Whether this is appropriate from a “goals” point of view must be discussed in that context; as an effective mechanism for encouraging all countries to take their fair share of binding cuts, it may or may not be effective. Though trade sanctions have been part of worldwide environmental treaties before, unilateral imposition raises questions of WTO violations.¹⁰⁵

2. *Research and Development (R&D)*—Grants for increasing technological solutions to climate change are prominent in the proposed legislation. Many environmentalists and think tanks suggest that federal climate change legislation must include funds for alternative energy research, claiming that it is a necessary investment in order to make CO₂ reduction less expensive, and there has already been significant research into technologies that might be particularly beneficial.¹⁰⁶ As with any government grant, there is a significant risk that research funds will be spent improperly. As an example of the dangers of government research grants, ethanol incen-

“*Safety Valve*,” ENV’T & ENERGY DAILY, July 25, 2007 (link) (explaining the tension surrounding the “safety valve” possibility).

¹⁰¹ Darren Samuelsohn, *Boxer Raises concern Over ‘Safety Valve’ Provision in New Bill*, ENV’T & ENERGY DAILY, July 13, 2007 (link).

¹⁰² See Ling, *supra* note 100.

¹⁰³ See Samuelsohn, *supra* note 100.

¹⁰⁴ See Darren Samuelsohn, *Senate Moderates to Propose “Cost Control” Bill as Addendum to Cap-and-Trade*, ENV’T & ENERGY DAILY, July 24, 2007 (link).

¹⁰⁵ Steve Charnowitz, *Environmental Trade Sanctions and the GATT: An Analysis of the Pelly Amendment on Foreign Environmental Practices*, 9 AM. U. J. INT’L LAW & POL’Y. 751, 777–78 (1994) (discussing how some trade sanctions for environmental treaty violations would violate the precursor to the WTO).

¹⁰⁶ See, e.g., JA EDMONDS ET AL., GLOBAL ENERGY TECHNOLOGY STRATEGY: ADDRESSING CLIMATE CHANGE (EXECUTIVE SUMMARY) 21 (2007) (link).

tives have been lambasted for being wasteful, inefficient, harmful to the poor, and a farm-state giveaway.¹⁰⁷

Five proposals, Bingaman-Specter, Udall-Petri, Lieberman-McCain, Feinstein-Carper and Larson, provide for direct R&D grants. In the cap and trade systems, these grants are to be funded from the money received from the auctioned portion of CO₂ allocations.¹⁰⁸ In the Larson tax proposal, six billion dollars of carbon tax receipts would go towards research and development.¹⁰⁹ The most striking aspect of these proposals is that, despite the abundance of free money on the table, there are few articulated standards for determining who should get this money, beyond the fact that it should contribute to a low carbon economy and be promising. The Bingaman-Specter proposal has the greatest level of specification. It identifies specific categories, including coal-fired plant efficiency, zero emission electricity production, coal sequestration, cellulosic biomass, and lower vehicle emission technology, that may receive grants, and even specifies a rudimentary formula for the awards.¹¹⁰ Specificity about allowable R&D in legislation can be both good and bad. With large amounts of money at stake, the pre-identification of eligible technologies increases the probability of lobbying for financial gain at the expense of funding for the most scientifically promising technologies.¹¹¹ However, if no specifications are set out for administratively awarding such grants, the award of the grants becomes a goal in itself, rather than necessarily being an efficient way to encourage innovation.

There are political and economic arguments about whether direct grants really do good or whether these issues should be left to the marketplace. The popularity of R&D among most factions supporting climate change legislation, however, seems to indicate that it will be part of a comprehensive scheme. R&D which benefits certain areas of the country may also be the necessary political “pork” to grease the wheels of Congressional voting.¹¹²

¹⁰⁷ Jack Lyne, *Ethanol Incentives: Fueling a Boon or a Boondoggle?*, SITE SELECTION, Aug. 2007, <http://www.siteselection.com/ssinsider/incentive/ti0708.htm> (link). For a more detailed discussion of the problems associated with ethanol incentives (including marketplace distortion, environmental harms, energy inefficiency, and food security) see L. Leon Geyer, Phillip Chong, & Bill Hxue, *Ethanol, Biomass, Biofuels and Energy: a Profile and Overview*, 12 DRAKE J. AGRIC. L. 61, 72, 74–76 (2007).

¹⁰⁸ See SUMMARY OF BILLS, *supra* note 2.

¹⁰⁹ *Id.*

¹¹⁰ Low Carbon Economy Act of 2007, S. 1766, 110th Cong. § 401 (2007), *available at* http://energy.senate.gov/public/_files/END07842_xml1.pdf (link).

¹¹¹ For example, the much touted hydrogen car in President Bush’s 2003 State of the Union address, which has received large amounts of federal funding, is no closer to reality than it was in 2003. Brett Clanton, *So, When Do We Get Hydrogen Vehicles*, HOUSTON CHRONICLE, Sept. 5, 2007, at A1.

¹¹² Alaska has already received funding for an International Arctic Climate Change Research Center for the University of Alaska Fairbanks, see International Arctic Research Center Homepage, <http://www.iarc.uaf.edu/index.php> (link) (last visited Nov. 20, 2007).

3. *CO₂ Equivalents*—Another issue that has not yet been thoroughly explored in the current crop of proposals is the eligibility and handling of other greenhouse gases as carbon dioxide equivalents. Overall, CO₂ produces about 70% of global warming potential worldwide, but other gases, such as refrigerants and methane, are far more potent contributors. The Kyoto Protocol and other major climate change policies have recognized this linkage, and the legislative provisions for the most part define a “Carbon Dioxide equivalent” uniformly: “For each greenhouse gas (other than carbon dioxide), the quantity of carbon dioxide that would have an effect on global warming equal to the effect of a unit of the greenhouse gas, as determined by the President, taking into consideration global warming potentials.”¹¹³

While this seems direct enough, the details could get more complicated. Two issues in particular should be addressed: 1) should the greenhouse gas equivalents be limited, and 2) how should equivalency to CO₂ be determined. The Bingaman-Specter and Lieberman-McCain proposals define “greenhouse gases” as only including carbon dioxide, methane, nitrous oxide, hydrochlorofluorocarbons, perfluorocarbons, and sulfur hexafluoride.¹¹⁴ Waxman, Kerry-Snowe, and Boxer-Sanders, on the other hand, add another provision to the definition of “greenhouse gas” which allows the administrator to designate additional greenhouse gases. Though the Bingaman-Specter and Lieberman-McCain limitations of gases reflect allowable gas equivalents in the Kyoto Protocol, having the possibility of recognizing other gases maintains flexibility to identify other, more efficient reduction possibilities.

With respect to the second issue regarding equivalents, while Bingaman-Specter says the CO₂ equivalency will be “determined by the President, taking into consideration global warming potential,” Lieberman-McCain (and other bills) simply allow determination by the administrator. While this may seem a distinction without a difference, the additional requirement of taking into consideration global warming potential disallows consideration of other important factors. Some reduction in greenhouse gas equivalents may have collateral dangers, while other may have benefits.

For instance, by funneling money to offset more potent greenhouse gases that impact other environmental effects, the Kyoto Protocol’s CDM may be creating a market to allow more harmful gases to be sold for credit.¹¹⁵ But in developed countries, reductions of volatile organic com-

¹¹³ Low Carbon Economy Act of 2007, S. 1766, 110th Cong. § 3(2)(B) (2007) available at http://energy.senate.gov/public/_files/END07842_xml1.pdf (link).

¹¹⁴ *Id.* at § 3; see also Climate Stewardship and Innovation Act of 2007, S. 280, 110th Cong. § 3 (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s280is.txt (link).

¹¹⁵ *Kyoto Projects Harm Ozone Layer: Ozone Official*, REUTERS, Aug. 13, 2007, available at <http://www.reuters.com/article/environmentNews/idUSL137011320070813> (link).

pounds may also have collateral benefits in the reduction of ozone pollution and toxic air pollution. This effect may be very large, and the related programs in the Clean Air Act should be examined in the formation of any climate change legislation to ensure that these benefits (and possible costs) are taken into account, or that the administrator can take them into account in determining various benefits of relative reductions in different greenhouse gases.

4. *Relationship to other CO₂ trading systems*—Finally, the relationship between any comprehensive cap-and-trade law and existing greenhouse gas control systems must be analyzed. Any trading or tax systems should be able to integrate with other verified CO₂ (or CO₂ equivalent) trading systems. If the systems do not create an even playing field a conversion process can be established. The same system can be implemented if usage in different sectors is not equivalent.

Boxer-Sanders explicitly notes that verifiable state and local early reductions shall be recognized, meaning that any reductions taken pursuant to the northeast greenhouse gas initiative will be valid.¹¹⁶ Lieberman-McCain takes a similar approach.¹¹⁷ Lieberman-McCain goes on to allow verified international trading allowances to satisfy 30% of allowable offsets, while the Bingaman-Specter bill allows the use of comparable foreign emissions credits to satisfy up to 10% of valid offsets.¹¹⁸ Kerry-Snowe and Waxman do not discuss state or international equivalent systems. Our legislation need not slavishly follow another model and adopt its decisions on trading price or offsets, but we must consider how these programs will interact because this interaction will affect the success and efficiency of the programs.

Other issues may be important in comprehensive climate change as well. If energy legislation is considered, there could be many legislative provisions to encourage energy conservation. With the costs of insurance rising due to climate change, the government may need to address the availability of insurance or re-insurance. But the issues outlined above provide a fairly comprehensive model of concerns for climate change legislation.

CONCLUSION

None of the current legislative proposals encompass all of the best options for each of these policy considerations, but the major bills, such as Bingaman-Specter and Lieberman-McCain, could be altered to do so. Big changes would require including an auction system (Stark proposes a 100%

¹¹⁶ Global Warming Pollution Reduction Act, S. 309, 110th Cong. § 704(f)(2)(B) (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s309is.txt (link).

¹¹⁷ Climate Stewardship and Innovation Act of 2007, S. 280, 110th Cong. § 3 (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s280is.txt (link).

¹¹⁸ *Id.* at § 144(a); Low Carbon Economy Act of 2007, S. 1766, 110th Cong. § 501(f)(2) (2007), available at http://energy.senate.gov/public/_files/END07842_xml1.pdf (link).

auction), resetting the target reductions in accord with international agreement, and establishing a binding target that is sufficient for harm avoidance (most studies suggest that at least a 50% reduction in annual CO₂ production from 1990 levels by mid-century is necessary to avoid the worst impacts, but 80% may better approach our responsibility).

Climate change legislation is complex; we cannot get by on vague calls for CO₂ reduction. The devil is in the details and the intent behind those details. While the current legislative proposals address some of the issues associated with climate change legislation, none do so completely; and without examining all of the issues together, incorrect choices will be made. Armed with a checklist of issues, we can weigh the benefits and harms of current proposals and better tailor them to avoid climate change harms in a fair and efficient manner. We may not all agree on necessary reduction levels, acceptable harms, or what is fair or efficient, but a focus on the issues in this essay will make such discussions and decisions more transparent.