



## U.S. Senate Climate Change Bills in the 110th Congress: Learning by Doing

*Kenneth R. Richards\* and Stephanie Hayes Richards\*\**

INTRODUCTION .....	3
I. POLICY PERSPECTIVE .....	5
A. Appropriate Targets.....	5
B. Cost-effective Abatement.....	5
C. Administrative and Public Finance Impacts.....	7
D. Relation to Efficacy, Legal Constraints, and Political Feasibility .....	8
II. EMISSIONS REDUCTION TARGETS .....	9
A. Provisions.....	10
B. Discussion and Recommendations .....	12
III. COST-CONTAINMENT DESIGN FEATURES.....	16
A. Provisions.....	18
1. Controlling the Cost of Compliance.....	18
2. Upstream and Downstream Focused Regulation.....	20
B. Discussion and Recommendations .....	21
1. Use of Cap-and-Trade System.....	21
2. Borrowing Provisions.....	22
3. Banking .....	24
4. Cost Relief Measures .....	24
5. Upstream versus Downstream Regulation.....	29
IV. INCENTIVES FOR ACTIVITIES OUTSIDE THE COVERED FACILITIES .....	31

\* Associate Professor, School of Public and Environmental Affairs, Indiana University; Affiliated Associate Professor of Law, Maurer School of Law, Indiana University; Senior Visiting Fellow, Smith School of Enterprise and Environment, University of Oxford. Professor Richards holds a J.D. and a Ph.D. from the Law School and Wharton Business School at the University of Pennsylvania; a BSCE and MSCE from Northwestern University; and a BA from Duke University.

\*\* Managing Principal, Bloomington Energy and Environmental Intelligence, LLC, Bloomington, IN. Ms. Richards holds an MPA and an MBA from the School of Public and Environmental Affairs and the Kelley School of Business, Indiana University, and a BA from Campbell University.

The authors would like to acknowledge the excellent editorial assistance provided by Elizabeth Baldwin. They would also like to thank John Graham of the School of Public and Environmental Affairs, Ian Parry of Resources for the Future, Jeffrey R. Holmstead of Bracewell & Giuliani, and Tom Brewer of Georgetown Business School for their very helpful reviews of this paper.

A.	Provisions.....	31
1.	Domestic Offset Projects.....	32
2.	International Credits and Offsets.....	35
3.	Early Action Allowances.....	37
4.	Carbon Capture and Sequestration Projects.....	38
5.	Agriculture and Forestry.....	40
B.	Discussion and Recommendations.....	43
1.	Domestic Offset Projects.....	46
2.	International Credits and Offsets.....	46
3.	Early Action Allowances.....	47
4.	Carbon Capture and Storage.....	47
5.	Agriculture and Forestry.....	48
V.	DISTRIBUTION OF ALLOWANCES AND AUCTION REVENUES.....	48
A.	Provisions.....	49
1.	Direct Allocation.....	49
2.	Auction for Earmarking.....	56
3.	Auction for Revenue Raising.....	61
B.	Discussion and Recommendations.....	61
1.	Comparison of the Bills.....	62
2.	Policy Perspective on Distribution of Allowances.....	63
3.	Electric Utility Industry.....	66
4.	Controlling Entry and Exit by Firms.....	67
5.	Low-Income Household Energy Assistance.....	67
6.	Technological Development, Deployment, and Lock-in Problem.....	70
7.	Credits for Early Action.....	70
8.	Adaptive Measures.....	71
9.	Design Simplicity.....	71
VI.	BORDER ADJUSTMENTS FOR LEAKAGE AND COMPETITIVENESS.....	71
A.	Provisions.....	72
B.	Discussion and Recommendations.....	80
1.	Policy Options and their Relative Merits.....	81
2.	Legal Considerations.....	84
3.	Comparison of the Bills.....	85
4.	Separate Pool of International Reserve Allowances.....	87
5.	Stated Purposes for International Reserve Allowance Provisions.....	87
6.	Covered Products.....	88
7.	Price of Allowances.....	90
8.	Number of Required Allowances.....	90
9.	Exclusions.....	92
10.	Implementation Date.....	94
11.	Role of Negotiations.....	94
VII.	SYNTHESIS AND CONCLUSIONS.....	95
	APPENDIX OF TABLES.....	104

## INTRODUCTION

In the 110<sup>th</sup> Congress, the Senate considered three leading broad-based, cap-and-trade climate change bills. The Low Carbon Economy Act of 2007 (Bingaman-Specter bill)<sup>1</sup> was introduced after Senator Bingaman (D-N.M.) circulated a draft bill based on a report developed by the National Commission on Energy Policy.<sup>2</sup> The America's Climate Security Act of 2007 (Lieberman-Warner bill)<sup>3</sup> was the successor to the earlier McCain-Lieberman bill,<sup>4</sup> one of the first broad climate change bills introduced in Congress. As these two bills evolved they showed convergence from their earlier incarnations,<sup>5</sup> but substantial differences between them remained.

On May 20, 2008 Senator Boxer, Chair of the Senate Committee on Environment and Public Works, introduced a Manager's Amendment to the Lieberman-Warner bill. This new version of the legislation retained the short title "Lieberman-Warner Climate Security Act of 2008" and is described by many as a modification of S.2191. The newer legislative language itself, however, reveals the change to be a complete substitute and is embodied in a new bill number, S.3036. The new bill is better understood as a blending of many of the features of both the Bingaman-Specter bill and the original Lieberman-Warner bill, with several amendments adopted from other parties.

There have been many comparisons among the bills, but those comparisons have been largely descriptive rather than analytical, limited to summaries of the bills' provisions for targets, scope of coverage, allocation of allowances, treatment of offsets, and use of auction revenues. There were also a number of criticisms leveled at the bills, but the criticisms were quite limited, largely focused on individual features of the bills, particularly the emissions reduction targets they set.

The purpose of this article is to fill a gap in the analyses of climate bills by providing a systematic, integrated description and assessment of these three specific bills, grounded in a clear description of the evaluation criteria by which the bills can be assessed. As Congress and the Obama Administration craft new legislation for the 111<sup>th</sup> Congress, there are many lessons available from a close

---

<sup>1</sup> S. 1766, 110th Cong. (2007).

<sup>2</sup> Press Release, Nat'l Comm'n on Energy Policy, Energy Commission Praises Bingaman-Specter Legislation to Reduce US GHG Emissions (July 11, 2007), available at <http://bipartisanpolicy.org/news/press-releases/2007/07/energy-commission-praises-bingamandashspecter-legislation-reduce-us-ghg>.

<sup>3</sup> S. 2191, 110th Cong. (2007).

<sup>4</sup> Climate Stewardship and Innovation Act of 2005, S. 1151, 109th Cong. (2005).

<sup>5</sup> For example, the draft of the early Bingaman-Specter bill focused on controlling entities that produced carbon-containing fossil fuels while the McCain-Lieberman bill focused more on energy consumers. When the Bingaman-Specter bill was introduced control of carbon dioxide emissions from coal was focused not on coalmines but on coal-consuming electric utilities – focus had moved downstream slightly. When the Lieberman-Warner bill was introduced it shifted control of petroleum products from consumers upstream to refineries – a refocusing upstream.

examination of the Senate bills in the 110<sup>th</sup> Congress. Compared side-by-side, the bills indicate the major issues that must be addressed in any climate legislation. This study can help assure that successive legislation is appropriately comprehensive in scope, and that it is designed to be as cost-effective as possible given the political constraints.

Beyond immediate legislative efforts, policy makers in other countries may benefit from a review and critique of the elements of the Senate's various bills. The comparison of bills provides a basis for identification of critical issues while the discussion of tradeoffs (and clear mistakes) provides support for the decision making process.

More broadly, a detailed examination of the three bills provides insight into the anatomy of a cap-and-trade approach to environmental protection. Many of the important insights from this discussion are transferable to other applications of environmental protection such as air emissions, wetlands mitigation banking, and natural resources management. The climate change bills are a useful case study of the broader legislative design issues relevant to many environmental applications.

This study also provides an opportunity to consider the evaluation criteria by which one might choose from among the options for implementation of environmental policy. It is essential to understand the criteria that can be used to assess environmental programs to understand the tradeoffs and tensions that permeate the design process.

Given the history of the three bills, the release of the Manager's Amendment, S.3036, invites consideration of which elements of the two predecessors the Senate chose to adopt. This, in turn, provides a basis for evaluating whether the successor to the first two bills represents an improvement over the previous versions – legislative evolutionary progress, so to speak. In fact, viewed through the lens of the evaluation criteria, it appears that the Senate was evolving toward a better legislative product.

Finally, returning to the immediate U.S. legislation, the gradual improvements notwithstanding, there were several issues in all three bills that could have benefited from further refinement. Because draft legislation is often developed as an adaptation of earlier versions, many of the remaining flaws could be carried into future bills. It is important to recognize which types of issues seem to present the greatest challenges and why.

The underlying philosophy that guides the analysis are (1) regardless of the emissions targets Congress adopts, the program should be implemented in the most cost-effective manner possible; and (2) while politics may compel Congress to adopt measures that are less than optimal from a cost-effectiveness perspective, lawmakers should at least be aware that such political compromise involves a cost to society relative to "best" policy practices. The results of the analysis are pleasantly surprising. While there remains substantial room for improvement from a policy efficiency perspective, the Manager's Amendment

has incorporated some of the best policy principles from its predecessors and, in some cases, adopted entirely new approaches missing from either of the earlier bills.

Section II of this paper summarizes key criteria to evaluate policy options. Sections III to VI of this report are organized around the major design features of each of the three bills: emissions reduction targets; cost-containment design features; incentives for activities outside the covered facilities; the distribution of allowances and auction revenues; and mechanisms to address border adjustments for leakage and competitiveness. Each section describes the provisions of the three bills, discusses the implications of those provisions, and makes recommendations for potential improvements in Congress' final climate change bill. Section VII provides a synthesis of the results and conclusions.

## I. POLICY PERSPECTIVE

To compare the Senate climate change bills, this study combines a descriptive and an analytical approach. The descriptive introduction to each section highlights many of the key elements of each bill. This alone is an important exercise because it demonstrates different approaches that the Senate used in the 110<sup>th</sup> Congress, and illustrates how that chamber's approach evolved over the two-year period. However, the real emphasis of this article is the analytical element, examining whether the bills incorporate sound policy principles in their design. This invites at least a brief discussion of what those policy principles entail.<sup>6</sup>

### A. Appropriate Targets

With respect to climate change legislation, setting the targets includes delineating which greenhouse gases are covered and what levels of emissions will be allowed. Ideally, pollution emissions levels are set at a point where the costs of abating an additional unit of pollution are just equal to the benefits of abating that unit.<sup>7</sup> It is often the case, however, that there is simply insufficient information to develop a convincing cost-benefit analysis. In these situations, decision makers must rely even more heavily on judgment, politics and focal points.

### B. Cost-effective Abatement

Whatever the environmental emissions target, sound policy seeks to achieve

---

<sup>6</sup> See generally Kenneth R. Richards, *Framing Environmental Policy Instrument Choice*, 10 DUKE ENVTL. L. & POL'Y F. 221, 221-85 (2000) (detailing principles incorporated here).

<sup>7</sup> In economics, this is described as the point where marginal abatement costs equal marginal abatement benefits. See William D. Nordhaus, *To Slow or Not to Slow: The Economics of The Greenhouse Effect*, 101 ECON. J. 920, 923-24 (1991).

those levels at the lowest possible cost to society. First and foremost, policy must induce parties to adopt the lowest-cost emissions reduction options before moving on to more costly options. Cost-effectiveness can be promoted by a number of related provisions that, taken together, seek to cover as many sources of emissions as possible and to get each to contribute to the point where the cost of an additional unit of emissions reduction is the same as for others.

The primary condition necessary for cost-effectiveness is that when the abatement target is reached, i.e., firms have reduced emissions enough to meet the pollution reduction goal, the costs of one more unit of abatement is equal for all parties.<sup>8</sup> In the case of a pollutant as ubiquitous as carbon dioxide, everyone is a polluting party. Unfortunately, many environmental policies do not lead to this condition of equal costs. For example, because of the wide range of applications involved, policies such as mandating performance standards for electricity generation and minimum biofuels content for transportation fuels are unlikely to lead to equal marginal costs within the application of the standard, and even less so between standards.<sup>9</sup>

Alternatively, price signals – either in the form of marketable allowance prices or emissions taxes – are one of the most effective mechanisms for inducing abatement to a point where the cost of an additional unit of reduction is roughly equal across all parties.<sup>10</sup> This result, however, is based on assumptions that all the parties know what their costs and their options are for making reductions, that there are no barriers to the price signal passing through the production chain, and that all parties with opportunities for reduction are covered by the regulatory system.

Other factors also have an effect. To the extent possible, sound policy implementation also provides incentives for innovation for the development and diffusion of new practices and technologies.<sup>11</sup> The more prescriptive approaches, such as technology specifying regulations, tend to emphasize compliance over innovation. In contrast, the incentive-based approaches such as

---

<sup>8</sup> In economics, this is known as the equimarginal condition – equal marginal costs of abatement across all firms that have additional abatement opportunities. Intuitively, if one party had lower costs of additional abatement than another, it would be more cost effective to have the latter party abate less and the former party abate more.

<sup>9</sup> See generally THOMAS STERNER, POLICY INSTRUMENTS FOR ENVIRONMENTAL AND NATURAL RESOURCE MANAGEMENT 136-49 (Resources for the Future 2003) (discussing the optimal level and distribution of pollution abatement); Robert W. Hahn & Robert N. Stavins, *Economic Incentives for Environmental Protection: Integrating Theory and Practice*, 82 AM. ECON. REV. 464, 464-68 (1992); Robert N. Stavins, *Lessons From the American Experiment With Market-Based Environmental Policies* (Resources for the Future, Discussion Paper No. 01-53, 2001).

<sup>10</sup> See, e.g., STERNER, *supra* note 9; Robert Stavins, *Market-Based Environmental Policies 3* (Resources for the Future, Discussion Paper No. 98-26, 1998), available at <http://www.rff.org/RFF/Documents/RFF-DP-98-26.pdf>.

<sup>11</sup> See, e.g., Richards, *supra* note 6, at 255. See also Hahn & Stavins, *supra* note 9, at 464-68; Scott R. Milliman & Raymond Prince, *Firm Incentives to Promote Technological Change in Pollution Control*, 17 J. ENVTL. ECON. & MGMT. 247, 257 (1989).

taxes and marketable allowances provide rewards to innovation through lower costs.

Finally, cost-effectiveness is promoted by covering as many greenhouse gases as is practical, and as much of the economy as is feasible (subject to administrative costs as discussed below). Covering more gases and more facilities provides more opportunities for low-cost emissions reductions.<sup>12</sup> For a given level of emissions reduction, it will be less expensive to achieve the goal with reductions across the electricity, transportation, manufacturing, commercial and residential sectors than from any one sector alone.<sup>13</sup>

### C. Administrative and Public Finance Impacts

While most environmental economics studies focus on the costs of the abatement activities themselves, it is also important to consider the administrative and public finance impacts associated with a given policy option. The administrative costs include the costs of establishing the program, setting up the bureaucracy, educating covered parties, monitoring emissions and compliance, and taking enforcement action against violators. They also include the government's costs of making credible commitments to maintain the system so that long-term investments are protected.<sup>14</sup> The government can also use a variety of policy tools to influence emissions – taxes, subsidies, standards, quotas, marketable allowances and others.

Generally, when the government imposes taxes to raise revenue, it creates what economists call “deadweight loss,” inefficiencies that result from distorting prices in otherwise efficient markets for labor, capital, goods, or property.<sup>15</sup> It is also generally true that if the government wants to discourage an activity such as pollution it is more efficient to do this with a revenue-raising approach such as emissions fees or auctioned allowances.<sup>16</sup> This is because the price signal is driving the activity toward its efficient level, not away from it. To gain the social benefits of the environmental taxes or auctioned allowances, the revenues need to be used in a way that reduces distortionary taxes such as income tax or payroll taxes.<sup>17</sup> That can be achieved by directly linking the revenues from environmental taxes or auctioned allowances to reductions in marginal income

---

<sup>12</sup> Gilbert Metcalf & John Reilly, *Policy Options for Controlling Greenhouse Gas Emissions: Implications for Agriculture*, 23 CHOICES 34, 34 (2008); ANDREW KEELER, DESIGNING A CARBON DIOXIDE TRADING SYSTEM: THE ADVANTAGES OF UPSTREAM REGULATION 4 (2002), available at [http://www.cleanair-coolplanet.org/cpc/documents/2002\\_CO2\\_trading\\_system.pdf](http://www.cleanair-coolplanet.org/cpc/documents/2002_CO2_trading_system.pdf).

<sup>13</sup> See Metcalf & Reilly, *supra* note 12, at 34; KEELER, *supra* note 12, at 4.

<sup>14</sup> Adam B. Jaffe, Richard G. Newell & Robert N. Stavins, *A Tale of Two Market Failures: Technology and Environmental Policy*, 54 ECOLOGY ECON. 164, 169 (2005).

<sup>15</sup> James Hines, *Three Sides of Harberger Triangles*, 13 J. ECON. PERSP. 167, 168-69 (1999).

<sup>16</sup> Peter Cramton & Suzie Kerr, *Tradeable Carbon Permit Auctions: How and Why to auction not Grandfather*, 30 ENERGY POL'Y 333, 339-40 (2002).

<sup>17</sup> *Id.*

taxes – a “revenue-neutral” approach.<sup>18</sup>

All other things being equal, sound policy involves approaches that minimize the burden to public finances and the costs of administration. Generally this means there is a preference for approaches that achieve the same effects as the alternatives, but raise revenue, require monitoring fewer parties, and use more readily available information.

#### *D. Relation to Efficacy, Legal Constraints, and Political Feasibility*

New climate legislation needs to be effective at limiting emissions. If there is flexibility in the environmental goal, then the policy can accommodate tradeoffs between the certainty of reaching a particular target and other factors, such as the goal of not exceeding a particular cost. Hence, the design of climate legislation needs to reflect the degree of certainty that Congress seeks.<sup>19</sup>

Climate legislation must also be designed to be consistent with legal constraints. At a minimum, all legislation in the United States must comply with constitutional provisions such as the Commerce Clause and the Takings Clause.<sup>20</sup> Moreover, new legislation should be crafted to avoid conflict with existing legislation or regulations.

Similarly, it is important that the provisions of domestic legislation withstand any challenges based on international trade law under the World Trade Organization (WTO). Moreover, in the case of climate legislation in particular, sound policy requires that the new program accommodate existing or emerging international agreements to which the United States is or might become a party. In this sense, policy requires a structure that anticipates integration within an international system.

Finally, new environmental programs emerge from our political process. To this end sound policy must acknowledge political constraints, particularly those arising from distributional issues.<sup>21</sup> Distributional issues can take the form of regional or income class equity. For example, because low-income households spend a greater percentage of income on energy than high-income households, they will be hit particularly hard by a rise in energy prices. Similarly, Midwest states will bear a greater part of the cost of carbon dioxide emissions reductions since they are more reliant on coal than their coastal counterparts.

---

<sup>18</sup> For more discussion on the public finance impacts of environmental policy, see STEPHEN SMITH & HANS B. VOS, *EVALUATING ECONOMIC INSTRUMENTS FOR ENVIRONMENTAL POLICY* (Org. for Econ. Co-operation and Dev. 1997); Ian W.H. Parry & Robertson C. Williams III, *A Second Best Evaluation of Eight Policy Instruments to Reduce Carbon Emissions*, 21 *RESOURCE AND ENERGY ECON.* 347, 347-73 (1999).

<sup>19</sup> See SMITH & VOS, *supra* note 18; Richards, *supra* note 6, at 227.

<sup>20</sup> Richards, *supra* note 6, at 272-76.

<sup>21</sup> See generally STERNER, *supra* note 9 (explaining in more detail the politics of environmental policy); Nathaniel O. Keohane, Richard L. Revesz & Robert N. Stavins, *The Choice of Regulatory Instruments in Environmental Policy*, 22 *HARV. ENVTL. L. REV.* 313, 313-67 (1998).



In sum, sound policy seeks to minimize the sum of the costs of abatement (or compliance), program administration, and public finance, even as it provides appropriate levels of assurance of reaching the emissions targets. The choice of design is constrained, however, by domestic and international law and by politics.

## II. EMISSIONS REDUCTION TARGETS<sup>22</sup>

The emissions targets incorporated into broad-based climate change bills are perhaps the most visible, and therefore the most politically volatile, attribute of such legislation. In an ideal world of policy formation, we would turn to cost-benefit analyses for estimates of the environmental benefits and emissions abatement costs associated with various levels of emissions reductions. The appropriate target is the one where the damages associated with slightly higher emissions are just equal to the costs of avoiding those emissions.

In the real world, the impacts of climate change and the corresponding estimates of optimal emissions levels for greenhouse gases have been highly uncertain.<sup>23</sup> A practical alternative to the economist's optimization exercise is to identify targets that limit damage to an "acceptable" level and are economically manageable. For example, policy makers and government officials often turn to the authoritative Intergovernmental Panel on Climate Change (IPCC), whose most recent assessment report calls for 50 to 85 percent reductions in global GHG emissions relative to 2000 levels by 2050, stabilizing atmospheric concentrations of carbon dioxide at 445 to 490 parts per million.<sup>24</sup> While the IPCC prescription refers to global emissions levels, much of the United States' domestic public debate about targets has focused on these recommendations. All three of the proposed climate change bills in the 110th Congress used these figures as a focal point.<sup>25</sup>

Because of the challenges associated with calculating an optimal level of emissions reductions, an appropriate target for U.S. greenhouse gas emissions

---

<sup>22</sup> Each of the bills provides a schedule of emissions allowances that vary (generally decline) over time. A comparative graph of those schedules can be found in the report by the authors, KENNETH R. RICHARDS & STEPHANIE HAYES RICHARDS, *THE EVOLUTION AND ANATOMY OF RECENT CLIMATE CHANGE BILLS IN THE U.S. SENATE: CRITIQUE AND RECOMMENDATIONS* 5 fig.1 (2009), available at [http://www.bloomingtoneei.com/PDFs/Climate\\_Bill\\_Comparison\\_-\\_April\\_2009.pdf](http://www.bloomingtoneei.com/PDFs/Climate_Bill_Comparison_-_April_2009.pdf).

<sup>23</sup> William D. Nordhaus, *Reflections on the Economics of Climate Change*, 7 J. OF ECON. PERSP. 11, 11-25 (1993).

<sup>24</sup> D. Gordon et al., *Findings of the IPCC Fourth Assessment Report: Climate Change Mitigation*, Union of Concerned Scientists (2007), available at [http://www.ucsusa.org/global\\_warming/science\\_and\\_impacts/science/findings-of-the-ipcc-fourth-1.html](http://www.ucsusa.org/global_warming/science_and_impacts/science/findings-of-the-ipcc-fourth-1.html). For the United States to contribute proportionately to a global reduction of 50 to 85 percent below 2000 levels, the country would have to reduce its annual emission of greenhouse gases to between 1,047 and 3,489 million metric tons of CO<sub>2</sub>-equivalent.

<sup>25</sup> S. 3036, 110th Cong. § 2 (2008); S. 1766, 110th Cong. § 2 (2007); S. 2191, 110th Cong. § 2 (2007).

reductions levels may be determined by political decision as was the case with SO<sub>2</sub> emissions.<sup>26</sup> While this analysis has little in the way of concrete recommendations in this area, leaving the choice of targets to the political process, it is important to understand the differences among the three bills.

#### A. Provisions

The three major climate change bills proposed in the 110th Congress utilized cap-and-trade approaches, which seek to minimize the costs of achieving identified environmental objectives. The basic concept of cap-and-trade legislation is that a specified number of allowances are issued. Covered facilities are required to hold allowances equal to their greenhouse gas emissions levels. Facilities are permitted to buy and sell allowances from each other to minimize the costs of compliance.

In the case of emissions reductions, the bills differed in several ways: (1) gases covered; (2) number of allowances issued; (3) timetables for reductions; and (4) sectors covered. While all three bills covered all greenhouse gases, they differed substantially in terms of targets, timetables, and covered facilities for GHG emissions reductions.<sup>27</sup>

All three bills covered six basic greenhouse gases (GHGs): carbon dioxide (CO<sub>2</sub>); methane; nitrous oxide; hydrofluorocarbons; perfluorocarbons; and sulfur hexafluoride. The Bingaman-Specter bill and the Lieberman-Warner bill explicitly regulated all six greenhouse gases. In contrast, the Manager's Amendment called for the regulation of hydrofluorocarbons in separate, parallel legislation. This broad coverage had important implications for the cost-effectiveness of the bills because it maximized the opportunities to identify the covered entities with the lowest marginal abatement costs.<sup>28</sup>

##### 1. Bingaman-Specter

The Bingaman-Specter bill allowed the President to adjust environmental goals based on the actions of the United States' major trading partners, which meant the bill had the capacity to result in either the most modest or the most ambitious environmental objectives of the three bills. Under the most modest scenario, the Bingaman-Specter bill resulted in a 1 percent increase in GHG emission levels relative to 2000 levels by 2025 and a 4 percent reduction in emissions by 2050 for the entire economy.<sup>29</sup> However, the President had the

---

<sup>26</sup> Robert N. Stavins, *What Can We Learn from the Grand Policy Experiment?: Lessons from SO<sub>2</sub> Allowance Trading*, 12 J. OF ECON. PERSP. 69, 71 (1998).

<sup>27</sup> For a description of the methods used in the numerical analysis of the three bills, see RICHARDS & RICHARDS, *supra* note 22, at 80 app.

<sup>28</sup> JOHN M. REILLY, HENRY D. JACOBY & RONALD G. PRINN, MULTI-GAS CONTRIBUTORS TO GLOBAL CLIMATE CHANGE: CLIMATE IMPACTS AND MITIGATION COSTS OF NON-CO<sub>2</sub> GASES 1 (2003), available at [http://web.mit.edu/globalchange/www/PewCtr\\_MIT\\_Rpt\\_Reilly.pdf](http://web.mit.edu/globalchange/www/PewCtr_MIT_Rpt_Reilly.pdf).

<sup>29</sup> S. 1766, 110th Cong. § 101 (2007).

authority to direct the United States to further reduce annual emissions if the five largest trading partners of the United States took comparable actions to reduce GHG emissions.<sup>30</sup> If the President adopted the more stringent conditional targets, the United States could achieve a 59 percent reduction in GHG levels by 2050 (relative to 2000 emissions).<sup>31</sup>

## 2. Lieberman-Warner

The Lieberman-Warner bill included ambitious environmental objectives, though still fell shy of the goals recommended by the IPCC. The Lieberman-Warner bill would have achieved a 17 percent reduction in GHG emission levels (below 2000 levels) by 2025 and a 42 percent reduction by 2050 for the entire economy, whereas the IPCC recommended 50 to 85 percent reductions by the year 2050.<sup>32</sup> The Lieberman-Warner bill also included substantial incentives for carbon capture and storage technology in the form of bonus allowances that gave away as much as 4.5 tons of allowances for every ton of carbon emissions avoided via CCS.<sup>33</sup> As will be elaborated upon in Sections IV and V of this paper, the Lieberman-Warner bill included a CCS bonus allowance account with a starting balance of 3,932,160,000 emission allowances.<sup>34</sup> Potentially, this account had the possibility of increasing the total level of emissions, particularly during the early years of the program.

## 3. Manager's Amendment

The Manager's Amendment provided a compromise approach to emission targets<sup>35</sup> by combining the sector coverage of the Bingaman-Specter bill with the emissions reduction goals of the Lieberman-Warner bill, while adjusting required reductions in early years to limit transition pains.

By expanding its sector coverage, the Manager's Amendment placed caps on approximately 84 percent of total greenhouse gas emissions.<sup>36</sup> Also, the

---

<sup>30</sup> See *id.* § 501. The President is authorized to make a decision in 2030 to mandate reductions of at least 60 percent below 2006 levels by 2050.

<sup>31</sup> See *id.* §§ 101, 501. The 2006 U.S. GHG emissions levels were 7,076 million metric tons of carbon dioxide equivalent. If the President were allowed to mandate reductions to 60 percent below this level, emissions would be 2,830 million metric tons of CO<sub>2</sub> equivalent in 2050. Since 2000 emission levels were 6,978 million metric tons, the reduction would be equivalent to 59 percent below 2000 levels.

<sup>32</sup> S. 2191, 110th Cong. § 1201 (2007).

<sup>33</sup> See *id.* § 3603.

<sup>34</sup> See *id.* § 3601.

<sup>35</sup> S. 3036, 110th Cong. § 201 (2008).

<sup>36</sup> Since HFCs currently contribute to less than one percent of total U.S. greenhouse gas emissions, the Manager's Amendment sector coverage has been assumed to be equal to that of the Bingaman-Specter bill minus one percent. See ScienceDaily.com, *Beyond Carbon Dioxide: Growing Importance of Hydrofluorocarbons (HFCs) in Climate Warming*, Science Daily (July 9, 2009), available at <http://www.sciencedaily.com/releases/2009/06/090622171503.htm>.

Manager's Amendment reduced the emissions reduction required between 2011 and 2012; Lieberman-Warner required a reduction of nearly 11 percent in one year, whereas the Manager's Amendment required just over a 7 percent reduction.

### *B. Discussion and Recommendations*

Given the uncertainties surrounding the impacts of climate change and the costs of abatement, it is difficult for economists to prescribe an "optimal level" of greenhouse gas emissions abatement. While economists' modeling attempts have yielded very different results, they have tended to include modest reductions in the short-term followed by deeper reductions in the medium- and long-term.<sup>37</sup> Similar projections were incorporated into the Lieberman-Warner bill and the Manager's Amendment. It is interesting to note, however, that in the case of SO<sub>2</sub> emissions trading, the environmental objective was based on a political decision rather than precise economic modeling. In his analysis of the SO<sub>2</sub> trading program, Stavins points out that one of the reasons this trading program was so successful was economists focused on determining the most cost-effective means of achieving the environmental goal rather than entrenching themselves in identifying the "optimal level" of abatement.<sup>38</sup>

Similarly, this article will focus on contributing to a better understanding of the different political goals embedded in the U.S. Senate climate change bills. After all, there is a long time-frame associated with this policy. It is always possible that Congress could reconsider the environmental goals of the program when additional information is available about the costs and benefits of emissions abatement. One of the primary advantages of a tradable permit system is its relative flexibility—the government can change the environmental objectives by adjusting the cap over time to provide a smaller or larger number of allowances.<sup>39</sup>

To fully understand the environmental objectives of these bills, it is important to evaluate all three bills using comparable emission reduction measures. There have been many differing reports regarding the amount of emissions reductions that each bill is likely to achieve.<sup>40</sup> Two primary reasons for the variation

---

<sup>37</sup> WILLIAM NORDHAUS, THE STERN REVIEW ON THE ECONOMICS OF CLIMATE CHANGE 3 (2007), available at [http://nordhaus.econ.yale.edu/stern\\_050307.pdf](http://nordhaus.econ.yale.edu/stern_050307.pdf).

<sup>38</sup> Stavins, *supra* note 26, at 71.

<sup>39</sup> See, e.g., Anita Engels, Lisa Knoll & Martin Huth, *Preparing for the 'Real' Market: National Patterns of Institutional Learning and Company Behavior in the European Emissions Trading Scheme (EU ETS)*, 18 EUROPEAN ENV'T. 276, 276-97 (2008) (explaining that the European Emissions Trading Program involved an initial period, Phase I, during which there was an over-allocation of allowances leading to variable, and ultimately very low, price for carbon. Phase I was followed by a revised Phase II with real allowance scarcity and higher prices).

<sup>40</sup> There have been varying reports regarding the impacts the Bingaman-Specter bill would have on greenhouse gas emissions:

7.6% below BAU by 2020; 21.9% below BAU by 2030. RAY KOPP & BILLY PIZER, FIVE RECENT

among the numbers that appear in this and other analyses, reports, and Congressional documents are base year and sector coverage.<sup>41</sup>

One factor that substantially affects the apparent percent reduction is whether the estimates are based on emissions reductions for the entire U.S. economy or just the covered sectors. On a percentage basis, the capped sectors will necessarily show greater reductions than for the entire economy. The analysis on which this article is based includes the assumption that while emissions from capped sectors will decrease substantially, the emissions from uncovered sectors will increase at an average “business as usual rate” of 1.29 percent each year.<sup>42</sup> For example, a summary of the Manager’s Amendment stated the bill “will reduce emissions from covered facilities 19 [percent] below current levels by 2020, and 71 [percent] by 2050. It is estimated to reduce total US emissions (from all sources, capped and non-capped) by up to 66 [percent] by 2050.”<sup>43</sup>

A second factor that creates a difference in apparent reductions is the base year to which later emissions are compared. The higher the emissions in the base year, the greater the reductions appear in a later year. So, for example, emission levels in 2000 were 6,978 million metric tons of CO<sub>2</sub> equivalent and in 2005 they were 7,181 million metric tons. Hence, a future emission levels drop to 5,000 million metric tons, would represent a 28 percent decrease relative to 2000 levels, but only a 30 percent decrease relative to 2005 levels. The IPCC recommended reductions – 50 to 85 percent – are based on global, economy-

SENATE BILLS PROPOSE MANDATORY GREENHOUSE GAS CAPS: SIDE-BY-SIDE COMPARISON AND ANALYSIS 2 (Resources for the Future 2007), available at [http://www.rff.org/rff/News/Features/upload/26848\\_1.pdf](http://www.rff.org/rff/News/Features/upload/26848_1.pdf).

60% below 2006 levels by 2050. U.S. ENVT. PROT. AGENCY, EPA ANALYSIS OF BINGAMAN-SPECTER REQUEST ON GLOBAL CO<sub>2</sub> CONCENTRATIONS 6 (2007), available at <http://www.epa.gov/climatechange/downloads/s1766analysispart1.pdf>.

2006 levels in 2020, 1990 levels in 2030, and at least 60 percent below 1990 levels by 2050. ENERGY INFO. ADMIN., EIA ANALYSIS v (2008), available at [http://www.eia.doe.gov/oiaf/servicrpt/s2191/pdf/sroiaf\(2008\)01.pdf](http://www.eia.doe.gov/oiaf/servicrpt/s2191/pdf/sroiaf(2008)01.pdf).

There have been equally diverse summaries of the Lieberman-Warner bill/Manager’s Amendment, including:

7 percent below 2006 emission levels by 2012, 39 percent below 2006 levels by 2030, and 72 percent below 2006 levels by 2050. EIA ANALYSIS, *supra* at v.

19 percent below 2005 levels by 2020 and 71 percent below 2005 levels by 2050. PEW CTR. ON GLOBAL CLIMATE CHANGE, SUMMARY OF THE BOXER SUBSTITUTE AMENDMENT TO THE LIEBERMAN-WARNER CLIMATE SECURITY ACT 3 (2008), available at <http://www.pewclimate.org/docUploads/L-WFullSummary.pdf>.

<sup>41</sup> Other factors such as assumptions about the impact of offsets, the Business As Usual scenario, and estimated percentage of sector coverage will also have a lesser impact on estimates of GHG emissions reductions.

<sup>42</sup> For further discussion of the basis for the numerical analysis, see RICHARDS & RICHARDS, *supra* note 22, at 80 app.

<sup>43</sup> U.S. Senate Comm. on Envt. & Pub. Works, A Summary of the Boxer Substitute Amendment to the Lieberman-Warner Climate Security Act 1 (2008), available at [http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore\\_id=441a4c27-8df5-4008-8931-7e07e8914a51](http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=441a4c27-8df5-4008-8931-7e07e8914a51).

wide emissions reductions in the year 2050 relative to 2000 levels. Therefore, the percent reductions calculated for this analysis are based on economy-wide reductions for the same years.

The Lieberman-Warner bill and the Manager's Amendment applied a different approach than that used by the Bingaman-Specter bill. They seemed to embrace the commitment to developed country leadership embodied in the United Nations Framework Convention on Climate Change.<sup>44</sup>

Article 4 of the Convention states:

Each of these [Annex I] Parties shall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs. These policies and measures will demonstrate that developed countries are taking the lead in modifying longer-term trends in anthropogenic emissions consistent with the objective of the Convention. . .

The Bingaman-Specter bill took a more cautious approach to emission reductions. It coupled limited initial reductions with a promise that if the U.S.'s five largest trading partners<sup>45</sup> took comparable actions, then the President had the authority to introduce more stringent emission reduction targets. In the absence of "comparable" actions by our major trading partners, the U.S. would only reduce GHG emissions 4 percent below 2000 emissions by 2050. The reserved approach of the Bingaman-Specter bill was certainly understandable given the global nature of carbon dioxide emissions.<sup>46</sup> As the economies of large developing countries like China and India continue to grow and their energy usage soars,<sup>47</sup> legislators might understandably be concerned that the U.S. will spend billions of dollars on climate change mitigation efforts only to have the nation's efforts dwarfed by continued increases of carbon dioxide emissions in developing countries. It is difficult to determine whether the United States could exert more influence on the course of international negotiations by taking unilateral action to reduce emissions or by holding out to

---

<sup>44</sup> United Nations Framework Convention on Climate Change art. 4, May 9, 1992.

<sup>45</sup> The U.S.'s five largest trading partners are currently Canada, China, Mexico, Japan, and Germany. See U.S. Census Bureau, Top Ten Countries with which the U.S. Trades, <http://www.census.gov/foreign-trade/top/dst/current/balance.html> (last visited Apr. 29, 2009).

<sup>46</sup> Because of the long atmospheric residence time of greenhouse gases, emissions in Ottawa, Beijing, Mexico City, Tokyo, and Berlin have essentially the same effect on climate change as emissions in the United States. For a discussion of the slight global variations in atmospheric concentrations of carbon dioxide in the atmosphere, see National Aeronautics and Space Administration, *NASA Maps Shed Light on Carbon Dioxide's Global Nature* (Oct. 9, 2008), available at <http://www.nasa.gov/topics/earth/features/airs-20081009.html>.

<sup>47</sup> Some reports show China's carbon dioxide emissions exceeded those of the U.S. in 2006 while others predict the country will surpass the U.S. in the next year or two. See, e.g., *China surpassed US in carbon emissions in 2006: Dutch report*, REUTERS, Oct. 10, 2007, available at <http://www.livemint.com/2007/06/20235536/China-surpassed-US-in-carbon-e.html>.

try to force broader coverage under a multilateral treaty.<sup>48</sup> Ultimately, the issue of international strategy is a matter for political deliberation.

If Congress decides to pursue a “developed country leadership” approach, then it is important to note that the Manager’s Amendment offered an improved implementation strategy relative to the original Lieberman-Warner bill. By expanding its sector coverage, the Manager’s Amendment placed caps on approximately 84 percent of total greenhouse gas emissions compared to 80 percent for the Lieberman-Warner bill. By providing broader sector coverage, the Manager’s Amendment offered more opportunities to identify the covered entities with the lowest marginal abatement costs.

In his response to the *Stern Review on the Economics of Climate Change*, William Nordhaus indicated “[o]ne of the major findings in the economics of climate change has been that efficient or ‘optimal’ economic policies to slow climate change involve modest rates of emissions reductions in the near term, followed by sharp reductions in the medium and long term.”<sup>49</sup> Lieberman-Warner would have required a reduction of nearly 11 percent in annual emissions between 2011 and 2012, whereas the Manager’s Amendment required just over a 7 percent reduction during the same time. In this sense the Manager’s Amendment would have reduced the impact of the transition.

Also, where the targets for Lieberman-Warner would have involved economy-wide emissions reductions in 2025 and 2050 of 17 and 42 percent, respectively (relative to 2000 levels), the figures were 16 and 47 percent for the Manager’s Amendment. In essence, the Manager’s Amendment would have delayed emissions reductions slightly in favor of greater ultimate reductions.

It is also important to note that the Lieberman-Warner bill included substantial reliance on geological carbon capture and storage (“CCS”). Such provisions could have compromised the program’s environmental efficacy, in that the CCS provisions may have limited the bill’s ability to meet its stated environmental objectives. As will be elaborated upon in Sections IV and V of this paper, the Lieberman-Warner bill included a CCS bonus allowance account with a starting balance of 3.9 billion emission allowances.<sup>50</sup> The purpose of these “off budget” allowances was to encourage CCS projects. However, the incentives came in the form of bonus allowances that gave away as much as 4.5 allowances for every ton of carbon emissions avoided via CCS.<sup>51</sup> This effectively increased the emissions level in each year in which the bonus is used. The amount is not trivial. The starting balance of the bonus allowance account,

---

<sup>48</sup> For a concise discussion of theories regarding strategic positions of negotiating partners in international agreements, see D.F. Sprinz & M. Wei, *Domestic Politics and Global Climate Policy*, in INTERNATIONAL RELATIONS AND GLOBAL CLIMATE CHANGE (U. Luterbacher & D.F. Sprinz eds. MIT Press 2001).

<sup>49</sup> NORDHAUS, *supra* note 37, at 3-4.

<sup>50</sup> S. 2191, 110th Cong. § 3601 (2007).

<sup>51</sup> *See id.* § 3603.

3.9 billion, is equal to 75 percent of all allowances available in the first year of the program. These extra allowances were nearly equal to all of the scheduled reductions for the first decade of the program. This could have had the effect of seriously compromising the claimed emissions targets of the bill. As will be discussed again in Sections IV and V, this mass quantity of off-budget CCS bonus allowances should be eliminated from the final climate change bill.

Finally, while the Manager's Amendment represented an improvement over the original Lieberman-Warner bill, the final climate change bill should resolve any ambiguity between the new law and the Clean Air Act (CAA).<sup>52</sup> Unlike its predecessors, the Manager's Amendment contained multiple references to the Clean Air Act. Unfortunately, these references were largely limited to borrowing procedural provisions from the Clean Air Act.<sup>53</sup> The Manager's Amendment did, however, require the President to submit to Congress a report on "any direct regulation of carbon-dioxide emissions that has occurred or may occur under the Clean Air Act."<sup>54</sup> While the Manager's Amendment did make some attempt to address the relationship between the new climate change legislation and the Clean Air Act, the language in new legislation needs to further clarify this relationship. To avoid confusion, to prevent counterproductive duplication of regulations, and to encourage consistency in programs, future climate change legislation should clearly supersede or be integrated with the Clean Air Act on all matters related to climate change.

### III. COST-CONTAINMENT DESIGN FEATURES

As discussed above, given the emissions abatement target, careful policy design will attempt, among other things, to minimize both the costs of compliance and the cost of monitoring and enforcement. Minimizing the costs of compliance requires providing flexibility to entities through incentive-based systems such as taxes or marketable allowances. A cost-effective cap-and-trade program will also regulate as many emitters as is administratively practical. Regulating more emitters, rather than fewer, under a cap-and-trade program increases the opportunity for low cost emissions reductions. At the same time,

---

<sup>52</sup> The Supreme Court decision in *Massachusetts v. U.S. Environmental Protection Agency*, 549 U.S. 497 (2007), (declaring that EPA has authority to regulate greenhouse gases) may invite speculation about whether a new, broader, climate change act is intended to supersede the CAA on matters of climate change. For more discussion on the implications of this case, see Jonathan H. Adler, Colloquy, *Massachusetts v. EPA Heats Up Climate Policy No Less Than Administrative Law: A Comment on Professors Watts and Wildermuth*, N.W. U. L. REV. (2007), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=993511](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=993511). For a thoughtful discussion of how greenhouse gas legislation might fit within the existing structure of environmental law, see William Pedersen, *Adapting Environmental Law to Global Warming Controls*, 18 N.Y.U. ENVTL. L.J. 256, 256-83 (2008), available at <http://www1.law.nyu.edu/journals/envtlaw/issues/vol17/Pedersen%20Macro.pdf>.

<sup>53</sup> S. 3036, 110th Cong. §§ 1722(b)(1), 1751 (2008).

<sup>54</sup> *Id.*



increasing the number of regulated entities will increase the costs of monitoring and enforcement, particularly as the program covers larger numbers of smaller entities.

In the design of a cap-and-trade program, a government may regulate emitters *downstream* or *producers* upstream. The government is said to regulate downstream when it places limitations on parties that emit the pollution, and regulates *upstream* by regulating companies that produce products (primarily fossil fuels), the use of which will eventually result in emissions. In past air emissions regulations, controls have generally been focused downstream on the point of emissions. For example, sulfur dioxide controls have been applied—in the form of technology or emissions allowance requirements—on larger emitters of the pollutants such as electricity generation facilities. Despite historical preferences for downstream regulation, minimizing the cost of both emissions reductions and monitoring and enforcement are served by an upstream approach, controlling the amount of carbon entering the economy rather than the amount of emissions from end-users.<sup>55</sup>

There remains a great deal of uncertainty regarding the eventual costs of a climate change program, particularly one that sets significant limits on national GHG emissions. Policy analysts attempting to model and predict the economic costs of various proposals derive a wide range of estimates.<sup>56</sup> Because of this uncertainty, there may be an advantage to including provisions designed to limit

<sup>55</sup> For further discussion of the economic rationale for upstream versus downstream controls, see CAROLYN FISCHER ET AL., USING EMISSIONS TRADING TO REGULATE U.S. GHG EMISSIONS—PART I OF 2: BASIC POLICY DESIGN AND IMPLEMENTATION ISSUES (1998), *available at* <http://www.rff.org/rff/Documents/RFF-CCIB-10.pdf>.

<sup>56</sup> The EIA estimates the economic costs of the climate change bills, in terms of declines in Gross Domestic Product (GDP), would be as follows:  
S. 1766 – approximately \$66 billion in 2000 dollars from 2009 – 2030 (4 percent discount rate)  
S. 2191 – between \$444 and \$1,306 billion in 2000 dollars from 2009 – 2030 (4 percent discount rate)

This same report presents the annual economic costs of the bills in non-discounted dollars:

S. 1766 - \$11 billion in 2020 and \$12 billion in 2030 (in 2000 dollars)

S. 2191 – Between \$43 billion and \$141 billion in 2020 and between \$59 billion and 163 billion in 2030 (in 2000 dollars)

ENERGY INFO. ADMIN., OFFICE OF INTEGRATED ANALYSIS & FORECASTING, ENERGY MARKET AND ECONOMIC IMPACTS OF S. 2191, THE LIEBERMAN-WARNER CLIMATE SECURITY ACT OF 2007 37 (2008), *available at* [http://www.eia.doe.gov/oiaf/servicrpt/s2191/pdf/sroiaf\(2008\)01.pdf](http://www.eia.doe.gov/oiaf/servicrpt/s2191/pdf/sroiaf(2008)01.pdf).

The EPA estimates the resulting decline in GDP to be as follows:

S. 1766 – Between \$78 billion and \$386 billion in 2020 and between \$124 billion and \$757 billion in 2030 (in 2005 dollars)

S. 2191 – Between \$99 billion and \$506 billion in 2020 and between \$158 and \$938 billion in 2030 (in 2005 dollars)

U.S. ENVTL. PROT. AGENCY, EPA ANALYSIS OF THE LOW CARBON ECONOMY ACT OF 2007 75 (2008), *available at* [http://www.epa.gov/climatechange/economics/pdfs/S1766\\_EPA\\_Analysis.pdf](http://www.epa.gov/climatechange/economics/pdfs/S1766_EPA_Analysis.pdf);

U.S. ENVTL. PROT. AGENCY, EPA ANALYSIS OF THE LIEBERMAN-WARNER CLIMATE SECURITY ACT OF 2008 61 (2008), *available at* [http://www.epa.gov/climatechange/downloads/s2191\\_EPA\\_Analysis.pdf](http://www.epa.gov/climatechange/downloads/s2191_EPA_Analysis.pdf).

the range of potential costs in the final national climate change bill.

### A. Provisions

This section considers the provisions in each of the bills that were designed to control the cost of compliance and the cost of monitoring and enforcement. Provisions for activities outside the cap, such as the use of offsets, are often categorized as cost-containment mechanisms since they have the effect of lowering compliance costs. However, offsets are fundamentally different than other cost-containment mechanisms, and present unique implementation challenges. They are discussed separately in Section IV of this paper.

All three climate change bills encouraged trading of marketable allowances to facilitate cost-effective GHG abatement. However, the bills differed substantially with respect to the other strategies they adopted to limit the costs of the GHG emissions cap and where they focused attention in terms of downstream or upstream legislation. One of the primary design differences among the bills is that the Bingaman-Specter bill incorporated a “safety valve” that provided additional emissions allowances if the allowance price exceeded a threshold level. The other major difference was that the Lieberman-Warner bill relied more on downstream controls than the Bingaman-Specter bill and the Manager’s Amendment (Table 1).

#### 1. Controlling the Cost of Compliance

##### a. Bingaman-Specter

The Bingaman-Specter bill included a Technology Accelerator Payment (TAP), also known as a price cap or safety valve, of \$12 per metric ton for CO<sub>2</sub> in 2012.<sup>57</sup> The TAP would increase 5 percent each year in addition to annual adjustments for inflation. Under this provision, covered facilities could buy extra allowances if the cost of compliance and the market price of allowances become greater than the current TAP.<sup>58</sup> The Bingaman-Specter bill did not include a provision for borrowing allowances. However, covered facilities could bank allowances for an unlimited number of years.<sup>59</sup>

---

<sup>57</sup> S. 1766, 110th Cong. § 102(a), (d) (2007).

<sup>58</sup> For further discussion of combined price- and quantity-based controls in global climate change policy, see W. Pizer, *Combining Price and Quantity Controls to Mitigate Global Climate Change*, 85 J. OF PUB. ECON. 409, 409-34 (2002).

<sup>59</sup> S. 1766, 110th Cong. § 103 (2007). For further discussions of emissions banking, see, e.g., R. Innes, *Stochastic Pollution, Costly Sanctions, and Optimality of Emission Permit Banking*, 45 J. ENVTL. ECON. & MGMT. 546, 546-68 (2002); M. Liski & J. Montero, *A Note on Market Power in an Emissions Permits Market With Banking*, 31 ENVTL. & RES. ECON. 159, 159-73 (2004).

b. Lieberman-Warner

The Lieberman-Warner bill enlisted banking and borrowing as its cost-containment mechanisms in addition to trading. The borrowing provision allowed covered facilities to borrow allowances for up to 15 percent of current year requirements (use year)<sup>60</sup> from their expected future allocations up to five years after the current year (source year). Borrowed allowances had to be repaid at a rate of 1.1 times “the number of years beginning after the use year and before the source year.”<sup>61</sup> The banking provision simply allowed facilities to save allowances indefinitely for later use with no penalty.<sup>62</sup>

c. Manager’s Amendment

The Manager’s Amendment introduced several changes intended to ameliorate the economic burden of the new regulations. It clarified the Senate’s intent to allow covered facilities to “borrow” allowances from future allocations<sup>63</sup> and provided numerous opportunities for discretionary executive branch intervention in the cap-and-trade program through the creation of a Carbon Market Efficiency Board (“CMEB”).<sup>64</sup>

First, the Manager’s Amendment clarified the borrowing mechanism introduced in the Lieberman-Warner bill. Covered facilities could borrow allowances for the current year against future allocations up to five years from the source year.<sup>65</sup> Emitters were allowed to borrow enough allowances to cover up to 15 percent of total emissions in the source year<sup>66</sup> at an annual compound interest rate of 10 percent.<sup>67</sup>

Second, like the other two bills, the Manager’s Amendment allowed facilities to bank allowances indefinitely.<sup>68</sup> The Manager’s Amendment also added several “emergency off-ramp” provisions that served a purpose analogous to the Bingaman-Specter safety valve. The bill delegated responsibility for many of its cost relief measures to the CMEB.<sup>69</sup> These provisions allowed the CMEB to provide cost relief by (1) increasing the emissions allowances that covered entities can borrow,<sup>70</sup> (2) expanding the repayment period for borrowed allowances,<sup>71</sup> and (3) relaxing constraints on the use of foreign emissions

---

<sup>60</sup> S. 2191, 110th Cong. § 2301 (2007).

<sup>61</sup> *See id.* § 2303.

<sup>62</sup> *See id.* § 2201.

<sup>63</sup> S. 3036, 110th Cong., §§ 511-513 (2008).

<sup>64</sup> *See id.* §§ 521-527.

<sup>65</sup> *See id.* § 512.

<sup>66</sup> *See id.* § 511(a)(2).

<sup>67</sup> *See id.* § 513.

<sup>68</sup> *See id.* § 501.

<sup>69</sup> Established under S. 3036, 110th Cong. § 421 (2008).

<sup>70</sup> *Id.* § 521(a)(1).

<sup>71</sup> *See id.* § 521(a)(2).

allowances and the generation of offset allowances.<sup>72</sup>

The emergency off-ramp provisions of the Manager's Amendment also established a cost-containment auction<sup>73</sup> in addition to a regular auction.<sup>74</sup> The cost containment auction is essentially a type of limited safety valve or price ceiling. The CMEB<sup>75</sup> would hold a cost-containment auction each December from 2012 to 2027, during which the government would sell up to 450 million allowances annually<sup>76</sup> from a pool of reserved allowances. The pool consisted of an initial amount of six billion allowances taken from the quantities that were established for the years 2030 to 2050<sup>77</sup> and supplemented by any allowances from current and preceding years that were not sold at the regular auction. The price of allowances would have been \$22 to \$30 in 2012 and risen five percent per year in subsequent years, adjusted for inflation. The proceeds of the cost-containment auction were earmarked – 70 percent to pay for offset style projects and 30 percent to supplement the Climate Change Consumer Assistance Fund.<sup>78</sup>

Through the regular auction, the CMEB would sell the allowances under the cap for a given year that were not otherwise allocated to entities. For the regular auction, the Manager's Amendment established a reserve price, initially set at \$10 and rising in inflation adjusted dollars by five percent per year, below which the government would not sell allowances.<sup>79</sup> While the price cap used in the cost-containment auction helped protect against excessive abatement costs, the regular auction reserve price counterpart ensured that pollution abatement occurred at a faster rate if compliance costs turned out to be lower than anticipated.

## 2. Upstream and Downstream Focused Regulation

The Bingaman-Specter bill and the Manager's Amendment would have regulated CO<sub>2</sub> emissions from petroleum and natural gas on an upstream basis by requiring natural gas processing plants and petroleum refineries to submit allowances for their carbon content.<sup>80</sup> Under both bills coal would be regulated downstream, requiring facilities that consume 5,000 tons of coal or more per year to submit allowances for the carbon content<sup>81</sup> of the coal they consume.<sup>82</sup>

---

<sup>72</sup> See *id.* § 521(a)(3-4).

<sup>73</sup> See *id.* § 522.

<sup>74</sup> See *id.* § 4(41).

<sup>75</sup> See S. 3036, 110th Cong. § 526 (2008). The quantity available for auction declines by about one percent per year.

<sup>76</sup> Under section 526, the number of allowances that may be sold in 2012 is 450 million. That number decreases by one percent each year through 2027.

<sup>77</sup> S. 3036, 110th Cong. §§ 522(a), 525(b)(1) (2008).

<sup>78</sup> See *id.* § 527.

<sup>79</sup> See *id.* § 524.

<sup>80</sup> S. 1766, 110th Cong. § 102(a) (2007); S. 3036, 110th Cong. § 4(16) (2008).

<sup>81</sup> S. 1766, 110th Cong. § 3(22) (2007); S. 3036, 110th Cong. § 4(16)(A) (2007).

<sup>82</sup> There is a significant range of conversion factors for tons of CO<sub>2</sub> emissions per ton of coal.

The bills also would have regulated fossil fuel importers and producers/importers of other GHGs.<sup>83</sup> Comparatively, the Lieberman-Warner bill regulated using a combination of both upstream and downstream approaches. The legislation explicitly identified four types of covered facilities.<sup>84</sup> The first provision applied primarily to CO<sub>2</sub> emissions from electric utilities. The second provision applied to industrial emissions. These first two provisions were downstream-type approaches. The third provision applied to facilities, primarily petroleum refineries, which introduced carbon into the economy in the form of transportation fuels. This is an exception to the downstream approach to CO<sub>2</sub> regulation in the Lieberman-Warner bill. Finally, the last section implied upstream regulation of non-fuel sources of GHG emissions.

Under the Manager's Amendment, certain sources of emissions were exempt from regulation. First, control of hydrofluorocarbons (HFCs) was assigned to a separate, parallel program for later development.<sup>85</sup> Also a bit puzzling perhaps, while imports of natural gas and oil were subject to the cap,<sup>86</sup> the Manager's Amendment exempted imports of petroleum-based liquid fuels from NAFTA countries that had enacted national greenhouse gas emissions reduction requirements that are as strict as the ones in the United States.<sup>87</sup>

### B. Discussion and Recommendations

Compliance flexibility and cost-containment measures may be a political necessity to any U.S. climate change bill. However, it is important to consider how efforts to negotiate numerous cost-containment components into a single bill affect the extent to which the bill is able to achieve the stated environmental objective.

#### 1. Use of Cap-and-Trade System

In the case of climate change, it is advisable to use a policy instrument with economic incentives such as a carbon tax or a cap-and-trade system because it helps ensure that greenhouse gas emissions reductions are achieved at the lowest possible cost.<sup>88</sup> The economics literature has debated whether a carbon tax or a

---

The factors, by coal type, are approximately 1.4 for lignite, 1.9 for subbituminous, 2.5 for bituminous, and 2.8 for anthracite. Energy Info. Admin., Official Energy Statistics from the U.S. Gov't, <http://www.eia.doe.gov/oiaf/1605/coefficients.html> (last visited Nov. 3, 2009).

<sup>83</sup> See generally S. 1766, 110th Cong. § 3 (2007).

<sup>84</sup> See *id.* § 4(7).

<sup>85</sup> See generally S. 3036, 110th Cong. § 1501 (2008).

<sup>86</sup> See *id.* § 4(16)(d), (f).

<sup>87</sup> See *id.* § 202(c).

<sup>88</sup> Robert N. Stavins, *Market-Based Environmental Policies: What Can We Learn from U.S. Experience (and Related Research)?* 2 (Resources for the Future, Discussion Paper No. 03-43, 2003).

cap-and-trade system would be more efficient in the case of climate change legislation and arguments can be mustered for both approaches.<sup>89</sup> However, it is also important to consider the political realities. Most of the climate change bills that have been set forth in Congress have been cap-and-trade proposals. In his remarks to a joint session of Congress on February 24 of this year, President Obama specifically asked Congress to send him “cap-and-trade” legislation to cover greenhouse gas emissions. It is pragmatic to accept the reality that the United States will be using a cap-and-trade system to address climate change. Accordingly, Congress should focus its efforts on ensuring that the policy tool is structured in the most efficient and effective manner possible.

There are many reasons why the President and Congress may be focusing on cap-and-trade legislation. First, since the European Union took action prior to the United States and has chosen to regulate greenhouse gases with a trading system, a cap-and-trade system would make it easier for the United States to collaborate with global partners. Second, because of Americans’ distaste for taxes, virtually all environmental economic incentive instruments implemented in the United States have involved either tradable permits or subsidies.<sup>90</sup> Third, despite economists’ prescriptions for auctioning of allowances, tradable permits have generally been given away in the past<sup>91</sup> so such legislation is more likely to gain the support of industry groups and legislators seeking rents for their constituents. Finally, some argue that the ability for politicians to address distributional issues through the allocation of allowances is one of the key advantages of a tradable permit system.<sup>92</sup>

## 2. Borrowing Provisions

The borrowing provision in the Manager’s Amendment was an improvement compared to the one described in the original Lieberman-Warner bill. Both bills allowed entities to borrow allowances from the EPA Administrator to cover their current year (“use year”) needs. The Administrator could only lend allowances from the five years (“source years”) immediately following the use year. So if an entity needed to borrow additional allowances to cover emissions in 2015, the Administrator could only provide allowances from 2016 to 2020. The borrower had to then pay back the allowances in the source year from which the allowances were borrowed. In the hypothetical, if the Administrator provided allowances from 2018, the loan would, by definition, be a three-year

---

<sup>89</sup> See generally Warwick J. McKibbin & Peter J. Wilcoxon, *The Role of Economics in Climate Change Policy*, 16 J. ECON. PERSP. 107, 107-129 (2002); Harrison Fell & Richard Morgenstern, *Alternative Approaches to Cost Containment in a Cap-and-Trade System* (Resources for the Future, Discussion Paper No. 09-14, 2009) (weighing the pros and cons of use of these policy tools with regard to climate change in more detail).

<sup>90</sup> Stavins, *supra* note 26, at 74.

<sup>91</sup> Stavins, *supra* note 10, at 9.

<sup>92</sup> *Id.* at 12.

loan and had to be repaid in 2018 with 2018 allowances. The number of allowances due for each allowance borrowed would be 1.33 (i.e.,  $(1.1)^3$ ) allowances.

The difference between the two bills related to the number of allowances that had to be paid back in the source year. The original Lieberman-Warner borrowing provision was poorly worded and presented the potential for confusion regarding its intent. The original text established an interest rate of 1.1 times “the number of years beginning after the use year and before the source year,”<sup>93</sup> which could be interpreted to have a number of different meanings.

The Manager’s Amendment provided clearer direction, charging 10 percent compounded annual interest rate on borrowed allowances.<sup>94</sup> The problem with charging a flat interest rate, rather than an interest rate that varies according to prevailing market rates, is that it does not account for inflation or respond in any way to market forces. As a result, it creates substantial opportunities for arbitrage. For example, if inflation rates rose to 10 percent in a given year, companies would be paying no interest in real terms. Conversely if the prime interest rate was closer to 3 percent as it is now,<sup>95</sup> then the borrowing provision would be unlikely to achieve its goals of decreasing compliance costs and preventing system shocks.<sup>96</sup> While the Manager’s Amendment was an improvement over the earlier Lieberman-Warner bill, it could be further improved by tying the interest rate to variations to a benchmark interest rate.

While the Manager’s Amendment eliminated the confusion regarding the design of the borrowing provisions, its implications in practice may still be unclear. It would be easy to assume that borrowing entities would pay an annual compound interest rate of 10 percent. However, the allowances had to be paid back with allowances from the year in which they were borrowed. The effective interest rate would have had to reflect the rise in real terms, assuming there was one. So, if the real (inflation adjusted) price of allowances was rising by five percent per year, the effective interest rate in real terms would be 15.5 percent. In practice, it is likely to be difficult to predict the trajectory of allowance prices, even over five years, so borrowers would have some difficulty predicting the real cost of borrowing. This suggests that a secondary market may develop to

---

<sup>93</sup> S. 2191, 110th Cong. § 2303 (2007).

<sup>94</sup> S. 3036, 110th Cong. § 513 (2008).

<sup>95</sup> MarketVector.com, U.S. Prime Interest Rate Forecast Percent Average of Month, <http://www.marketvector.com/interest-rate/prime-rate.htm> (last visited Nov. 1, 2009).

<sup>96</sup> A recent study suggests that borrowing provisions can help contain the cost of implementing a program for any particular emissions target by cushioning against external shocks to firms. However, based on a simulation exercise, the study shows that the advantages of borrowing provisions largely disappear if the interest rate charged for borrowing allowances is above a six percent annual rate. That specific conclusion, of course, is largely dependent upon the assumed parameters of the model. However, the observation that high interest rates could obviate the benefits of the system is generally applicable. See Fell & Morgenstern, *supra* note 89, at 23.

insure against price fluctuation risks.

The borrowing provision in the Manager's Amendment could have also resulted in a high default rate among borrowers. Given the potentially high and uncertain effective rates charged for borrowing, companies with sufficient access to capital and credit would likely opt to cover their current year emissions a number of ways. They can do this by purchasing allowances on the open market, buying allowances from the cost-containment auction (see below), or obtaining allowances from offset projects. It is possible that borrowers would be comprised primarily of distressed companies that do not have viable alternatives. This in turn suggests the possibility of a high default rate on borrowing. However, there are no provisions in the Manager's Amendment that required entities to provide security for their loans. It is possible that this oversight could be addressed when the EPA develops specific rules. However, it would be better to include explicit provisions in the legislation.

### 3. Banking

All three bills included provisions for unlimited banking of allowances. Banking provisions provide covered entities the opportunity to save allowances for subsequent years when they believe the costs of pollution abatement will be more expensive.<sup>97</sup> The temporal flexibility created by such banking provisions provided significant cost savings in past tradable permit programs.<sup>98</sup> Consequently, banking is not a controversial component of climate change legislation.

It is interesting to note, however, that while the borrowing provisions in the Lieberman-Warner and Manager's Amendment bills charged a form of interest on borrowed allowances, there is no corresponding provision for interest on banked allowances. An argument can be made that banked allowances delay damages and therefore should be encouraged.<sup>99</sup>

### 4. Cost Relief Measures

A recent study of cost containment mechanisms illustrates the significance of price ceilings and price floors, used individually and in conjunction with

---

<sup>97</sup> Richards, *supra* note 6, at 250.

<sup>98</sup> A. DENNY ELLERMAN, RICHARD SCHMALENSSEE, PAUL L. JOSKOW, JUAN PABLO MONTERO & ELIZABETH M. BAILEY, EMISSIONS TRADING UNDER THE U.S. ACID RAIN PROGRAM 47 (MIT Center for Energy and Environmental Policy Research 1997); Suzi Kerr & David Maré, *Efficient Regulation Through Tradeable Permit Markets: The United States Lead Phasedown* 15, (Dep't of Agric. & Res. Econ., Univ. of Md., Coll. Park, Working Paper No. 96-06, 1996); Stavins, *supra* note 10, at 5.

<sup>99</sup> See, e.g., Kenneth Richards, *The Time Value of Carbon in Bottom-up Studies*, in ECONOMICS OF CARBON SEQUESTRATION IN FORESTRY 284 (Roger A. Sedjo, R. Neil Sampson, & Joe Wisniewski eds., CRC Press 1997).



banking and borrowing.<sup>100</sup> The study also describes a mechanism called a price collar, essentially a combined price ceiling and price floor.<sup>101</sup> One of the conclusions of the study is that using a price collar, particularly in tandem with banking and borrowing, reduces the cost of implementing a program with any particular emissions target.<sup>102</sup> But the study also demonstrates that there is a tradeoff between the cost savings from using a price collar and control over the precise level of emissions – i.e., the cost savings comes with greater variability in the actual emissions levels.<sup>103</sup> The choice of tradeoff between control costs and emissions variability will be a matter for Congress to resolve, as it is largely a political choice.

The Bingaman-Specter bill and the Manager's Amendment contained more extensive cost-containment measures than the Lieberman-Warner bill. While a price ceiling like the Bingaman-Specter TAP limited the costs of compliance, it might have also limited the environmental benefits of the policy. While the provisions for "emergency off ramps" incorporated into the Manager's Amendment appeared to be a reasonable discretionary power to afford to the Carbon Market Efficiency Board, it may be possible to design a system that will more reliably and efficiently protect the environment.

The TAP provision in the Bingaman-Specter bill was the subject of considerable attention and analysis. The U.S. Department of Energy's Energy Information Administration projected that the TAP would be triggered in 2017, while the U.S. Environmental Protection Agency estimates the TAP would be triggered in 2030.<sup>104</sup> In either case, this safety valve could compromise the environmental efficacy of this legislation and is considered to be a "dealbreaker" by some environmentalists.<sup>105</sup> This effect could be counterbalanced, at least partially, by the provisions in the bill that created an opportunity for tightening the GHG emissions limits, i.e., pursuing more aggressive reductions.<sup>106</sup> However, even if the more constraining target was imposed, the TAP could have rendered this target meaningless by allowing much higher emissions.

At the same time, the Bingaman-Specter TAP could have limited opportunities for the United States to participate in the global carbon emissions

---

<sup>100</sup> Fell & Morgenstern, *supra* note 89.

<sup>101</sup> *Id.* at 2.

<sup>102</sup> *Id.* at 18.

<sup>103</sup> *Id.* at 19.

<sup>104</sup> Press Release, U.S. Senate Committee on Energy and Natural Resources, Key Findings From EIA and EPA on Bingaman-Specter 'Low Carbon Economy Act' of 2007, *available at* [http://www.energy.senate.gov/public/index.cfm?FuseAction=PressReleases.Detail&PressRelease\\_id=095669c2-ca5b-4b72-adf5-51239cbd9216&Month=1&Year=2008&Party=0](http://www.energy.senate.gov/public/index.cfm?FuseAction=PressReleases.Detail&PressRelease_id=095669c2-ca5b-4b72-adf5-51239cbd9216&Month=1&Year=2008&Party=0) (last visited Nov. 1, 2009).

<sup>105</sup> D. Samuelsohn, Behind 'Safety Valve' Debate Resides 30+ Years of History, *available at* <http://www.carbontax.org/blogarchives/2008/03/11/guest-column-behind-the-cap-and-trade-safety-valve/> (last visited Nov. 13, 2009).

<sup>106</sup> S. 1766, 110th Cong. § 501 (2007).

trading market. The \$12/metric ton TAP was lower than the current EU Environmental Trading System market clearing price of €13.40<sup>107</sup> (approximately \$18.85).<sup>108</sup> Therefore, such a policy could have decreased the United States' credibility in the international arena and limited opportunities to participate in the global trading market.<sup>109</sup> If history is any indicator, it is entirely possible that the TAP, which rises at a rate of 5 percent per year after adjustment for inflation, would never be used. Actual compliance costs of environmental regulations have historically been much lower than forecasted.<sup>110</sup>

The question of whether to include a safety valve such as the TAP in the future legislation will remain a matter of politics. Some economists support such a hybrid policy on the grounds that it protects covered entities if the actual costs of the program substantially exceed its expected costs.<sup>111</sup> At the same time, if the TAP is triggered, it allows emissions to exceed the targets set by the program, thereby compromising the purpose of the emissions abatement program. This trade-off is the type of compromise that is best resolved within the political sphere.

As mentioned above, the "cost relief" measures in the Manager's Amendment provided an alternative to the TAP, varying in four important respects. First, the cost containment auction had a higher trigger price than the TAP—\$22 - \$30 per metric ton of carbon dioxide equivalent rather than \$12 per metric ton—creating less opportunity for the price cap to be used. Second, the cost containment auction limited the number of allowances potentially added to the emissions to 450 million metric tons of carbon dioxide equivalent per year. There was no limit to the number of allowances the TAP could add to the market. Third, the cost containment auction derived its allowances by deducting allowances from the allocation to future years. Finally, the regular auction price floor of \$10 per allowance supplemented the price cap to encourage low-cost abatement

---

<sup>107</sup> Point Carbon EUA OTC Assessment, <http://www.pointcarbon.com> (last visited Nov. 1, 2009).

<sup>108</sup> Online Currency Calculator, <http://www.x-rates.com/calculator.html> (last visited Nov. 1, 2009).

<sup>109</sup> If the United States participated in an international cap-and-trade system but retained the TAP, when the global price of an allowance exceeded the trigger price for the TAP, the United States would be in a position to introduce an unlimited number of allowances, the equivalent of printing money. Viewed alternatively, retaining a TAP would make it difficult for the United States to meet internationally agreed upon caps with any certainty.

<sup>110</sup> See Winston Harrington, Richard D. Morgenstern & Peter Nelson, *On the Accuracy of Regulatory Cost Estimates*, 19 J. POL'Y ANALYSIS & MGMT. 297, 297-322 (2000) (comparing *ex ante* and *ex post* cost estimates for 28 different environmental rules. This research looked at eight different economic incentive policies. *Ex ante* compliance costs were overestimated in seven of the eight rules. Insufficient data in the eighth case prevented conclusive results about the final case study).

<sup>111</sup> See, e.g., STERNER, *supra* note 9, at 150-66; Warwick J. McKibbin & Peter J. Wilcoxon, *The Role of Economics in Climate Change Policy*, 16 J. ECON. PERSP. 107, 107-29 (2002); W.A. Pizer, *Combining Price and Quantity Controls to Mitigate Global Climate Change*, 85 J. PUB. ECON. 409, 409-34 (2002).

reductions.<sup>112</sup> All of these variations operated to reduce the potential for actual emissions to exceed the stated target and contribute to economic efficiency.

While the cost-containment auction incorporated into the Manager's Amendment was arguably more sophisticated than the Bingaman-Specter TAP, it could have still led to implementation difficulties. In fact, the term "auction" is a misnomer. In 2012 the government would have determined the allowance price based on "economic modeling," constrained to a price range of \$22 to \$30 per allowance.<sup>113</sup> In subsequent years the price of allowances in the cost-containment "auction" would be set automatically as five percent above the previous year with adjustments for inflation.<sup>114</sup>

There are several potential problems with the Manager's Amendment cost-containment mechanism. First, the initial price would be entirely derived from models rather than developed from actual bids, and may have diverged significantly from the market-clearing price. Second, the fact that the price in subsequent years would be derived by an automatic increase means that the potential for a wedge between prices and demand could further widen.

Third, limiting the number of allowances sold in the cost-containment auction, even though the government fixed the price, raised the possibility of excess demand. To address this potential excess demand, the bill directed the Administrator of the EPA to establish a limitation on the amount that each entity could purchase at the cost-containment auction "that ensure[d] fair access to emission allowances by all covered entities."<sup>115</sup> However, virtually no guidance existed to help define what would constitute "fair access."

Finally, it is important to recognize that the cost-containment auction was essentially a mechanism by which the allowances allocated to one period (2030 to 2050) were reassigned to another (2012 to 2027). The revenues were not allocated to relieve burdens on entities in future years. These intergenerational issues should not be lost in the obscurity of a new bill's language. At a minimum it suggests that decreases in emissions could occur less rapidly than expected.

Adding in allowances from the cost-containment pool<sup>116</sup> could result in a substantial increase (7.8 to 10.8 percent) in emissions for the years 2012 to 2027. At the same time, in the "out years," 2030 to 2050, the cost-containment auction would lead to even greater reductions. This would occur because allowances from those years would have been reduced by 9.4 to 21.0 percent per

---

<sup>112</sup> Fell & Morgenstern, *supra* note 89.

<sup>113</sup> S. 3036, 110th Cong. § 523 (2008).

<sup>114</sup> *Id.*

<sup>115</sup> *See id.* § 526(d).

<sup>116</sup> Under S. 3036, section 523, up to 450 million allowances would be available for purchase through the cost-containment auction in 2012. Every year thereafter through 2027, the limit of allowances available through the cost-containment auction would decrease by one percent. For a more detailed illustration of how the cost-containment pool would impact emissions, see RICHARDS & RICHARDS, *supra* note 22, at 18 fig.2.

year in 2030 to 2050, assuming an equal allocation of deductions across those years. Of course, the political reality is that when the time comes, Congress may override the decision to reduce emissions in 2030 to 2050 by the amount of the borrowed emissions allowances. This capacity to unilaterally increase the number of allowances will worry potential international trading partners and devalue U.S. allowances.

Despite these problems, the cost-containment auction in the Manager's Amendment provided clearer environmental efficacy than the Bingaman-Specter TAP and lower expected abatement costs than the Lieberman-Warner bill. The Manager's Amendment placed a limit on the number of additional allowances that could be introduced annually. It substantially raised the price of the supplemental supply of allowances contained in the Bingaman-Specter bill. And, at least in concept, it reduced long-term emissions allowance caps by the same amount as near-term increases.

The cost containment auction could be further improved. First, by conducting a real auction each year (rather than deriving the price directly from economic modeling), the United States government can ensure that the allowance price represents what the market will bear. Second, by not placing an upper limit on the cost containment auction price, the government can avoid the potential for excess demand at an artificially constrained price. Whether this approach is preferable to a price collar, which simply combines a price floor and a price ceiling, involves a trade-off between cost containment and environmental efficacy. That is ultimately a political decision best resolved by Congress.

The Manager's Amendment also delegated substantial responsibility to the Carbon Market Efficiency Board.<sup>117</sup> The seven members of the CMEB, appointed by the President with the advice and consent of the Senate, are appointed to 14-year staggered, nonrenewable terms. The composition was designed to assure balanced representation of "financial, agricultural, industrial, commercial sectors, and the geographical regions, of the United States, and include a representative of consumer interests."<sup>118</sup> The CMEB controls several cost relief measures, including relaxing limits on borrowing, expanding the period of repayment for borrowed allowances, and expanding the percent of foreign and offset allowances that can be used by covered entities. Each of these provisions could significantly affect the efficacy of the program in reaching the stated emissions goals.

There exists relatively little guidance to the Board regarding how to exercise its power. The bill directs the CMEB to "exercise the cost relief measure[s] incrementally, and only as needed to avoid significant economic harm during the applicable allocation year."<sup>119</sup> Given that the CMEB directly affects the tradeoff

---

<sup>117</sup> S. 3036, 110th Cong. §§ 421-423, 521 (2008).

<sup>118</sup> It is interesting to note that the specifications for the CMEB do not include representation of environmental interest groups.

<sup>119</sup> S. 3036, 110th Cong. § 521(a) (2008).

between costs and efficacy, an inherently political issue, Congress might consider providing the Board more specific guidance.

#### 5. Upstream versus Downstream Regulation

The predominantly *upstream* approach used in the Manager's Amendment and the Bingaman-Specter bill is the superior approach to regulating carbon dioxide emissions.<sup>120</sup> The differences between the upstream and downstream approaches are significant. There are two main problems with the downstream approach in the Lieberman-Warner scheme: it covered a narrower range of emitters and it increased administrative complexity.

First, the Lieberman-Warner bill spanned a narrower range of emitters than the coverage scheme of either the Bingaman-Specter bill or the Manager's Amendment. All three bills took largely the same approach to coal, i.e., concentrating attention on the primary user.<sup>121</sup> However, the original Lieberman-Warner bill would have regulated utilities that produce more than 10,000 metric tons of CO<sub>2</sub> equivalent per year, while the Bingaman-Specter bill and the Manager's Amendment would have covered any coal consumer that used more than 5,000 tons of coal per year (Table 1). This means that for higher quality coal (i.e. coal that has more energy and more carbon per ton than lower quality coal), the Lieberman-Warner bill would have covered smaller utilities than the other two bills. The Lieberman-Warner bill did not control all the emissions flowing from commercial, residential, or small industrial users of natural gas or oil. Under the upstream approach, the Bingaman-Specter bill and the Manager's Amendment captured virtually all of the carbon flowing into the economy via natural gas or oil, regardless of the size of the end-users – only the smallest oil refiners and natural gas processors would be excluded.

The second disadvantage of the downstream approach is that it would be more administratively challenging than the upstream regulation. Under the predominantly upstream approach, all fossil fuel-related CO<sub>2</sub> emissions would be controlled by monitoring a limited number of natural gas processors, petroleum refineries, and coal-burning electric utilities.<sup>122</sup> The Bingaman-Specter bill and the Manager's Amendment advocated this approach. The regulated entities are all accustomed to keeping records and reporting their fuel

---

<sup>120</sup> For a more detailed discussion of the benefits of upstream regulation of carbon dioxide, please see ANDREW KEELER, DESIGNING A CARBON DIOXIDE TRADING SYSTEM: THE ADVANTAGES OF UPSTREAM REGULATION (2002), available at [http://www.cleanair-coolplanet.org/cpc/documents/2002\\_CO2\\_trading\\_system.pdf](http://www.cleanair-coolplanet.org/cpc/documents/2002_CO2_trading_system.pdf).

<sup>121</sup> Almost 93% of coal produced in the United States in 2007 was used for electricity production. See U.S. Energy Information Administration, U.S. Coal Consumption by End-Use Sector, available at [www.eia.doe.gov/cneaf/coal/page/acr/table26.html](http://www.eia.doe.gov/cneaf/coal/page/acr/table26.html) (last visited Nov. 10, 2009).

<sup>122</sup> The most effective strategy is to focus on the point in the production chain, from extraction to consumption, which has the fewest entities. For natural gas that is processors, and for oil it is refiners. For coal, it is coal mines, though the vast majority of coal goes to electricity generation plants, and the numbers of generators are roughly comparable to the number of mines.

production or use. The downstream approach, in contrast, would have substantially increased the number of reporting entities and required far more effort to implement, while simultaneously controlling a smaller percentage of total GHG emissions.

Given these problems, why do so many legislators and activists focus on inefficient downstream controls? The first reason is regulatory habit. Past air emissions regulations have been applied at the point of emissions; it is the familiar approach. But CO<sub>2</sub> is a fundamentally different pollutant than its predecessors in regulatory history. Virtually all carbon introduced into the economy via fossil petroleum, natural gas, and coal ends up as CO<sub>2</sub> emissions. (The only exceptions are carbon capture and storage (CCS), an as-yet unproven technology, and non-fuel uses, a minor portion of fossil fuel use.) Thus, estimation and control of emissions is much more easily accomplished upstream by limiting the amount of carbon introduced into the economy by a relatively small number of energy producers. Downstream regulation is substantially more complicated, attempting to estimate actual emissions from a substantially larger number of emitters.

Second, some observers have suggested that a downstream approach applied closer to the users will somehow encourage more investment in energy efficiency than an upstream approach. This suggestion does not stand up to even the most cursory scrutiny. The upstream approach, by definition, limits the amount of carbon that can be turned into CO<sub>2</sub>. Thus, the price of fossil fuels will increase, inducing investment in energy efficiency just as the downstream approach would. In fact, by passing those costs on to a larger portion of CO<sub>2</sub> emitters, the upstream approach induces a broader range of energy efficiency investments. The push for downstream controls may also result from simple political pressure. The initial draft of the Bingaman-Specter bill would have controlled the amount of carbon introduced via coal at the mines themselves. It is possible that the push to move controls to a subset of the end-users—electric utilities in the case of mines, industry in the case of all fuels—is a result of energy producers' reluctance to invite further scrutiny of the energy production process.

The final Senate legislation should focus controls upstream for all fossil fuels. This upstream approach would reduce both administrative and compliance costs.<sup>123</sup> This is most important for petroleum and natural gas, where the number of upstream parties is limited and the number of downstream emitters is potentially quite large. Logically, even coal-based carbon should be controlled at the point of production, i.e., the mine mouth. However, this is likely less important than in the case of the other fuels because the vast majority of coal goes to a limited number of large electric utilities.

---

<sup>123</sup> Stavins, *supra* note 26, at 69-88.

#### IV. INCENTIVES FOR ACTIVITIES OUTSIDE THE COVERED FACILITIES

While all of the bills placed caps on a substantial portion of emissions of CO<sub>2</sub> and other GHGs, some sources were still not included. To create additional opportunities to cost-effectively reduce net GHG emissions, the bills recognized and provided incentives for activities that captured and stored or destroyed GHGs in a way that further reduced (or “offset”) net emissions. To varying degrees and in varying manners, the bills allowed parties to claim credit for these activities that were not covered directly under the emissions cap and trading programs.

While the “offset” concept is attractive, implementation of the programs present challenges for measurement and monitoring of the projects. To ensure the environmental efficacy of the national climate change program, projects must be scrutinized to assure that they actually offset at least the amount of greenhouse gases for which they are being credited.

##### A. Provisions

There are several types of activities that might be considered as offsets. This paper will address five main categories of offsets: domestic offset projects, which can include a wide range of activities that avoid or sequester greenhouse gas emissions; international credits and offsets; early action allowances; carbon capture and sequestration projects (CCS); and agriculture and forestry projects.

Two important distinctions exist among the offset and crediting programs. The first distinction is what action is rewarded. Under an *input-based* approach, simply taking an action that is apt to lead to positive results is sufficient. Under an *output-based* approach, rewards in the form of emissions allowances or monetary payments are intended to be directly proportional to the measured (or estimated) emissions reductions or carbon sequestration. This distinction is important because an output-based approach is generally more likely to lead to actual GHG emissions reductions, but it also faces greater estimation challenges.

The second distinction is related to the source of the award. Under some programs, the award comes out of the annual budget of allowances. Other programs, in contrast, create additional allowances beyond the annual scheduled amount to reward activities. These are the *on-budget* versus *off-budget* approaches, respectively. The off-budget approach creates more risk for compromise of the environmental objectives of the national climate change program, and hence raises the stakes for correctly evaluating the emissions reductions or sequestration of the projects.

Note that recognizing the two alternatives on these two dimensions creates four possible approaches to rewarding activities outside covered facilities. The three climate change bills use all of the four approaches (Table 2). The on-budget, output-based programs are the most likely to result in verifiable emission reductions. The on-budget, input-based programs will have a positive

or at least neutral effect on emissions. The off-budget, output-based activities need to be closely scrutinized to ensure they do not have a negative impact on emissions. Provisions for off-budget, input-based activities need to be eliminated from the program or rewritten to ensure they do not undermine the environmental objectives of the climate change program.

## 1. Domestic Offset Projects

### a. Bingaman-Specter

The Bingaman-Specter bill allowed facilities to use an unlimited number of domestic offsets to cover their emissions.<sup>124</sup> Credit towards allowances could be earned by taking GHG precursors out of the emissions stream, for example, by using fossil fuels as feedstocks;<sup>125</sup> exporting fuels to other countries;<sup>126</sup> exporting hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrous oxide to other countries;<sup>127</sup> destroying hydrofluorocarbons;<sup>128</sup> and sponsoring carbon sequestration projects.<sup>129</sup> The bill also set forth certain types of projects that would allow “the use of streamlined procedures for distributing credits,” including landfill, animal waste, municipal wastewater or coalbed methane use<sup>130</sup> or reducing sulfur hexafluoride emissions from transformers.<sup>131</sup> Under this bill, the President also had the option to issue credits to a covered facility for “unclassified projects” not otherwise eligible for credits<sup>132</sup> and could distribute less than one credit for each ton of GHG emissions avoided.<sup>133</sup>

The Bingaman-Specter bill delegated broad responsibility for monitoring and reporting offsets to the executive branch<sup>134</sup>:

-The President is to establish any procedures deemed necessary for reporting information, standardizing evaluation methods, avoiding double counting, verifying emissions, etc.

-The President is to develop processes by which to determine whether the entity has achieved actual GHG emissions reductions or sequestration.

Unclassified projects (for which the President was allowed to distribute less

<sup>124</sup> S. 1766, 110th Cong. § 303(a) (2007).

<sup>125</sup> *See id.* § 301(b).

<sup>126</sup> *See id.* § 301(c).

<sup>127</sup> *See id.* § 301(e).

<sup>128</sup> *See id.* § 301(d).

<sup>129</sup> *See id.* § 302.

<sup>130</sup> *See* S. 1766, 110th Cong. §§ 302(a), (b), (d), 303(b) (2007).

<sup>131</sup> *See id.* §§ 303(b), 302(c).

<sup>132</sup> *See, e.g., id.* § 303(d) (“unclassified projects” are ineligible under §§ 205, 206, 207, 301 & 302).

<sup>133</sup> *See id.* § 303(c).

<sup>134</sup> S. 1766, 110th Cong. § 601(c) (2007).



than one credit for each ton of GHG emission avoided) and methane projects (for which the President was to develop streamlined procedures for issuing credits) are classified as off-budget, input-based (Table 2). The other offset programs mentioned in this section were classified as off-budget, output-based, since they are easily measured as to ensure credits issued are proportional to GHG emission reductions.

b. Lieberman-Warner

The Lieberman-Warner bill allowed facilities to offset up to 15 percent of emissions through allowances awarded for domestic offset projects.<sup>135</sup> An offset allowance is defined as:<sup>136</sup>

a unit of reduction in the quantity of emissions or an increase in sequestration equal to 1 carbon dioxide equivalent at a facility that is not a covered facility, where the reduction in emissions or increase in sequestration is eligible to be used as an additional means of compliance for the submission requirements established under section 1202.

The legislation also stated that “[t]he term ‘offset project’ means a project, other than a project at a covered facility, that reduces greenhouse gas emissions or increases sequestration of carbon dioxide.”<sup>137</sup> Eligible projects,<sup>138</sup> however, were limited to a number of specified agricultural and rangeland projects,<sup>139</sup> land use change and forestry activities,<sup>140</sup> manure management and disposal practices,<sup>141</sup> and other terrestrial offset practices.<sup>142</sup> The list of eligible domestic activities did not appear to encompass avoided deforestation.

The Lieberman-Warner bill charged the Secretary of Agriculture, in consultation with the EPA Administrator, to publish a handbook “that provides easy-to-use guidance on achieving, reporting, registering, and marketing offsets.”<sup>143</sup> The Administrator, in consultation with the Secretary of Agriculture, was charged with developing regulations for the “issuance and certification of

<sup>135</sup> S. 2191, 110th Cong. § 2402(a) (2007).

<sup>136</sup> *See id.* § 4(20).

<sup>137</sup> *See id.* § 4(21).

<sup>138</sup> *See id.* § 2403(b).

<sup>139</sup> *See id.* §§ 2403(b)(1)(A)-(F). Eligible agricultural and rangeland practices include altered tillage practices, winter cover cropping, continuous cropping, conversion of cropland to rangeland or grassland, reduction of nitrogen fertilizer use, reduction in flooding of rice paddies, reduce in carbon emissions from organic soils.

<sup>140</sup> *See* S. 2191, 110th Cong. §§ 2403(b)(2)(A)-(B) (2007). Land use change and forestry activities were limited to afforestation or reforestation and forest management.

<sup>141</sup> *See id.* § 2403(b)(3)(A)-(B). Manure management and disposal projects include waste aeration and methane capture and combustion.

<sup>142</sup> *See id.* § 2403(a)(4). Terrestrial offset practices include capture or reduction of non-covered fugitive emissions, methane capture and combustion at non-agricultural facilities, and any other practice recognized by the Administrator of the EPA.

<sup>143</sup> *See id.* § 2401(c)(1).

offset allowances” that “ensure[d] that those offsets represent real, verifiable, permanent, and enforceable reductions in greenhouse gas emissions or increases in biological sequestration.”<sup>144</sup>

The Lieberman-Warner bill provided relatively detailed guidance to the Administrator regarding the rigor of the offset quantification, monitoring, and verification standards that should be developed.<sup>145</sup> To improve and simplify the offset process, the Administrator was also given specific instructions regarding action. Because of the relatively stringent requirements set for offset credits, the aforementioned programs are classified as off-budget, output-based in Table 2.

### c. Manager’s Amendment

As with the Lieberman-Warner bill, the Manager’s Amendment allowed regulated facilities to cover up to 15 percent of their allowance obligations with domestic offset projects.<sup>146</sup> If a covered facility did not use offset projects to cover 15 percent of its obligations, it could use additional international allowances or international carbon credits.<sup>147</sup> Alternatively, the covered facility could “carry over” these remaining domestic offsets into the subsequent year.<sup>148</sup>

The Manager’s Amendment combined, and even expanded upon, the opportunities for offsets under the Bingaman-Specter bill and the Lieberman-Warner bill. The Manager’s Amendment highlighted numerous circumstances under which a party would receive credit: Removal of GHG precursors;<sup>149</sup> Carbon Capture and Storage;<sup>150</sup> Use of Fuel as a Feedstock;<sup>151</sup> Fuel Exports;<sup>152</sup> and Fuels Purchased for International Flights.<sup>153</sup> These credit opportunities, with the exception of fuel purchased for international flights, also appeared in the Bingaman-Specter bill. The Manager’s Amendment also included opportunities for offset credits referenced in the original Lieberman-Warner bill<sup>154</sup>: agricultural and rangeland, land use and forestry, manure management and disposal, fugitive emissions, and methane capture and combustion.<sup>155</sup>

The Manager’s Amendment included processes for project approval<sup>156</sup> identical to those in the Lieberman-Warner bill.<sup>157</sup> The Manager’s Amendment,

---

<sup>144</sup> See *id.* § 2402(b).

<sup>145</sup> See *id.* §§ 2404-2411.

<sup>146</sup> S. 3036, 110th Cong. § 302(b)(1) (2008).

<sup>147</sup> See *id.* § 302(b)(2).

<sup>148</sup> See *id.* § 302.

<sup>149</sup> See *id.* § 202(e).

<sup>150</sup> See *id.* § 202(f).

<sup>151</sup> See S. 3036, 110th Cong. § 202(g) (2008).

<sup>152</sup> See *id.* § 202(h).

<sup>153</sup> See *id.* § 202(i).

<sup>154</sup> S. 2191, 110th Cong. § 2403 (2007).

<sup>155</sup> S. 3036, 110th Cong. § 303 (2008).

<sup>156</sup> See *id.* §§ 304-311.

<sup>157</sup> S. 2191, 110th Cong. §§ 2404-2411 (2007).

however, took one step that may ameliorate the substantial estimation difficulties associated with offset projects. The bill directed the Administrator to develop a list of categories of agricultural, forestry, and land use-related projects eligible for offset credit,<sup>158</sup> and to develop methodologies that could be used to assess reductions or sequestration associated with each type of project.<sup>159</sup> What distinguishes this provision from other climate change bills – or from any other offset program, for that matter – is that it provided for testing of the methodologies. This was the first scheme to require offset estimates to be reproducible by independent evaluators:<sup>160</sup>

METHODOLOGY TESTING.—The Administrator may not issue a methodology under this section until the Administrator determines that—

- (1) the methodology has been tested by 3 independent expert teams on at least 3 different offset projects to which that methodology applies; and
- (2) the emission reductions or sequestrations estimated by the expert teams for the same offset project do not differ by more than 10 percent.

This provision would have further ensured that offset projects resulted in real reductions in carbon dioxide emissions or carbon sequestration. This program was classified as off-budget, output-based (Table 2).

## 2. International Credits and Offsets

### a. Bingaman-Specter

The Bingaman-Specter bill allowed the President to decide to accept credits from foreign GHG regulatory programs that “the President determine[d] to have a level of environmental integrity that is not less than the level of environmental integrity of the programs under this Act.”<sup>161</sup> International credits, then, were classified as off-budget, output-based (Table 2).

In addition, the President could have established a program to give offset credits for projects undertaken outside the United States.<sup>162</sup> Regulated parties could satisfy up to 10 percent of their compliance obligations with international offset credits.<sup>163</sup> The provisions of the Bingaman-Specter bill allowed for the

---

<sup>158</sup> S. 3036, 110th Cong. § 303(b) (2008).

<sup>159</sup> *See id.* § 303(c).

<sup>160</sup> *See id.* § 303(e). This language was adopted from LYDIA OLANDER ET AL., DESIGNING OFFSETS POLICY FOR THE U.S. (Nicholas Inst. 2008), available at <http://www.nicholas.duke.edu/institute/offsetspolicy.pdf>.

<sup>161</sup> S. 1766, 110th Cong. § 501(d) (2007).

<sup>162</sup> *See id.* § 501(e)(1).

<sup>163</sup> *See id.* § 501(f)(2).

development of “streamlined procedures for distributing credits for the greenhouse gas emission mitigation benefits of projects for which the President determines there are broadly accepted standards or methodologies for quantifying and verifying those benefits.”<sup>164</sup> Because the goal of the aforementioned streamlined procedures was to maintain processes that quantified and verified emission reductions, the Bingaman-Specter international offset provisions were classified as off-budget, output-based in Table 2.

b. Lieberman-Warner

The Lieberman-Warner bill allowed covered facilities to satisfy an additional 15 percent of their allowances with “credits obtained on a foreign GHG market.”<sup>165</sup> Since the EPA was required to develop rules regarding the use of international credits that ensured the foreign government’s program is at least as stringent as the United States’, this program is classified as off-budget, output-based (Table 2).<sup>166</sup>

c. Manager’s Amendment

Relative to the other two bills, the Manager’s Amendment limited the quantity of international credits. Rather than concentrating on limits to facilities, however, the system limited the number of allowances available in the aggregate. International offset allowances would be limited to an additional five percent beyond each year’s basic allowance cap.<sup>167</sup> However, if the number of international offset allowances was less than the allowable five percent, the program would have allowed the difference to be made up with allowances from an authorized foreign carbon market.<sup>168</sup> Alternatively, the system could roll over allowances in excess of five percent for use in a subsequent year.<sup>169</sup>

The Manager’s Amendment required the EPA Administrator to develop rules regarding the distribution of offset allowances to “projects that reduce greenhouse gas emissions or increase sequestration of carbon dioxide in countries other than the United States.”<sup>170</sup> The Administrator was required to develop these within two years of the bill’s enactment.<sup>171</sup> The regulations for this international program would be required to meet the same requirements as those for the domestic offset program. This is an output-based, off-budget system (Table 2).<sup>172</sup>

---

<sup>164</sup> See *id.* § 501(e)(2).

<sup>165</sup> S. 2191, 110th Cong. §2501 (2007).

<sup>166</sup> See *id.* § 2502.

<sup>167</sup> S. 3036, 110th Cong. § 321(b)(1) (2008).

<sup>168</sup> See *id.* § 321(b)(2).

<sup>169</sup> See *id.* § 321(b)(3).

<sup>170</sup> See *id.* § 321(a).

<sup>171</sup> See *id.*

<sup>172</sup> See *id.* § 321(c)(2).

As with the other bills, the EPA Administrator must develop rules that allow the use of foreign allowances only from countries with national climate change program “of comparable stringency to the program established by this Act, including comparable monitoring, compliance, and enforcement.”<sup>173</sup> As a result, this program’s international allowances are classified as off-budget, output-based in Table 2.

### 3 Early Action Allowances

#### a. Bingaman-Specter

Between 2012 and 2020, 1 percent of annual allowances would be used to reward covered facilities that took early actions to reduce GHG emissions.<sup>174</sup> If the amount of allowances set aside for early action in the allocation scheme was insufficient to cover all eligible projects, the President could establish procedures for allocating the available early action credits among eligible projects. The amount of allowances available for early action could not have exceeded the 1 percent allocation.<sup>175</sup>

The basis for the early action awards is not entirely clear. The bill required entities making early reduction claims to substantiate the amount of reduction under the 1605(b) Voluntary Reporting of Greenhouse Gases Program, the Environmental Protection Agency’s Climate Leaders Program, or through a State-administered or private registry.<sup>176</sup> At least some of the eligible systems do not require rigorous estimation methods. Consequently, the Bingaman-Specter early action program is classified as on-budget, input-based in Table 2.

#### b. Lieberman-Warner

The Lieberman-Warner bill also stipulated that the EPA Administrator was to allocate to owners or operators of covered facilities allowances for actions taken since the beginning of 1994 “that resulted in verified and credible reductions of [GHG] emissions.”<sup>177</sup> The amount allocated to reward early actions was:<sup>178</sup>

- 5 percent of emission allowances designated for 2012;
- 4 percent of emission allowances for 2013;
- 3 percent of emission allowances for 2014;
- 2 percent of emission allowances for 2015; and

---

<sup>173</sup> See *id.* § 322.

<sup>174</sup> S. 1766, 110th Cong. § 201(a) (2007).

<sup>175</sup> See *id.* §§ 206(a)(2),(b).

<sup>176</sup> See *id.* § 206(c)(2).

<sup>177</sup> S. 2191, 110th Cong. § 3301 (2007).

<sup>178</sup> *Id.*

- 1 percent of emission allowances for 2016.

To receive credits for early action, an entity must have reported emission reductions through the Environmental Protection Agency's Climate Leaders Program, the 1605(b) Voluntary Reporting of Greenhouse Gases Program, a state or regional greenhouse gas emission program, or a voluntary entity program.<sup>179</sup> Due to the reporting requirements associated with the voluntary programs outlined above, the Lieberman-Warner early action program is classified as on-budget, input-based in Table 2.

#### c. Manager's Amendment

The Manager's Amendment offered early credit from 2012 – 2025.<sup>180</sup> This represented a more extensive use of early action credit than either of its predecessors.

Early action allowances are to be distributed to entities:

-Holding allowances from the State of California or the Regional Greenhouse Gas Initiative;<sup>181</sup>

-Repowering power plants;<sup>182</sup> or

-Leading early carbon capture and storage projects "monitored by a network developed by an international collaborative government and industry research program."<sup>183</sup>

Because of the selective nature of the Manager's Amendment early action initiative, this program is classified as on-budget, output-based in Table 2.

#### 4. Carbon Capture and Sequestration Projects

Carbon capture and sequestration (CCS) refers to the practice of separating CO<sub>2</sub> from the exhaust stream in electric generation or industrial processes, compressing the gas, transporting it to a suitable geological structure, and injecting it deep below the earth's surface for permanent disposal. One of the advantages of the CCS strategy is that it is relatively easy to measure the amount of CO<sub>2</sub> that has been stored. For this reason, the CCS programs under all of the bills are output-based (Table 2).

##### a. Bingaman-Specter

The Bingaman-Specter bill provided for the President to establish the

---

<sup>179</sup> *Id.*

<sup>180</sup> S. 3036, 110th Cong. § 702 (2008).

<sup>181</sup> *See id.* § 704.

<sup>182</sup> *See id.* § 705.

<sup>183</sup> *See id.* § 706.

conditions for long-term carbon sequestration and storage in geological structures and the distribution of credits equal to the amount stored.<sup>184</sup> In addition, another 8 percent of annual allowances would be used to further encourage CCS projects. The bonus allowances decreased from 3.5 per ton in 2012 to 0.5 per ton in 2039, after which time the bonuses were discontinued. Qualifying projects could receive bonuses for a maximum of 10 years. If there were not enough bonus allowances to cover all eligible projects, then additional allowances would be deducted from the amount available for auction. If there were excess bonus allowances, those additional allowances would be sold at auction.<sup>185</sup> Since the intent of the offset provision was to distribute credits for CCS projects proportionate to “the quantity of carbon dioxide sequestered by the entity during the calendar year,” the Bingaman-Specter CCS bonus program was classified as on-budget, output-based in Table 2. Note, however, that the bonus allowances were in excess of the amount of the sequestration.

b. Lieberman-Warner

The Lieberman-Warner bill also provided special incentives for capture of CO<sub>2</sub> and storage in geological formations.<sup>186</sup> The program established a bonus allowance account with a 2012 initial balance of 3,932,160,000 windfall emission allowances that, from 2012 and 2035, would be augmented by another 4 percent of each year’s annual allowances. Eligible facilities then would be awarded credits “equal to the product obtained by multiplying the number of metric tons of CO<sub>2</sub> geologically sequestered by the project and the bonus allowance rate for that calendar year,” where the rate decreases from 4.5 in 2012 to 0.5 in 2039.<sup>187</sup> This rate apparently constituted the entire reward for CCS, i.e. there was no initial credit for the CCS “offset” project itself as there is under the Bingaman-Specter bill. Thus, by 2039 each ton of sequestered carbon would only receive a half ton of credit.

Projects would have only received bonus allowances for the first 10 years of the project or from 2012 through 2021 if the project began operation before 2012.<sup>188</sup> If the bonus allowance account was not sufficient to cover the number of eligible projects, the EPA Administrator would “(1) distribute the remaining bonus allowances only to qualifying projects that were already qualifying projects during the preceding calendar year; (2) distribute the remaining bonus allowances to those qualifying projects on a pro rata basis; and (3) discontinue the program established under this subtitle as of the date on which the Bonus Allowance Account is projected to be fully used based on projects already in

---

<sup>184</sup> S. 1766, 110th Cong. § 302 (2007).

<sup>185</sup> *See id.* § 207.

<sup>186</sup> S. 2191, 110th Cong. §3601 (2008).

<sup>187</sup> S. 2191, 110th Cong. §3603 (2007).

<sup>188</sup> *See id.* § 3604.

operation.”<sup>189</sup>

Since the Lieberman-Warner bill called for the distribution of bonus allowances in a manner that is proportionate to the “metric tons of carbon dioxide sequestered by the project,”<sup>190</sup> the initial starting balance of 3.9 billion allowances was classified as off-budget, output-based. The annual allocations were classified as on-budget, output-based in Table 2.

### c. Manager’s Amendment

The Manager’s Amendment offered a far more measured approach to CCS than either of its predecessors. It offered a smaller percentage of allowances to CCS projects, eliminated the windfall of off-budget allowances provided for in the Lieberman-Warner bill, and established clear performance measures for such projects.

The bonus allowance rate was approximately half of that of the other bills, starting at a ratio of 2:1 and declining to zero by year 2040.<sup>191</sup> The Manager’s Amendment also included a CCS “Kick-Start” program.<sup>192</sup> The program set aside 1 percent of all allowances from 2012 through 2022 with the “goal of rapidly bringing into operation in the United States not fewer than 5 nor more than 10 commercial facilities that capture and geologically sequester carbon released when coal is used to generate electricity.”<sup>193</sup>

As with the other bills, projects could receive bonus allowances only for ten years.<sup>194</sup> Should the number of allowances in the bonus account be insufficient to reward all eligible projects, then the Administrator would “(1) distribute the remaining bonus allowances only to qualifying projects that were already qualifying projects during the preceding calendar year; (2) distribute the remaining bonus allowances to those qualifying projects on a pro rata basis; and (3) discontinue the program established under the subtitle as of the date on which the Bonus Allowance Account is projected to be fully used based on projects already in operation.”<sup>195</sup> Unlike its predecessors, the Manager’s Amendment established performance standards for CCS projects.<sup>196</sup>

## 5. Agriculture and Forestry

### a. Bingaman-Specter

The Bingaman-Specter bill set aside allowances to provide incentives for

<sup>189</sup> See *id.* § 3605.

<sup>190</sup> See *id.* § 3603.

<sup>191</sup> S. 3036, 110th Cong. §1013(a) (2008).

<sup>192</sup> See *id.* § 1005.

<sup>193</sup> See *id.* § 1002.

<sup>194</sup> See *id.* § 1014.

<sup>195</sup> See *id.* §1015.

<sup>196</sup> See *id.* §1012. For more details, see RICHARDS & RICHARDS, *supra* note 22, at 38 tbl.3.



agricultural projects.<sup>197</sup> Between 2012 and 2050, 5 percent of allowances were to be set aside to reward agricultural carbon sequestration projects.<sup>198</sup> There is significant ambiguity regarding the basis for allocation of those allowances. It would appear, however, that the allowances were allocated on the basis of actual carbon sequestration (output-based) rather than on the basis of project implementation (input-based). The Bingaman-Specter bill required the Secretary of Agriculture to develop a “standardized system of measurements for agricultural greenhouse gases” and “delineate the most appropriate system of certification of credit.”<sup>199</sup> Taking into account this information, the Secretary of Agriculture was to develop “a program under which agricultural sequestration allowances may be distributed to entities that carry out sequestration projects on agricultural land that achieve long-term greenhouse gas emission mitigation benefits.”<sup>200</sup>

If the amount of carbon calculated for agricultural sequestration projects exceeded the 5 percent allocation, additional allowances could be drawn from the portion allocated for auction. Given the emphasis on agricultural soil carbon sequestration, it is unclear whether conversion of cropland to forest stands was a permissible project. It is possible that forestry projects, such as cropland conversion, may have been included as unclassified projects.<sup>201</sup>

#### b. Lieberman-Warner

Beyond the off-budget, output-based provisions of the offset program, there were two other programs under the Lieberman-Warner bill that addressed agriculture and forestry. First, the bill allocated 5 percent of annual allowances to encourage emission reductions and sequestration increases in the agriculture and forestry sectors.<sup>202</sup> While the provisions of this program required the Secretary of Agriculture to develop methods of soil carbon management,<sup>203</sup> those methods were never referenced in the distribution provisions. The system seems designed more to reward practices than outcomes, as the allocation was directed to “entities that carry out sequestration projects on agricultural and forest land.”<sup>204</sup>

The bill also allocated 3 percent of allowances for international forest activities, which, unlike the domestic offset provisions, included prevention of deforestation.<sup>205</sup> This international program emphasized making rewards for

---

<sup>197</sup> S. 1766, 110th Cong. §205(b) (2007).

<sup>198</sup> *See id.* §201(a).

<sup>199</sup> S. 1766, 110th Cong. §205(a)(2) (2007).

<sup>200</sup> *See id.* § 205(b).

<sup>201</sup> *See id.* § 303.

<sup>202</sup> S. 2191, 110th Cong. §3701 (2007).

<sup>203</sup> *See id.* § 3702.

<sup>204</sup> *See id.* § 3703. There is a significant ambiguity in this provision.

<sup>205</sup> *See id.* § 3803.

carefully measured results. The EPA Administrator was to develop, in consultation with the Secretary of State, the Secretary of the Interior, and the Secretary of Agriculture, regulations regarding the reward of international forestry allowances. The regulations were to “ensure that the emission reductions or sequestrations are real, permanent, additional, and verifiable, with reliable measuring and monitoring and appropriate accounting for leakage.”<sup>206</sup> The EPA Administrator, in consultation with the Secretary of State, would keep an updated list of countries capable of implementing such projects. The list would be based on the existence of historical data regarding carbon stocks, their technical ability to monitor changes in carbon stocks, and their institutional capacity to lead forestry programs.<sup>207</sup> Within three years of the enactment of the bill, and every five years after that, the EPA would conduct a review of the international forestry program. Ten years after the bill’s enactment, the EPA would conduct a review of all countries that contribute to at least 0.5 percent of global greenhouse gas emissions and apply a discount to forest credits imported from any country that has not enacted legislation to cap those emissions.<sup>208</sup> Consequently, the Lieberman-Warner international forestry program is classified as on-budget, output-based in Table 2.

### c. Manager’s Amendment

The Manager’s Amendment offered a smaller percentage of allowances to agriculture and forestry projects than either of its predecessors. It would have allocated 4.25 percent of allowances to these projects in years 2012 through 2030; and 4.5 percent, from 2031 through 2050.<sup>209</sup>

Within two years of the bill’s enactment, the Secretary of Agriculture would have to develop regulations for the distribution of the aforementioned allowances to reward the achievement of the following practices: (1) “real, verifiable, additional, permanent, and enforceable reductions in greenhouse gas emissions from the operations of the entities”; (2) “real, verifiable, additional, permanent, and enforceable increases in greenhouse gas sequestration on land owned or managed by the entities;” and (3) “pilot projects or other research regarding innovative practices for use in measuring – (A) greenhouse gas emission reductions; (B) sequestration; or (C) other benefits and associated costs of the pilot projects.”<sup>210</sup> In addition, the Secretary of Agriculture would ensure that about 0.5 of the 4.25 to 4.5 percent annual allowances set aside for agriculture and forestry projects (11 to 12 percent of ag and forestry allowances)

---

<sup>206</sup> See *id.* § 3804.

<sup>207</sup> See *id.* § 3805.

<sup>208</sup> S. 2191, 110th Cong. § 3806 (2007).

<sup>209</sup> S. 3036, 110th Cong. § 331 (2008).

<sup>210</sup> See *id.* § 332.

go to enteric fermentation and manure management programs.<sup>211</sup> Another 0.25 of the 4.25 to 4.5 percent annual allowances set aside for agriculture and forestry (5 to 6 percent of ag and forestry allowances) would be used to encourage the development of new project types and methodologies.<sup>212</sup> The Secretary of Agriculture would also ensure that entities receiving credit for agricultural and forestry projects under Section 331 of the act did not receive more allowances than they would as an offset project under Subtitle A.<sup>213</sup> Overall, the program is classified in Table 2 as on-budget, output-based. However, the use of a small percentage of allowances to encourage new project types and methodologies suggests there may have been some input-based rewards.

Under the Manager's Amendment, one percent of annual allowances would have been set aside for international forestry projects between 2012 and 2050. The Manager's Amendment included standards for international forestry projects similar to that of the original Lieberman-Warner bill. Therefore, the Manager's Amendment international forestry projects are classified as on-budget, output-based in Table 2.

### *B. Discussion and Recommendations*

There are two key, interrelated issues in the area of offsets and other-activities outside the emissions cap: (1) the relation of the offsets to the annual allocation of allowances; and (2) the measurement and integrity of the offset projects and the credits with which they are rewarded.

In general, programs that use offset projects simply as a mechanism for allocating allowances under the cap will not compromise the environmental efficacy of the emissions targets. All three bills allocated a portion of the annual allowances to reward early actions and agriculture projects and to provide bonuses for CCS. In addition, the Lieberman-Warner bill and the Manager's Amendment both offered on-budget allowances for domestic and international forestry projects. These on-budget provisions did not change the amount of allowances available each year. While their allocation could have significant implications for the parties involved, their availability would not change the amount of potential emissions.<sup>214</sup>

In contrast, the off-budget, or offset, provisions under the three bills would effectively create new allowances, augmenting the number of allowances circulated each year. In theory, the amount of realized net emissions would have remained unchanged because the additional allowances are perfectly offset by the reduction in emissions associated with the offset projects.<sup>215</sup> This

---

<sup>211</sup> *Id.*

<sup>212</sup> *Id.*

<sup>213</sup> *Id.*

<sup>214</sup> S. 2191, 110th Cong. §§ 3601, 3701, 3803 (2007); S. 1766, 110th Cong. §§ 206, 207 (2007).

<sup>215</sup> S. 2191, 110th Cong. §2402 (2007); S. 1766, 110th Cong. §301 (2007).

difference between on-budget provisions, which merely affect the allocation of allowances, and off-budget provisions is significant. Off-budget emissions actually create new allowances, which underscores the importance of accurate assessment of the impacts of the off-budget provisions.

The hazard with the off-budget, output-based approach is that if the activities or projects fail to deliver on their promised emissions reductions/sequestration enhancements, then the level of net national emissions will increase. This suggests that to justify an off-budget program, it will be necessary to assure that the projects will in fact offset emissions that are at least equal to the offset credits they generate. Unfortunately, developing methods for reliably estimating the emissions reductions associated with offset projects has proven difficult.

This, in turn, raises the question of whether the executive branch can develop regulations for an offset program; as all three bills required of the executive branch. A full assessment of carbon offset project evaluation protocols is beyond the scope of the legislative analysis presented in this article. However, it is important to observe that Federal government, state government, and private parties have been working on this issue for well over a decade and have yet to demonstrate a system that is not vulnerable to substantial manipulation.

The primary challenges revolve around two key issues. First, project analysis requires comparing the observed levels of emissions (or sequestration) to a reference case — i.e., what would have happened in the absence of the project. The problem is that the reference case cannot be observed. As such, it could be manipulated significantly by project developers subject to a profit motive.<sup>216</sup> Second, while it is possible to observe what happens within the boundaries of a well-defined project, there are often secondary (unintended) effects, potentially as large as the primary (intended) effects that could dissipate the beneficial effects of the project. Many of those who advocate including offset projects as part of a trading system have attempted to address these issues. None have done so in a convincing manner.<sup>217</sup>

The significance of this problem should not be underestimated. Under the original Lieberman-Warner bill and the Manager's Amendment, it would be possible to generate as much as an additional 15 percent of allowances under the offset provisions. It is not beyond the realm of possibility that those offset

---

<sup>216</sup> KENNETH RICHARDS, NEIL SAMPSON & SANDRA BROWN, *AGRICULTURAL AND FORESTLANDS: U.S. CARBON POLICY STRATEGIES* (Pew Center on Global Climate Change ed., 2006).

<sup>217</sup> For a more detailed discussion of the problems associated with evaluation of forest carbon offset projects, see Kenneth Richards & Krister Andersson, *The Leaky Sink: Persistent Obstacles to a Forest Carbon Sequestration Program Based on Individual Projects*, 1 *CLIMATE POL'Y* 41, 41-54 (2000). For a discussion of the problems with a particular offset project, see ARIANA DENSHAM ET AL., *CARBON SCAM: NOEL KEMPFER CLIMATE ACTION PROJECT AND THE PUSH FOR SUB-NATIONAL FOREST OFFSETS* (2009) available at <http://www.greenpeace.org/raw/content/international/press/reports/carbon-scam-noel-kempfer-carbo.pdf>.

projects, implemented under an inevitably flawed protocol, would result in no additional real reductions. Inclusion of the offset projects, then, could delay the onset of real emissions reductions by a decade or more. Because there were no limits to the use of offsets under the Bingaman-Specter bill, the entire climate program could have been vitiated by the offset provisions.

The Manager's Amendment attempted to address the problems associated with measurement in offset projects, although additional measures were needed to ensure the environmental efficacy of the bill. One step that would garner confidence for existing or proposed protocols would be to demonstrate reproducibility of results. This would require that independent, impartial teams of expert evaluators apply a model protocol (or estimation method) to a variety of projects and derive roughly the same results across the range of projects.<sup>218</sup> Despite calls for such an exercise,<sup>219</sup> this type of demonstration project has never been conducted.

As mentioned previously, the Manager's Amendment directed the Administrator to develop a list of categories of agricultural, forestry, and land use-related projects that are eligible for offset credit.<sup>220</sup> The Administrator was also required to develop and test methodologies that ensured independent reproducibility of results.<sup>221</sup> Unfortunately, the Manager's Amendment did not use the concept of "reproducibility" to its best advantage. First, it applied it only to domestic offset programs. Second, it applied it only to agricultural, forestry and land-use projects. Finally, it applied the concept in a muddled fashion.<sup>222</sup> While Section 303(c) and (e) provide clear direction to develop the methodology, the directions to developers in Section 304 do not clearly state that the developer must employ the methods of Section 303(c). In fact, those methods are not referenced anywhere in the bill.

To protect its environmental goals, the national climate change program should include a requirement that the standardized measurement methods used to evaluate any type of project, must lead to results that are reproducible by independent experts and are not subject to strategic manipulation. This must

---

<sup>218</sup> Richards & Andersson, *supra* note 216, at 41-54.

<sup>219</sup> See, e.g., Kenneth Richards, *A Brief Overview of Carbon Sequestration Economics and Policy*, 33 ENVTL. MGMT. 545, 545-58 (2004).

<sup>220</sup> S. 3036, 110th Cong. § 303(b) (2008).

<sup>221</sup> OLANDER ET AL., *supra* note 160. In the interest of full disclosure, the concepts and language on reproducibility were provided by the authors of this report in Kenneth Richards & Stephanie Hayes Richards, *An Analysis of the Leading Climate Change Bills in the U.S. Senate*, 38 ENVTL. L. REP. 10388, 10388-417 (2008). See also S. 3036, 110th Cong. § 303(c)-(e) (2008).

<sup>222</sup> This is not the only example of a muddling of a bill's treatment of measurement protocols. In its treatment of agriculture and forestry projects, S.2191 section 3702, the Lieberman-Warner bill borrowed its language on the development of soil carbon sequestration estimation directly from the Bingaman-Specter bill's section on agriculture projects, S.1766 section 205(a)(2). Unfortunately, the soil carbon methods developed for agriculture would not be an appropriate basis for evaluating forestry projects. The drafters of the Lieberman-Warner bill, however, did not adjust the requirements when they expanded the scope of the coverage.

remain true whether the chosen measurement method is domestic or international, methane reduction or carbon sequestration, etc. It may be possible to develop such rigorous methods for some project types, particularly methane capture projects.

There will inevitably be some types of beneficial projects for which it is simply not possible to develop sufficiently credible methods of estimation. This is not to say that the projects are not beneficial, but rather that estimations may be idiosyncratic, subject to manipulation and gaming. For these types of activities or projects Congress should consider providing incentives via input-based payments under the Farm Bill or a similar vehicle.

These general guidelines allow us to provide very specific recommendations regarding the different types of activities outside the covered facilities.

### 1. Domestic Offset Projects

The Manager's Amendment effectively combined all the different types of domestic offset projects mentioned in its predecessors. Therefore, it is useful to look at the wording of the Manager's Amendment to provide more specific guidance on the future of domestic offset projects. The Manager's Amendment included numerous types of offset project types for which emissions reduction/sequestration are easy to estimate and can remain off-budget: removal of GHG precursors, carbon capture and storage, use of fuel as a feedstock, fuel exports, fuels purchased for international flights, and methane capture and combustion. At the same time, the Manager's Amendment mentioned several types of offset projects for which identifying a baseline and contending with leakage have proven to be an elusive exercise: agriculture and rangeland, land use and forestry, manure management and disposal, and fugitive emissions. These categories of projects should be encouraged through the same budgeting process as the environmental provisions of the Farm Bill. Decoupling the projects from the trading system eliminates the risk that they will undermine the environmental efficacy of the climate change legislation. Alternatively, financing these project categories with on-budget allowances would also protect environmental efficacy.

### 2. International Credits and Offsets

The requirements for international credits and offsets should parallel those for domestic projects.

Project types that are relatively easy to assess may remain off-budget and output-based. Project types that are more difficult to assess, such as agriculture and forestry projects, need to be financed through the regular budgeting process or through on-budget allowances. Thus, additional detail should have been incorporated into section 321 of the Manager's Amendment.

### 3. Early Action Allowances

Ideally, allowances set aside for early action would be eliminated. While the allowances for early action are on-budget and would not compromise the environmental efficacy of the legislation, such provisions will simply reward past activities and have no impact on current or future emissions levels. They also increase the program's administrative costs.

### 4. Carbon Capture and Storage

While the Manager's Amendment provided less preferential treatment to CCS technology than its predecessors, the rewards for CCS projects need to be proximate to the carbon sequestration achieved by a particular project. This would prevent inefficient choices between technology investments. Under the Bingaman-Specter bill, CCS projects would have received one allowance for every metric ton of carbon dioxide sequestered<sup>223</sup> and between 3.5 and 0.5 bonus allowances between 2012 and 2039.<sup>224</sup> The Lieberman-Warner bill set aside 4 percent of annual on-budget allowances between 2012 and 2035 and an additional 3.9 billion off-budget allowances to reward each metric ton of carbon dioxide sequestered with between 4.5 (in 2012) and .5 (in 2039) allowances.<sup>225</sup> The Manager's Amendment would have auctioned 1 percent of allowances in years 2012 through 2022 to "kick start" CCS projects, and set aside between 3 percent (2012 to 2025), 4 percent (2026 to 2030), and 1 percent (2031 to 2050) for long-term CCS projects to provide between 2 (2012 to 2017) and 0.5 (2030 to 2039) bonus allowances for such endeavors.<sup>226</sup>

It is preferable to fund the development and deployment of the basic technology rather than to over-incentivize its operation. The knowledge and experience that accompany the initial phases of development and deployment contribute broadly to social intellectual capital. The same cannot be said of operations. Although the CCS bonus rewards in all the bills are output-based, the CCS projects receive proportionately more allowances than the carbon sequestration achieved. This could lead to some unfortunate incentives. At a minimum it could lead to inefficient dispatch across plants. In the extreme, if the value of the bonus allowances exceeds the operating costs of the plant, as it likely would in the early years of the program, there would be an incentive for operators to overproduce, running plants even in time of low demand just to earn the bonus allowances. Thus, bonuses for CCS projects should be eliminated from future national climate change bills.

---

<sup>223</sup> S. 1766, 110th Cong. § 302 (2007).

<sup>224</sup> *See id.* § 207.

<sup>225</sup> S. 2191, 110th Cong. § 3601-3605 (2007).

<sup>226</sup> S. 3036, 110th Cong. § 1005-1015 (2008).

## 5. Agriculture and Forestry

Ideally, the on-budget and off-budget agriculture and forestry provisions would be combined into one Farm Bill type provision, funded through the general budgeting process, to ensure these projects do not compromise the environmental efficacy of the climate change bill. Alternatively, these provisions would be combined into one on-budget program for the same reason.

All three bills contained on-budget allowances for agriculture and forestry projects. This was arguably appropriate, given the challenges associated with the measurement of project contributions. Keeping the programs on-budget avoids the possibility of compromising the environmental efficacy of the climate legislation. The fact that the Manager's Amendment requires the Secretary of Agriculture to assure that the projects under the agriculture and forestry provisions do not receive more allowances than they would under the offset program acknowledges the possible overlap between the two approaches.

Two recommendations emerge from this discussion. First, the provisions of all three bills would be improved by moving all agriculture and forestry sequestration projects out of the offset provisions and into this on-budget approach. Rather than measuring each offset project to protect against fraud the emphasis would shift to evaluation of the program as a whole to check for effectiveness. Second, better still would be funding the agriculture and forestry programs through the general budget process. Under such a process, they would compete with other public priorities – neither automatically funded nor limited by the amount of revenue from allowance auction revenues.

## V. DISTRIBUTION OF ALLOWANCES AND AUCTION REVENUES

Generally, there are two methods of distributing the allowances issued under a pollution cap-and-trade program: giving them away or selling them.<sup>227</sup> Under the former approach, the allowances are allocated to entities in proportion to their historic emissions ("grandfathered") or given to particular industries, possibly as a means of developing political support. Under the latter approach, the government or another entity offers allowances for sale at an open auction, with the revenues going to either special earmarked funds or to the general revenue fund.

Often this decision is cast as one of allocation versus auction. As discussed below, it is more useful to think of the difference as one of pre-committed (through either direct allocation or earmarking) versus general government finance use. *Direct allocation* simply means that the allowances are given to entities for their use, which may include selling the allowances on the market. *Earmarking* means that the government is selling the allowances and allocating

---

<sup>227</sup> Carolyn Fischer et al., *Using Emissions Trading to Regulate U.S. GHG Emissions: An Overview of Policy Design and Implementation Issues*, 51 NAT'L TAX J. 453, 453-64 (1998).



the revenues to a predetermined purpose. In contrast, if the government sells the allowances and uses the revenues for deficit reduction, debt repayment, offsetting tax reductions, or otherwise lowering the social cost of government finance (or other general public finance purpose), then it is a *revenue raising* approach. Included in this latter category could be allocation of allowances to individual state governments so they can auction the allowances for a revenue raising purpose.

#### A. Provisions

All three bills use a combination of distribution approaches. Each allocates allowances for a variety of purposes including industry, agriculture, early action, CCS, and state programs. At the same time, they each auction a portion of allowances and earmark funds for a variety of purposes. These purposes include technology development, adaptation, worker training, energy assistance, and administrative costs. Only the Manager's Amendment, however, engages in revenue raising.

##### 1. Direct Allocation

###### a. Bingaman-Specter

###### **Industry**

Beginning in 2012, the Bingaman-Specter program would have allocated 53 percent of allowances to industry, with that amount declining to 1 percent by 2042 and zero thereafter.<sup>228</sup> The allowances allocated to the industrial sector would have been allocated to coal mines (12 percent), petroleum refineries (seven percent), natural gas processing plants (four percent), electric companies (54 percent), regulated nonfuel chemical facilities (4 percent), and carbon-intensive manufacturing facilities (19 percent). For all but the carbon intensive manufacturing category, 92 percent of the allowances would have been allocated to existing sources according to historic levels of carbon content or CO<sub>2</sub> emissions and 8 percent would have been allocated to new sources according to the potential emissions of each.<sup>229</sup> If the amount allocated for new sources was insufficient to cover all eligible new sources, allowances would have been shifted for this purpose from the allowances allocated for auction.<sup>230</sup>

For the carbon-intensive manufacturing sector, the program would have allocated 96 percent of the allowances to currently operating facilities.<sup>231</sup> Each facility would be assigned to one of several major industrial categories. Within

---

<sup>228</sup> S. 1766, 110th Cong. § 201(a) (2007). A graphical representation of allocation of allowances and auction revenue may be found in RICHARDS & RICHARDS, *supra* note 22, at 45 fig.3.

<sup>229</sup> See S. 1766, 110th Cong. § 202(b) (2007).

<sup>230</sup> See *id.* § 202(b)(3)(C).

<sup>231</sup> See *id.* § 203(b).

each category the allowances available for that category would be allocated to individual facilities in proportion to the number of production employees the facility employs.<sup>232</sup> Four percent of the allowances allocated to the carbon-intensive manufacturing sector would be reserved for new entrants; and those entities would be awarded allowances on the same basis—number of employees—as the existing operations.<sup>233</sup> If the number of allowances reserved for new entrants was insufficient to cover those eligible, allowances could be shifted from those allocated for auction.<sup>234</sup>

### Early Action

In the years 2012 to 2020, the Bingaman-Specter plan would have allocated 1 percent of allowances to reward parties that carried out projects to reduce emissions or increase sequestration prior to 2012.<sup>235</sup> The projects eligible for early action allowances are limited to (1) those reported under EIA's §1605(b) Voluntary Reporting of Greenhouse Gas Program, (2) EPA's Climate Leader's Program, or (3) a state-administered or private registry.<sup>236</sup>

### States

In all years of the Bingaman-Specter program, 9 percent of the allowances would have been allocated to states.<sup>237</sup> One half of those allowances would have been allocated among the states in proportion to their historic levels of GHGs. The other half would have been allocated in proportion to their population.<sup>238</sup> While states would have a great deal of discretion, they would be expected to use the allowances to support low-income energy consumers and displaced workers, to promote energy efficiency and technology development, and to promote investment in the energy sector.<sup>239</sup>

### Carbon Capture and Storage

Each year, the program would have allocated 8 percent of allowances to a bonus allowance account to “encourage near-term development of certain geological sequestration projects.”<sup>240</sup> In addition to any allowances earned for the offset of CO<sub>2</sub>, the CCS program would have provided extra rewards ranging from 3.5 (in 2012) down to 0.5 (in 2032 through 2039) allowances per ton

---

<sup>232</sup> See *id.* § 203(d).

<sup>233</sup> See *id.* § 203(f)(2).

<sup>234</sup> See S. 1766, 110th Cong. §203(f)(3) (2007).

<sup>235</sup> See *id.* § 201(a)(1).

<sup>236</sup> See *id.* § 206(c).

<sup>237</sup> See *id.* § 201.

<sup>238</sup> See *id.* § 204(b).

<sup>239</sup> See S. 1766, 110th Cong. § 204(c) (2007). To the extent that the states sell the allowances and use the revenue for predetermined uses, the direct allocation to states could also be cast as a form of earmarking.

<sup>240</sup> See *id.* § 207(a)(1).

sequestered.<sup>241</sup> CCS projects would only be eligible for the bonuses during the first 10 years of their operation.<sup>242</sup> If there were insufficient allowances to cover bonuses for all of the eligible projects, the deficit would be made up by deducting allowances from the amount to be auctioned.<sup>243</sup>

### **Agriculture and Forestry**

For all of the years, 2012 to 2050, the Bingaman-Specter bill would have allocated 5 percent of allowances to agricultural carbon sequestration.<sup>244</sup> As with the CCS bonus allowances, the scheme would shift additional allowances from the auction account should the demand for allowances under this provision exceed its allocation.<sup>245</sup>

### **b. Lieberman-Warner**

#### **Industry**

At the outset of the Lieberman-Warner climate program, a majority of allowances would have been directly allocated to various purposes and sectors.<sup>246</sup> First, the bill allocated an amount to be split evenly between covered facilities in the electric utilities and the industrial sector, starting at 40 percent of allowances in 2012 and declining to 2 percent in 2035, after which there would be no direct allocation for these firms per se.<sup>247</sup> For the distribution of allowances in both of these sectors, there were provisions for new entrants to receive a portion of the allowances.<sup>248</sup> In the electric industry, the rural electric cooperatives were given preferential treatment in the allocation of allowances inasmuch as they were allocated a quantity of allowances equal to the amount of their CO<sub>2</sub> equivalent emissions in 2006.<sup>249</sup> There is no provision for what would happen when the amount of allowances allocated to the electric utility sector fell below the amount of rural electric cooperative emissions in 2006.

Another 10 percent of annual emissions allowances would have been allocated to electric cooperatives and regulated utilities that have a legal obligation to serve customers. The allowances were to be sold on the market and the proceeds used to mitigate economic impacts on low- and middle-income consumers via rebates or reduced charges, and to promote end use energy

---

<sup>241</sup> See *id.* § 207(a)(3).

<sup>242</sup> See *id.* § 207(a)(4).

<sup>243</sup> See *id.* § 207(a)(5).

<sup>244</sup> See *id.* § 205(c).

<sup>245</sup> See S. 1766, 110th Cong. § 205(d) (2007).

<sup>246</sup> A detailed graphical representation of the allocation of allowances and auction revenue under the Lieberman-Warner bill may be found in RICHARDS & RICHARDS, *supra* note 22, at 48 fig.4.

<sup>247</sup> S. 2191, 110th Cong. § 3901 (2007).

<sup>248</sup> See *id.* §§ 3903(a), 3904(a).

<sup>249</sup> See *id.* § 3903(b).

efficiency.<sup>250</sup>

### Early Action

A small percentage of allowances in the first years of the program (5 percent in 2012 declining to 1 percent in 2016) would have been allocated to parties that have taken actions since 1994 “that resulted in verified and credible reductions of GHG emissions.”<sup>251</sup> Many programs provide these opportunities, particularly programs such as the Climate Leaders Program, the 1605(b) Voluntary Reporting of Greenhouse Gas Program, state or regional emissions reduction programs, and other voluntary programs.<sup>252</sup>

### States

The Lieberman-Warner scheme would also have allocated 9 percent of allowances to states. This would be intended to encourage and reward energy efficiency, early adoption of stringent emissions reduction targets, and expenditures on low-income home energy assistance.<sup>253</sup> One of the nine percent of allowances set aside for states would be distributed to states that have adopted regulations allowing for the automatic adjustment of gas and electricity rates to cover the fixed costs of service, have provided incentives for energy utilities to invest in both demand and supply side energy efficiency, and have adopted the most recent energy performance codes for new buildings.<sup>254</sup> Another one of the nine percent of allowances would be distributed to states that are in compliance with the Energy Conservation and Production Act.<sup>255</sup> Two of the nine percent would be distributed to states with more stringent greenhouse gas emission reduction policies than required by the Federal government.<sup>256</sup> Each year, 1.67 of the 9 percent would be allocated based on the states’ relative expenditures for low-income energy assistance.<sup>257</sup> Another 1.67 of the 9 percent would be allocated to states in proportion to their populations.<sup>258</sup> The final 1.67 of the 9 percent of the annual allowances would have been allocated according to how much carbon is contained in the fuels the states mine (coal), process (natural gas) or refine (petroleum).<sup>259</sup> There are also provisions to allow allocation of 0.5 percent of total annual emissions allowances to tribal communities,<sup>260</sup> which could thereby reduce the amount of allocations to states from 9 percent to 8.5

---

<sup>250</sup> See *id.* §§ 3501, 3503.

<sup>251</sup> See *id.* § 3301.

<sup>252</sup> See *id.* § 3302(b).

<sup>253</sup> See S. 2191, 110th Cong. §§ 3401-3403 (2007).

<sup>254</sup> See *id.* § 3401(a).

<sup>255</sup> See *id.* § 3401(b).

<sup>256</sup> See *id.* § 3402.

<sup>257</sup> See *id.* § 3403(b)(1).

<sup>258</sup> See *id.* § 3403(b)(2).

<sup>259</sup> See S. 2191, 110th Cong. § 3403(b)(3) (2007).

<sup>260</sup> See *id.* § 3403(d).

percent.<sup>261</sup>

### **Carbon Capture and Storage**

For the years 2012 to 2035, the bill would have allocated 4 percent of the allowances to provide added incentives for geological CCS.<sup>262</sup> In addition, the Bonus Allowance Account commenced the program with a balance of 3.9 billion emission allowances that were not part of the annual allowance budget.<sup>263</sup> The bonus allowance program awards rates ranging from 4.5 allowances per ton of CCS in 2012 to 0.5 in 2039.<sup>264</sup>

### **Agriculture and Forestry**

Throughout the life of the program, 5 percent of annual allowances would have flowed to an emission allowance account for domestic agricultural and forestry terrestrial sequestration projects.<sup>265</sup> This section would be distinct from the offset program, essentially bringing forestry and agriculture on-budget rather than off-budget. This provision looks more like a program that subsidizes beneficial actions rather than a payment for carefully measured carbon outcomes.

### **International Forestry**

Between 2012 and 2050, another 3 percent of annual allowances would flow to an emission allowance account that would have provided incentives for reduced deforestation and increased reforestation in foreign countries.<sup>266</sup> The basis for the rewards appeared to be for outcomes achieved, as measured in terms of carbon; the language, however, is ambiguous.

### **c. Manager's Amendment**

#### **Industry**

The Manager's Amendment allocated 44.5 percent of allowances to industry in 2012, declining to 13.5 percent in 2050.<sup>267</sup> Within the industrial sector the new bill provided more favorable treatment to the natural gas, electric power, and carbon-intensive manufacturing industries at the expense of the coal, refining, and non-fuel entities.<sup>268</sup> It also provided that four percent of the

---

<sup>261</sup> See *id.* § 3403(d)(3).

<sup>262</sup> See *id.* § 3601(a).

<sup>263</sup> See *id.* § 3601(b).

<sup>264</sup> See *id.* § 3603.

<sup>265</sup> See S. 2191, 110th Cong. § 3701 (2007).

<sup>266</sup> See *id.* § 3803.

<sup>267</sup> S. 3036, 110th Cong. §§ 541, 551, 561, 571, 601 (2008). For a detailed graphical representation of the allocation of allowances and auction revenue under the Manager's Amendment, see RICHARDS & RICHARDS, *supra* note 22, at 51 fig.5.

<sup>268</sup> For additional details, see RICHARDS & RICHARDS, *supra* note 22, at 52 tbl.5.

allowances for carbon-intensive manufacturing would be reserved for new entrants.<sup>269</sup>

### Early Action

The Manager's Amendment included provisions for rewarding early action. The system would have initially allocated 5 percent of annual allowances to this purpose in 2012, decreasing to one percent in 2018, and phasing out after 2025.<sup>270</sup>

### States

The Manager's Amendment eventually allocated a substantially larger percentage of allowances to the states, and its approach differed from the original bills. The Manager's Amendment allocated 7 percent of total annual allowances to the States in 2012 rising to 14 percent by 2050,<sup>271</sup> and would have auctioned another 3 percent of annual allowances for this purpose in 2012, rising to 4.75 percent by 2050 (total allocation/auction of 10 percent in 2012 and 18.75 percent by 2050).<sup>272</sup> In contrast, both the Bingaman-Specter bill and the Lieberman-Warner bill consistently allocated 9 percent of allowances for this purpose each year.<sup>273</sup> The Manager's Amendment allocated 3 percent of annual allowances to states that are economically reliant on coal and manufacturing in 2012, rising to 4 percent in 2050.<sup>274</sup> In addition, the bill allocated another 4 percent of annual allowances in 2012 to states that have led the efforts to combat climate change, and that percentage would have increased to 10 percent by 2050.<sup>275</sup> The Manager's Amendment gave the states significant leeway regarding the use of these allowances. The allowances could be dedicated to any of the following purposes: consumer energy assistance, low carbon energy technologies, public transportation, relocation or adaptation assistance for coastal communities, relief for electricity generation or energy-intensive manufacturing, assistance for displaced workers, habitat protection, water projects, recycling programs, or improved health plans.<sup>276</sup>

### Carbon Capture and Storage

The Manager's Amendment would have substantially decreased national reliance on CCS technology when compared to the two earlier bills. The Manager's Amendment directed that 3 percent of allowances in 2012 to 2025; 4

---

<sup>269</sup> S. 3036, § 542(g) (2008).

<sup>270</sup> *See id.* § 702.

<sup>271</sup> *See id.* §§ 602, 614.

<sup>272</sup> *See id.* §§ 611, 613.

<sup>273</sup> S. 1766, 110th Cong. § 201 (2007); S. 2191, 110th Cong. § 3401-3403 (2007).

<sup>274</sup> S. 3036, 110th Cong. § 602 (2008).

<sup>275</sup> *See id.* § 614.

<sup>276</sup> *See id.*

percent, from 2026 to 2030; and 1 percent, from 2031 to 2050 for long-term CCS projects.<sup>277</sup> Most importantly, the Manager's Amendment eliminated the 3.9 billion starting balance for the CCS bonus allowance account included in the original Lieberman-Warner bill.<sup>278</sup>

### **Agriculture and Forestry**

The Manager's Amendment offered a comparable, yet slightly smaller proportion of allowances to agriculture and forestry projects. It dedicated 4.25 percent of allowances from 2012 through 2030 and 4.5 percent from 2031 through 2050 for such projects.<sup>279</sup>

### **International Forestry**

The Manager's Amendment also decreased allowances for international forestry projects. It distributes only 1 percent of annual allowances,<sup>280</sup> rather than the 3 percent provided by the original Lieberman-Warner bill.<sup>281</sup>

### **Technology Development**

The Manager's Amendment directed a substantially smaller proportion of allowances for advanced technology than the original climate change bills.<sup>282</sup> In 2012, the Manager's Amendment would have allocated 7.75 percent of total allowances to advanced technology programs.<sup>283</sup> By 2050, the Manager's Amendment would allocate only 3.25 percent of total allowances for technology programs.<sup>284</sup> At the same time, the Manager's Amendment would auction 3.5 percent of allowances in 2012 declining to 2.25 percent of allowances in 2050 for technology development.<sup>285</sup> This combination of allocated/auctioned allowances would have provided 11.25 percent of allowances in 2012 and 5.5 percent of allowances in 2050 for technology development.<sup>286</sup> This is a

---

<sup>277</sup> See *id.* § 1011. In addition, the Manager's Amendment also earmarks 1 percent of allowances from 2012 to 2022 to "kick start" the CCS program under section 1001.

<sup>278</sup> S. 2191, 110th Cong. § 3601 (2007).

<sup>279</sup> S. 3036, 110th Cong. § 331 (2008).

<sup>280</sup> See *id.* § 1312.

<sup>281</sup> S. 2191, 110th Cong. § 3803 (2007).

<sup>282</sup> Another difference among the bills is that the two original bills only use earmarking for technology development, whereas the Manager's Amendment uses both earmarking and direct allocation.

<sup>283</sup> 0.75 percent for the Efficient Buildings Program, 0.75 percent for Efficient Equipment and Appliances, 0.75 percent for the Efficient Manufacturing Program, 4 percent for Renewable Energy, 0.5 percent for Clean Commercial Fleets, and 1 percent for Cellulosic Biofuel. S. 3036, 110th Cong. §§ 801, 811, 821, 831, 1101, 1121 (2008).

<sup>284</sup> 0.75 percent for the Efficient Buildings Program, 0.75 percent for Efficient Equipment and Appliances, 0.75 percent for the Efficient Manufacturing Program, and 1 percent for Renewable Energy. *Id.*

<sup>285</sup> See *id.* §§ 901, 911, 1111, 1321.

<sup>286</sup> See *id.* §§ 801, 811, 821, 831, 901, 911, 1101, 1111, 1121, 1321.

completely different strategy than that employed by the original two bills, with the Bingaman-Specter bill offering 12 to 39 percent of allowances<sup>287</sup> and the Lieberman-Warner bill directing 13 to 40 percent of annual allowances for this same purpose.<sup>288</sup>

### Adaptation

The Manager's Amendment directed a similar proportion of allowances for adaptation efforts compared to the Bingaman-Specter bill. Overall, the Manager's Amendment allocated/auctioned 9 percent of allowances in 2012 and 20 percent of allowances in 2050 for this purpose.<sup>289</sup> The Bingaman-Specter bill allocated 8 percent in 2012 and 35 percent in 2050 for adaptation,<sup>290</sup> while the original Lieberman-Warner bill allocated between 5 and 15 percent of annual allowances for this purpose.<sup>291</sup> Examining the Manager's Amendment allowance distribution more closely, one notices that only 3 to 4 percent of annual allowances are directly allocated to adaptation programs,<sup>292</sup> while 6 to 16 percent of annual allowances are auctioned for this same purpose.<sup>293</sup>

## 2. Auction for Earmarking

### a. Bingaman-Specter

The Bingaman-Specter bill would have auctioned 24 percent of allowances in 2012 with increases of 0 to 2 percent each year until the year 2043, when the proportion of allowances auctioned would stabilize at 80 percent.<sup>294</sup> The Bingaman-Specter bill provided the following schedule for sale of the allowances available for auction:

- 2009—50 percent of 2012 auctioned allowances and 50 percent of 2013 auctioned allowances
- 2010—50 percent of 2014 auctioned allowances
- 2011—50 percent of 2015 allowances
- 2012 to 2050—50 percent of allowances for current year and 50 percent

---

<sup>287</sup> S. 1766, 110th Cong. § 201 (2007).

<sup>288</sup> S. 2191, 110th Cong. §§ 3101, 3201, 4302 (2007).

<sup>289</sup> S. 3036, 110th Cong. §§ 621, 631, 1201, 1331 (2008). As with technology development, the Manager's Amendment directs resources for adaptation through both direct allocation and earmarking, whereas the original bills utilize earmarking for adaptation programs.

<sup>290</sup> S. 1766, 110th Cong. § 201 (2007).

<sup>291</sup> S. 2191, 110th Cong. §§ 3101, 3201, 4302 (2007).

<sup>292</sup> S. 3036, 110th Cong. § 621 (2008).

<sup>293</sup> *See id.* §§ 631, 1201, 1331.

<sup>294</sup> *See id.* § 201.



of allowances from calendar year four years from current.<sup>295</sup>

Assuming that the price of allowances is \$8/metric ton in 2012 as predicted by the EIA analysis,<sup>296</sup> the Bingaman-Specter bill would have raised \$12.8 billion in revenues in 2012.<sup>297</sup> By 2030 when the price of allowances reached \$25/metric ton, the legislation would produce revenues closer to \$63.9 billion.<sup>298</sup>

In 2012, the revenues from allowances would be used for the following purposes: low-income energy assistance (17 percent), technology deployment (50 percent), and adaptation (33 percent).<sup>299</sup> In pure financial terms, this would mean that \$2.2 billion would be used to assist low-income residents with their energy bills, providing weatherization assistance, and helping individuals in rural areas where electricity prices are 150 percent above the national average.<sup>300</sup> Approximately \$6.4 billion would be used to develop and deploy zero or low-carbon energy technologies, advanced coal and sequestration projects, cellulosic biomass initiatives, and advanced technology vehicles.<sup>301</sup> The final \$4.2 billion would be used to address the impacts of climate change, with 25 percent going to coastal regions; 25 percent to U.S. regions above 50 degrees North latitude (i.e. Alaska); 20 percent for the contiguous United States; and 30 percent for fish and wildlife.<sup>302</sup> By 2030, revenues from allowance auctions could reach \$63.9 billion—\$5.7 billion for energy assistance, \$31.3 billion for technology development, and \$26.8 billion for adaptation.

---

<sup>295</sup> S.1766, 110th Cong. §208(e).

<sup>296</sup> Press Release, U.S. Senate Committee on Energy and Natural Resources, Key Findings From EIA and EPA on Bingaman-Specter 'Low Carbon Economy Act' of 2007, *available at* [http://www.energy.senate.gov/public/index.cfm?FuseAction=PressReleases.Detail&PressRelease\\_id=095669c2-ca5b-4b72-adf5-51239cbd9216&Month=1&Year=2008&Party=0](http://www.energy.senate.gov/public/index.cfm?FuseAction=PressReleases.Detail&PressRelease_id=095669c2-ca5b-4b72-adf5-51239cbd9216&Month=1&Year=2008&Party=0) (last visited Nov. 1, 2009).

<sup>297</sup> This projected revenue for 2012 was determined using the following calculation:  
 24% x 6,652 allowances (million metric tons of CO<sub>2</sub>) x \$8/metric ton = **\$12,771,840,000.00**  
 [Percent allowances auctioned] x [total allowances issued] x [expected allowance price]

The estimated revenues are based on an assumption that no allowances originally earmarked for auction have to be diverted to new entrant facilities or agricultural or carbon sequestration projects or supplemented by allowances that ended up not being issued by the president or were returned to the president due to a plant closing or by a state that failed to use the allowances within the allotted time frame (S. 1766, 110th Cong. § 208 (2007)).

<sup>298</sup> Based on:

53% x 4,819 allowances (million metric tons of CO<sub>2</sub>) x \$25/metric ton = **\$63,851,750,000.00**  
 [Percent allowances auctioned] x [total allowances issued] x [expected allowance price]

For additional details, please see RICHARDS & RICHARDS, *supra* note 22, at 55 tbl.6.

<sup>299</sup> S. 1766, 110th Cong. § 201 (2007).

<sup>300</sup> *See id.* § 403.

<sup>301</sup> *See id.* § 401.

<sup>302</sup> *See id.* § 402.

b. Lieberman-Warner

The Lieberman-Warner bill would have auctioned 24 percent of allowances in 2012<sup>303</sup> with increases of 1 to 3 percent per year, until 2036, after which the proportion of allowances auctioned would have remained stable at 73 percent.<sup>304</sup> To jump-start the Energy Technology Deployment provisions,<sup>305</sup> the bill provided for auction, within 180 days of passage, of a small percentage of the earliest allowances:

- 6 percent of 2012 allowances;
- 4 percent of 2013 allowances; and
- 2 percent of 2014 allowances.<sup>306</sup>

These early auction allowances would be in addition to the percentages of allowances allocated for later auction for those years. All the revenues from early and ongoing auctions would be assigned to one of four funds: energy assistance, technology development, adaptation, and worker training.

In 2012, 13 percent of all allowances would be auctioned for the Technology Deployment Fund with that portion increasing to 40 percent in 2036 through 2050. This fund is designed to develop and deploy zero- or low-carbon energy technologies, advanced coal and sequestration projects, cellulosic biomass initiatives, and advanced technology vehicles.<sup>307</sup>

In the early years of the program 5 percent of the total allowances will be auctioned for both the Adaptation Fund and the Energy Assistance Fund, each increasing to 15 percent in years 2036 and beyond. The Secretary of Energy would use the Adaptation Fund for assisting low-income residents with their energy bills, providing weatherization assistance, and helping individuals in rural areas where electricity prices are 150 percent above the national average.<sup>308</sup> The Adaptation Fund would be split between the Department of the Interior, EPA, the Army Corps of Engineers, and the Department of Commerce to help fish, wildlife, plant species, and habitats adapt to the impacts of climate change.<sup>309</sup>

Between 1 and 4 percent of all allowances would be auctioned each year to support the Climate Change Worker Training Fund. The Climate Change Worker Training Fund would be managed by the Secretary of Labor and used to

---

<sup>303</sup> The 24 percent includes 6 percent auctioned during the early auction and 18 percent from the regular annual auction.

<sup>304</sup> S. 2191, 110th Cong. § 3201 (2007).

<sup>305</sup> *See id.* §§ 4401-4405. The Energy Technology Deployment program provides funding for the development of zero- and low-carbon, advanced coal and sequestration, cellulosic biomass, ethanol, and advanced vehicle technologies.

<sup>306</sup> *See id.* § 3101.

<sup>307</sup> *See id.* §§ 4302, 4401.

<sup>308</sup> *See id.* §§ 4501-4502.

<sup>309</sup> *See id.* § 4702.

provide job training, temporary wages, and benefits for individuals whose jobs are displaced by this legislation and for training workers to fill jobs created by this legislation.<sup>310</sup>

The Lieberman-Warner bill would also establish a Climate Change and National Security Fund<sup>311</sup> to pay for recommendations made by the Climate Change and National Security Council<sup>312</sup> on steps to reduce the politically destabilizing effects of climate change on global politics. The provisions state that the amounts distributed to the fund from auction of allowances are to be made according to the provisions of §4302(b). But that section allocated all the auction funds among the four other programs previously mentioned. Apparently, the funds for the Climate Change and National Security Fund, up to five percent of total auction revenues, are to be deducted from the 45 percent of auction revenues that are allocated to the Energy Assistance Fund, the Climate Change Worker Training Fund, and the Adaptation Fund.<sup>313</sup>

To get a better sense of the magnitude of funds available for technology development, energy assistance, and adaptation involved in this bill, it is necessary to estimate the revenue that could be raised through the auction system. Assuming the price of allowances is \$19/metric ton in 2012 as predicted by the EIA analysis of the Lieberman-Warner Bill,<sup>314</sup> it is reasonable to assume the Lieberman-Warner bill could raise in excess of \$23 billion in revenues from allowance auctions.<sup>315</sup> By 2030, when the price of allowances has reached closer to \$61/metric ton,<sup>316</sup> the legislation could produce annual revenues closer to \$121 billion.<sup>317</sup>

### c. Manager's Amendment

The Manager's Amendment would have auctioned a smaller percentage of the total annual allowances than either of its predecessors. It would have auctioned

<sup>310</sup> See S. 2191, 110th Cong. § 3201, 4302 (2007). The percentage of allowances auctioned would range from 18 percent in 2012 to 73 percent in years 2036 – 2050. At the same time, the distribution of auction revenues will remain the same each year: 55 percent for technology, 20 percent to energy assistance, 20 percent to adaptation, and 5 percent for worker training programs.

<sup>311</sup> See *id.* §§ 4101-4103.

<sup>312</sup> See *id.* § 4801.

<sup>313</sup> See *id.* § 4802.

<sup>314</sup> U.S. ENERGY INFO. ADMIN., ENERGY MARKET AND ECONOMIC IMPACTS OF S. 2191, THE LIEBERMAN-WARNER CLIMATE SECURITY ACT OF 2007 (2008), available at <http://www.eia.doe.gov/oiaf/servicrpt/s2191/execsummary.html>.

<sup>315</sup> This projected revenue was determined using the following calculation:  
 $24\% \times 5,200 \text{ allowances (million metric tons of CO}_2\text{)} \times \$19/\text{metric ton} = \mathbf{\$23,712,000,000.00}$   
 [Percent allowances auctioned] x [total allowances issued] x [expected allowance price]

<sup>316</sup> U.S. ENERGY INFO. ADMIN., *supra* note 56.

<sup>317</sup> *Leading Senate emissions bill would raise energy costs – EIA*, Apr. 30, 2008, <http://www.eenews.net/EEDaily/2008/04/30/3>.

$57\% \times 3,472 \text{ allowances (million metric tons of CO}_2\text{)} \times \$61/\text{metric ton} = \mathbf{\$120,721,440,000.00}$   
 [Percent allowances auctioned] x [total allowances issued] x [expected allowance price]

24.5 percent of allowances in 2012, with increases of 0.5 to 10.5 percent per year, until 2032, after which the proportion of allowances auctioned would remain stable at 58.75 percent.<sup>318</sup>

All the revenues from early and ongoing auctions would be assigned among several funds.<sup>319</sup> The bill reflected different priorities than either the Bingaman-Specter or the Lieberman-Warner bills. The Manager's Amendment auctioned a substantially smaller proportion of allowances for technology development than either of its predecessors. In 2012, the Manager's Amendment would have auctioned 3.5 percent of allowances for technology development and those numbers will decline to 2.25 percent in years 2031 through 2050.<sup>320</sup> In contrast, the original Lieberman Warner bill would have auctioned 13 percent of allowances in 2012 and up to 31 percent of allowances in 2030 for this same purpose.<sup>321</sup> The Bingaman-Specter bill dedicated 12 percent of allowances in 2012 and 26 percent in 2030 for this purpose.<sup>322</sup>

Unlike its predecessors, the Manager's Amendment increased funding for energy assistance over time. In 2012, 14 percent of auction revenues would have gone to energy assistance and that proportion would increase to 24.2 percent in 2030. In contrast, the Lieberman-Warner plan consistently dedicated 20 percent of auction revenues to energy assistance each year. The Bingaman-Specter bill provided 17 percent of auction revenues for energy assistance in 2012, decreasing to just 9 percent in 2030.

Relative to the original Lieberman-Warner bill, the Manager's Amendment dedicated a comparable proportion of its allowances to adaptation, energy assistance, and worker training. The Manager's Amendment would have auctioned 6 percent of allowances in 2012 rising to 12 percent of allowances in 2030 for adaptation.<sup>323</sup> It would auction 3.5 percent of allowances in 2012 increasing to 12 percent of allowances in 2030 for energy assistance.<sup>324</sup> The Manager's Amendment would auction 1 to 4 percent of allowances to worker training each year.<sup>325</sup>

The Manager's Amendment also incorporated the Climate Security Act fund. The Manager's Amendment borrowed the concept of the Climate Security Act fund from the Lieberman-Warner bill, and set aside 0.75 percent of allowances

---

<sup>318</sup> S. 3036, 110th Cong. §§ 532, 581, 613, 611, 631, 901, 911, 1001, 1111, 1201, 1331, 1321, 1401, 1701 (2008). For a detailed graphical representation of allocation of allowances and auction revenue under the Manager's Amendment, please see RICHARDS & RICHARDS, *supra* note 22, at 51 fig.5.

<sup>319</sup> See S. 3036, 110th Cong. § 4302 (2008). For additional details, please see RICHARDS & RICHARDS, *supra* note 22, at 60 tbl.8.

<sup>320</sup> See S. 3036, 110th Cong. §§ 801, 811, 821, 831, 901, 911, 1101, 1111, 1121, 1321 (2008).

<sup>321</sup> S. 2191, 110th Cong. §§ 3201, 4302 (2007).

<sup>322</sup> S. 1766, 110th Cong. § 581 (2007).

<sup>323</sup> S. 3036, 110th Cong. § 621, 631, 1201, 1331 (2008).

<sup>324</sup> See *id.* § 581.

<sup>325</sup> See *id.* § 532.

each year to assist with administrative costs of policy implementation.<sup>326</sup> In 2012, the Manager's Amendment would raise approximately \$26 billion dollars in auction revenues, including \$6.4 billion for adaptation, \$3.8 billion for technology development, \$3.8 billion for energy assistance, \$3.1 billion for the states, \$1.0 billion for worker training, \$1.0 billion for CCS Kickstart, and the remaining \$800 million for the Climate Security Fund.

By 2030, the Manager's Amendment may raise as much as \$89.1 billion in auction revenue, with \$21.6 billion for adaptation, \$21.6 billion for energy assistance, \$8.6 billion for the states, \$5.9 billion for technology development, \$5.4 billion for worker training, and the remaining \$1.3 billion for the Climate Security Fund.

### 3. Auction for Revenue Raising

Neither the Bingaman-Specter nor the Lieberman-Warner bill included any provisions for revenue raising.

The Manager's Amendment primary departure from the earlier bills was found in the substantial percentage of allowances that it dedicated to deficit reduction. Unlike its predecessors, the Manager's Amendment dedicated from 5.75 (2012) to 19.75 (2032) percent of annual allowances to a Deficit Reduction Fund established at the U.S. Treasury. Auction revenues from the Manager's Amendment would be expanded to provide \$6.1 billion in 2012 and \$24.8 billion in 2030 for deficit reduction. The bill did not define, however, the purpose or uses of this new fund beyond its suggestive name and the fact that "No disbursement shall be made from the Deficit Reduction Fund, except pursuant to an appropriation Act."<sup>327</sup>

### B. Discussion and Recommendations

The distribution of allowances is a critical issue for the design of a climate change bill. The choice among direct allocation of allowances, earmarking of auction proceeds, and revenue raising profoundly affects the distribution of costs and benefits of the program. Moreover, an examination of the distribution schemes of the bills reveals other underlying issues that affect the fundamental efficiency of the various approaches.

This section starts with a brief comparison of the basic provisions of the three bills. It then moves to a discussion of the fundamental policy issues related to the three approaches to distribution. The discussion examines a number of specific issues, making recommendations for improvements in the three bills.

---

<sup>326</sup> See *id.* § 1701.

<sup>327</sup> See *id.* § 1404.

### 1. Comparison of the Bills

There were significant differences among the bills with respect to how they would directly allocate allowances (Table 3). The Lieberman-Warner bill would have allocated 40 percent of allowances to industry, split evenly between manufacturing and the electric industry (plus an extra 10 percent of allowances for electric cooperatives and regulated utilities to mitigate the costs of increased electricity prices). In contrast, the Bingaman-Specter bill was much more favorable to the electric power sector. It allocated 53 percent of all allowances to industry, and 54 percent of the industry allowances (28.6 percent of all allowances) to the electric power sector, with no restrictions on use. In addition, as the primary consumers of coal and a major consumer of natural gas, the electric utilities would benefit from the allocation of 12 percent of industry sector allowances that go to coal mines and from the 4 percent that goes to natural gas. The Manager's Amendment represents a compromise between the other two bills. It allocates 44.5 percent of allowances to industry, of which 62 percent go to the electric utility industry (27.6 percent of all allowances). This percentage is similar to the allowances for the electric sector under Bingaman-Specter, but eliminated the indirect allocation to the electric sector through allocation to coal companies.

All three bills also provided small, but significant allocations for agricultural programs, geological carbon capture storage, state programs, and early action. The Manager's Amendment rewarded early action more generously than the other bills, but provided fewer rewards for carbon capture and storage.

The bills also differed substantially with respect to their use of earmarking (Table 4). Each bill earmarked auction revenues, often for similar purposes, but the amounts differ substantially over the life of the programs. For example, all three bills offer a different plan for energy assistance. The Bingaman-Specter bill would have provided its peak level of energy assistance in the early years of the program, dedicating 17 percent of auction revenues to this cause in 2012 and as little as 6 percent of all auction revenues after 2042. The Lieberman-Warner bill consistently devoted 20 percent of auction revenues to this purpose. The Manager's Amendment dedicated between 14 and 26 percent of auction revenues to energy assistance, with the peak level of funding occurring in the later years of the program.

The Bingaman-Specter bill would have provided more funding to adaptation than the Lieberman-Warner bill and the Manager's Amendment. The Lieberman-Warner bill provided 20 percent of auction revenues to adaptation, whereas the Manager's Amendment provided between 19 and 27 percent of auction revenues for this purpose. The Bingaman-Specter bill devoted between 33 and 44 percent of annual auction revenues to assist with adaptation measures.

The Lieberman-Warner and Bingaman-Specter bills included higher spending levels for technology development. Both the Lieberman-Warner and the Bingaman-Specter bills maintained consistent spending for technology

development. Each year Bingaman-Specter would have dedicated 49 to 50 percent of auction revenues each year to this purpose whereas Lieberman-Warner would have dedicated 55 percent of revenues to this initiative. The Manager's Amendment dedicated between 4 and 14 percent of auction revenues to technology development each year.

## 2. Policy Perspective on Distribution of Allowances

All other things being equal, policy analysts prefer to see allowances auctioned for revenue-raising rather than allocated based on past emissions levels or auctioned for earmarked purposes.

Relative to direct allocation, the revenue raising approach has several advantages. First, it is a more consistent with the polluter-pays principle.<sup>328</sup> Second, it is a defensible, principled approach that rises above politics and favoritism.<sup>329</sup> Third, and most persuasive to the efficiency-seeking analyst, if it is conducted in a revenue-neutral manner, revenue raising auctions allow the government to displace distortionary taxes on goods, such as those on labor, capital, and sales, with a tax on an activity—GHG emissions—that is already being constrained. In other words, it can replace a distortionary tax with a non-distortionary tax.<sup>330</sup> This is not a trivial point. At least one analysis suggests that the social cost of the sulfur dioxide provisions of the 1990 Clean Air Act Amendments could have been reduced by more than 24 percent if the allowances had been auctioned rather than grandfathered.<sup>331</sup>

Finally, auctioning allowances better preserves clear price signals that convey information to consumers about the costs of energy consumption.<sup>332</sup> Grandfathering may show up as a subsidy to energy consumption in some markets, as for example in regulated electricity markets. In this respect the higher the percentage of allowances auctioned for government revenue-raising, the better. It has been suggested that it is politically necessary to engage in grandfathering or other forms of direct allocation to build a political coalition that will support a broad climate change bill. Ultimately, that is a decision that

---

<sup>328</sup> The polluter-pays principle ("PPP") has been a guiding tenet for environmental policy on the national and international level since its acceptance by the Organization for Economic Cooperation and Development (OECD) in 1972. The PPP holds that (1) the polluter should bear the financial responsibility for pollution prevention and clean-up and that (2) the government should not subsidize these costs. See James A. Tobey & Henri Smets, *The Polluter-Pays Principle in the Context of Agriculture and the Environment*, 19 *WORLD ECON.* 1, 63-64 (1996).

<sup>329</sup> If the allowances are grandfathered, it is likely that regulated entities will hire lobbyists to influence how allowances are distributed. See PETER CRAMTON & SUZI KERR, *TRADEABLE CARBON PERMIT AUCTIONS: HOW AND WHY TO AUCTION NOT GRANDFATHER* 15 (1999), available at <http://www.market-design.com/files/98wp-tradeable-carbon-permit-auctions.pdf>.

<sup>330</sup> *Id.* at 9-10, 16.

<sup>331</sup> L. Goulder, I. Parry & D. Burtraw, *Revenue-Raising vs. Other Approaches to Environmental Protection: The Critical Significance of Pre-Existing Tax Distortions*, 28 *RAND J. ECON.* 708, 721 (1996).

<sup>332</sup> See generally *id.*

the members of Congress will have to make, but at a minimum they should recognize that there is a substantial cost associated with that direct allocation.

Moreover, there may be politically feasible alternatives that retain the efficiency advantages of the revenue raising approach. For example, it is often argued that it is important to allocate allowances to the electric utility industry to protect low-income consumers from increased electricity prices. These allowances, however, would ensure that those low-income families could only reap the benefits of that allocation by consuming electricity. It would be better to auction the allowances and use the revenues to finance tax cuts to those same low-income families, allowing them to spend the money on any number of beneficial uses, not just electricity.

It has also been asserted that direct allocation of allowances is necessary to overcome regional differences in the impacts of the climate bill. For example, states whose electricity generation is particularly reliant on coal may oppose a climate bill unless they receive preferential treatment. While that may be true, there is no need to pass the benefits on to the states in an inefficient manner. Better to give those states (not their industries) the allowances or revenues from auctions, and allow them to lower distortionary state taxes or reduce their deficits.

Some observers have suggested that while it is clearly better to auction allowances than to give them away, the revenues should be earmarked for purposes related to mitigating and adapting to climate change. These uses could include renewable energy technology development and deployment, habitat protection programs, and incentives for geological carbon capture and storage.

There are numerous advantages to earmarking funds raised from the sale of allowance auctions, but also some serious disadvantages. Some would argue the earmarking process ensures a base level of funding for climate change programs and provides predictability in the long-term administration of programs. This argument, however, would only prove true for projects that may likely be cut in the general budgeting process. One could also say that earmarking creates a kind of social justice, in that it forces the activities that contribute to climate change to finance solutions to the problems they have created for society.<sup>333</sup> The bills' drafters may also believe administering agencies will receive more funding for climate change mitigation and adaptation when the issue is considered separately rather than when evaluated as part of a broader budgeting process. For example, it may be easier for Senators to fund climate change initiatives as part of this bill than when the issue is considered as part of the general budgeting process alongside other important, politically charged issues such as healthcare, Medicare, education, and the ever-growing federal budget deficit.

---

<sup>333</sup> Joel Michael, MN House of Representatives Research Department, *Earmarking State Tax Revenues 2-3*, 5 (Jan. 2008), available at <http://www.house.leg.state.mn.us/hrd/pubs/earmarking.pdf>.



But there are problems with this argument. At a conceptual level, there is no more reason to insist on earmarking revenues from the auction of allowances for climate change applications than requiring that wage taxes be used only to support labor or that capital gains tax revenues be used only to safeguard and promote investment. It may well be important to use government revenues to support research, education, and adaptation related to climate change. However, there is no reason to believe that the appropriate level of support for these activities is directly related to the revenues from allowance auctions.

At a practical level, it is virtually impossible to forecast more than thirty years into the future which uses of the revenues will be most productive. Earmarking tends to lock Congress into particular activities, even specific technologies, making it difficult to adjust to new information and developments. For example, both the Bingaman-Specter and Lieberman-Warner bills would have committed the country to long-term support of geological carbon capture and storage. While this technology may prove an important element in mitigating emissions, it is much too early to be sure what role it will play.

Earmarking would also make funding for climate change initiatives vulnerable to fluctuations in revenues since it will be challenging to predict the exact revenues that would be collected from an allowance auction. Furthermore, having an off-budget account like this could increase administrative costs since revenues generally must be tracked and accounted for outside the normal accounting procedures.<sup>334</sup> In addition, there is a risk that lawmakers, believing that all allowance auction revenues must be earmarked, will treat that money as somehow “cheaper” than money raised via taxes. They may commit funds to activities that they would not otherwise be willing to fund. While this may be the very attraction of earmarking to those engaged in climate change and environmental activism, it does not lead to more efficient policy.

Climate change programs, like all activities for which Congress appropriates funds, should be subject to regular review, and to competition with the many other important, socially beneficial, programs that the government has to evaluate. This is best achieved by directing revenues from the auction of allowances to general revenue fund to either the state or federal government treasuries.

In this regard, the Manager’s Amendment presented an encouraging development. That bill introduced the Deficit Reduction Fund, which would have received between 23 and 33 percent of auction revenues to improve the federal government’s finances. While this is an important step, Congress could do better still by first extending the percentage of auction revenue directed to this fund and then clarifying the specific purpose and mechanisms that govern the fund.

Efficiency arguments notwithstanding, legislatures generally allocate new

---

<sup>334</sup> *Id.* at 4.

allowances on the basis of direct allocation. Whether this choice arises from ignorance of the efficiency issues or political motivation is not entirely clear, but one suspects the latter.<sup>335</sup> It is important, though, to appreciate the full implications of the specific provisions of the three bills with respect to their allowance distribution schemes.

### 3. Electric Utility Industry

The provisions for distribution of allowances to the electricity industry, in particular, raise several issues. First, none of the bills fully accounted for the differential effects that allocating allowances to regulated versus restructured electric utilities would have. Allocation to the former will likely dull the price signal and advantage consumers while allocation to the latter will advantage stockholders. This difference has implications for both equitable treatment of electricity consumers and the efficacy of the price signal.

Regulated utilities have argued that allocating significant allowances to them will protect their customers from sudden increases in rates. The allowances that are awarded to regulated entities will not be included as costs in the ratemaking process, which has the effect of dulling the price signal that would encourage greater conservation and energy efficiency among electricity consumers. At the same time, customers of utilities in states that have restructured would not benefit from the protection of the ratemaking process. Even though the allowances are awarded at no cost, their providers will certainly treat the allowances as valuable assets and include that value in the price they charge. Thus, the current approach to allocating allowances to the electric power industry will unfairly protect customers of regulated utilities, transfer assets to the shareholders of utilities in restructured states, and blunt the positive effects of the price signal in the regulated states.

Interestingly, the Lieberman-Warner bill also stipulated that from the allowances allocated to the electric power sector, rural electric cooperatives (RECs) were to receive an amount equal to their emissions in 2006.<sup>336</sup> This provision would not only work greatly to the disadvantage of the non-REC entities, it would create the possibility in later years that more allowances will be due to the RECs than are available for the entire electric power sector. It appears that the Manager's Amendment addressed this problem. Rather than providing RECs with a set number allowances throughout the duration of the climate change program, the Manager's Amendment stated that the Administrator could not distribute more than 5 percent of allowances to RECs.<sup>337</sup>

---

<sup>335</sup> Robert Stavins also presents the argument that grandfathering is used for political control over distributional effects. Stavins, *supra* note 26, at 75.

<sup>336</sup> S. 2191, 110th Cong. § 3903(a)(2) (2007).

<sup>337</sup> S. 3036, 110th Cong. § 552 (2008).

#### 4. Controlling Entry and Exit by Firms

In general, Congress' climate change bill should avoid subsidies to new entrants by requiring new businesses to purchase their allowances on the open market. It is not clear why the bills provide a subsidy for new entrants in the manufacturing and electric power sectors by means of reserving allowances for that purpose. It is counterintuitive that new entrants, with new emissions, should not have to purchase allowances on the market, thereby bearing the full cost of their decision to enter the industry. The Bingaman-Specter bill set aside 4 percent of manufacturing allowances and 8 percent of all other industry allowances for new entrants.<sup>338</sup> The Lieberman-Warner bill also required that the allocation system set aside allowances for new entrants.<sup>339</sup>

All three bills made a similar mistake with respect to the exit from industry. The bills required that an entity that shuts down would have to return any allowances that were allocated for the post shutdown period.<sup>340</sup> This could cause inefficient firms to stay in business because they cannot recover the value of the emissions allowance asset, and would function as a type of tax on exiting production.

Unfortunately, the Manager's Amendment also propagated the mistaken subsidization of new entrants into manufacturing and electricity production.<sup>341</sup> The bill set aside 4 percent of allowances for new manufacturing companies and would presumably have set aside allowances for other types of new covered facilities through the allocation system development process.<sup>342</sup> To ensure appropriate incentives it will be necessary to exclude these types of subsidies from the final Congressional climate change bill.

#### 5. Low-Income Household Energy Assistance

Allowances that ease the economic burden of the climate change program on low-income families should be implemented carefully. All three bills included provisions for energy assistance in the form of allowances given to utilities, allowances auctioned for energy assistance programs, and auctions given to or sold to benefit the states. These allowances and the revenues from their auction need to be structured in a way that does not interfere with the market system to continue decreasing demand for electricity.

The Bingaman-Specter bill would have auctioned up to 5 percent of all

---

<sup>338</sup> S. 1766, 110th Cong. §§ 202-203 (2007).

<sup>339</sup> S. 2191, 110th Cong. §§ 3903-3904 (2007).

<sup>340</sup> S. 1766, 110th Cong. § 203 (2007); S. 2191, 110th Cong. § 3904(c) (2007); S. 3036, 110th Cong. § 542(h) (2008).

<sup>341</sup> S. 3036, 110th Cong. § 542 (2008).

<sup>342</sup> *Id.* (stipulating that 96 percent of allowances assigned for manufacturing companies would be distributed to existing companies).

allowances for energy assistance.<sup>343</sup> Half of the funds would be used for energy assistance for low-income individuals under the Low-Income Home Energy Assistance Act of 1981, through which the federal government subsidizes the electricity bills of low-income individuals. One-fourth of the funds would go to the Energy Conservation and Product Act Weatherization Assistance program. The remaining one-fourth of funds would go to a newly established Rural Energy Assistance Program, which would subsidize the energy bills in rural regions where electricity prices are more than 150 percent above the national average.<sup>344</sup> The design of these energy assistance programs would dull the price signal.

The Bingaman-Specter bill also provided energy assistance to consumers through the allowances it set aside for the states. Under Section 204, the Bingaman-Specter bill gave the states significant discretion over the use of allowances. These allowances may have been used “to mitigate impacts on low-income energy consumers,” “to avoid distortions in competitive electricity markets,” and “to mitigate impacts on energy-intensive industries in internationally competitive markets.” Given the level of discretion this language affords, there was potential that the states would use their allowances in a way that dulls the price signal.

The Lieberman-Warner bill would have auctioned up to 15 percent of annual allowances (by year 2050) for energy assistance,<sup>345</sup> a small increase from the 5 percent set aside under the Bingaman-Specter bill. Half of the funds would be used for energy assistance for low-income individuals under the Low-Income Home Energy Assistance Act of 1981. One-fourth of the funds would go to the Energy Conservation and Product Act Weatherization Assistance program. The remaining one-fourth of funds would go to a newly established Rural Energy Assistance Program.<sup>346</sup> The language used in the bill was identical to that found in the Bingaman-Specter bill, and as with that bill, these provisions could have interfered with market mechanisms designed to decrease demand for electricity.

The Lieberman-Warner bill would also have dedicated 10 percent of all allowances each year for electricity load-serving entities to provide rate relief and energy efficiency aid to consumers.<sup>347</sup> Under Section 3503, the Lieberman-Warner bill specified that these allowances could be used “to mitigate economic impacts on low- and middle-income energy consumers, including by reducing transmission charges or issuing rebates.” At the same time, this section of the bill would also prohibit electricity companies from issuing consumer rebates “based on the quantity of electricity used by the consumer.” This provision was likely intended to avoid giving customers a perverse incentive to increase their

---

<sup>343</sup> S. 1766, 110th Cong. § 201 (2007).

<sup>344</sup> *See id.* § 401.

<sup>345</sup> S. 2191, 110th Cong. §§3201, 4302 (2007).

<sup>346</sup> *See id.* § 4301.

<sup>347</sup> *See id.* § 3501.

rebate by increasing their consumption of electricity. However, the reduction in transmission charges also subsidizes and encourages consumption. It would be far more efficient to return funds to low- and middle-income families via tax rebates or reductions in their tax burden.

In addition to these provisions for low-income consumers, the Lieberman-Warner bill, like the Bingaman-Specter bill, set aside allowances for the states that could interfere with market mechanisms. Allowances given to the states could be used for a variety of purposes, including the mitigation of increased energy costs and alleviation of the impacts on energy-intensive industries.<sup>348</sup>

Again, the Manager's Amendment represented a compromise between its two predecessors, earmarking revenues from the auction of 3.5 to 15 percent of total annual allowances for energy assistance.<sup>349</sup> The Manager's Amendment corrected the funding mistakes of its predecessors by requiring funds from these auctions be used "to fund a tax initiative to protect consumers, especially consumers in greatest need, from increases in energy costs and other costs."<sup>350</sup> But the Manager's Amendment would also have subsidized consumer energy costs through the allowances it grandfathered for industry. Under Section 601, the Manager's Amendment set aside a substantial proportion of annual allowances for local distribution companies so they could mitigate the impacts of increased energy costs through decreased transmission charges or rebates, implementation of new technologies, or the development of demand response programs.<sup>351</sup> At a minimum, the decrease in transmission charges would dull the price signal, decreasing incentives for conservation.

In addition, the Manager's Amendment directed and earmarked between 10 and 18.75 percent of allowances for the states (Table 3).<sup>352</sup> These allowances may have been used to mitigate the impacts of increased energy costs on low-income consumers and energy-intensive industries.<sup>353</sup> If implemented improperly, the states' actions could interfere with market mechanisms so as to prevent the decreased demand for electricity that would accompany increased prices.

Some of the energy assistance provisions of the bills required or allowed mechanisms that would decrease the price of electricity faced by low-income families. While aiding the economically vulnerable segment of the population is

---

<sup>348</sup> *Id.*

<sup>349</sup> S. 3036, 110th Cong. § 582 (2008). The Manager's Amendment sets earmarks at 3.5 percent of total allowances for energy assistance in 2012 and up to 15 percent in years 2034 through 2050.

<sup>350</sup> *See id.* § 585.

<sup>351</sup> The term "demand response" is not defined in the bill, but likely refers to demand management via energy efficiency improvements.

<sup>352</sup> S. 3036, 110th Cong. §§ 602, 611, 613, 614 (2008). For example, in 2012 the Manager's Amendment would direct 7 percent of total allowances and auction 3 percent of total allowances for the states. By 2050, those numbers would increase to 14 percent of allowances directed to the states and 4.75 percent auctioned for this same purpose.

<sup>353</sup> *See id.* § 614.

an important consideration, it should be done by direct redistribution, decreased tax burdens, or other mechanisms that focus on disposable income. Even providing aid for energy efficiency and support for weatherization can be economically cost-effective. But keeping the price of electricity from fully reflecting the cost of allowances dulls the very price signal that leads to a decrease in electricity use and greenhouse gas emissions. Moreover, using an electricity price subsidy approach means that the supposed beneficiaries, low-income families, can only reap the benefits by consuming more electricity.

#### 6. Technological Development, Deployment, and the Lock-in Problem

The national climate change program should prevent over-investment in particular technologies that causes premature “lock-in” to those technologies. Both the Lieberman-Warner and the Bingaman-Specter bills provided substantial, sustained, and disproportionate incentives for CCS. However, such technological lock-in appeared to be limited in the Manager’s Amendment, which only dedicated between 1 and 4 percent of annual allowances for CCS and eliminates the 3.9 billion starting balance incorporated into the original Lieberman-Warner bill.

If CCS technology proves sufficiently promising for the future, the substantial commitment to CCS made in the first two bills might be warranted as a way to promote innovation and positive spillover effects. However, it is not yet clear that CCS is going to yield all the benefits that its proponents promise. If in the next decade it is found that the technology has undesirable environmental, technological, or economic characteristics, it will take an Act of Congress to end what is essentially subsidization. That may prove to be politically infeasible once an interest group has developed to protect that subsidy. For this reason, the U.S. Senate should be wary of any efforts to incorporate elements of the CCS programs of the Lieberman-Warner or Bingaman-Specter bills into the final climate change bill.

At the same time, it is important that the country invest in developing new, more cost-effective mechanisms for addressing energy efficiency, energy security, and greenhouse gas emissions. This requires a long-term sustained investment in the research and development capital – both physical and human – that sustains technological advances. In this area in particular, Congress should commit to sustained funding over as much as a twenty-year or longer horizon. Congress, however, should develop the program to maintain flexibility and not lock-in to specific technologies.

#### 7. Credits for Early Action

The final climate change bill should eliminate the credits for early action that were provided for in all three climate change bills. Early action is problematic for two reasons. First, it does nothing to change incentives because it will not

lead to more emissions reductions or carbon sequestration. Second, deciding which claimants are deserving of rewards will place a significant burden on the Administration. The programs specifically mentioned by the bills—the 1605(b) Voluntary Reporting Program, the Climate Leaders Program, and various state and private programs—have not led to particularly credible estimates of offset project accomplishments. The early action provisions in the bills should be dropped; they have little or no positive effects and will distract the government from effective implementation of more credible programs.

#### 8. Adaptive Measures

The United States' policy towards climate change should include complementary policies that encourage adaptive efforts. More so than its predecessors, the Manager's Amendment encouraged the States to use the allowances set aside for them to fund local adaptation measures such as relocation efforts, habitat protection, water projects, and health plans. It also encourages changes in individual consumption patterns by allowing the States to use their allowances for funding public transportation projects, supporting infrastructure for pedestrians and bicyclists, and developing recycling programs.<sup>354</sup> Additional emphasis on understanding and changing consumer behaviors and implementing appropriate adaptation policies will also be necessary to mount an effective response to climate change. However, such measures should be included in complementary policies, financed through the general budgeting process rather than being one of many options given to the States for use of a relatively small portion of annual allowances.

#### 9. Design Simplicity

In developing a final bill, Congress should strive for simplicity where possible. While the Manager's Amendment provided many advantages relative to its two immediate predecessors, it used an unnecessarily complicated mechanism to distribute allowances. Most notably, it used both direct allocation and earmarking to direct support to CCS, states, technology development, and adaptation. This multiplicity of mechanisms not only obfuscated the true impact of the bill, it also ran the risk of inviting the introduction of more and more provisions to fund special interests.

### VI. BORDER ADJUSTMENTS FOR LEAKAGE AND COMPETITIVENESS

Some argue that if the United States implements a national climate change policy while other countries do not, there will be counterproductive market responses to the change in the cost structure of U.S. companies. U.S. companies

---

<sup>354</sup> S. 3036, 110th Cong. §§ 6001-6007 (2008).

will have to bear the cost of emissions allowances whereas foreign producers will not. This will disadvantage U.S. products in both domestic and foreign markets, leading to increased imports and decreased exports. That disadvantage, in turn, may induce some companies to transfer their operations to other countries without greenhouse gas emissions regulation.<sup>355</sup> This result is particularly worrisome for stakeholders with interests in energy-intensive industries that engage in significant international trade or could be subject to substantial foreign competition.

The concern about the loss of U.S. industry competitiveness is compounded by the fact that a shift in production to overseas production facilities would decrease the effectiveness of the U.S. emissions policy. As productive activity shifts to countries that have not adopted comparable climate regulations, U.S. greenhouse gas emissions would decline, but global greenhouse gas emissions may actually increase. This is particularly true if these companies relocate to countries with less energy efficient production processes.<sup>356</sup>

As a result of these concerns – competitiveness and emissions leakage – there has been significant attention devoted to designing a border adjustment system<sup>357</sup> for the U.S. climate change program. This system would level the playing field for all companies engaged in the production of energy-intensive goods and prevent the migration of U.S. companies to countries without climate change regulation. Border adjustment policies, which found their way into all three versions of the U.S. Senate bill, present numerous challenges of interest to the policy analyst including environmental efficacy, cost-effectiveness, and political and legal constraints.

### *A. Provisions*

#### *1. Bingaman-Specter*

To “ensure that greenhouse gas emissions occurring outside the United States do not undermine the objectives of the United States to address global climate change” and “to encourage effective international action”<sup>358</sup> on climate change, the Bingaman-Specter bill categorized countries as “covered” or “excluded.”

---

<sup>355</sup> JULIA REINAUD, ISSUES BEHIND COMPETITIVENESS AND CARBON LEAKAGE: FOCUS ON HEAVY INDUSTRY 2, 31 (International Energy Agency 2008).

<sup>356</sup> *Id.*

<sup>357</sup> As will be discussed later in this section, border adjustment policies may generally take the form of grandfathered allowances to energy-intensive industries based on historical emissions, grandfathering based on output levels, an emission allowance requirement for imports, an exports rebate, or a full border adjustment for imports and exports. All three U.S. Senate bills include an international reserve allowance program, which requires importers to submit allowances to cover the emissions associated with their imported product. *See generally id.*; Carolyn Fischer & Alan K. Fox, *Comparing Policies to Combat Emissions Leakage: Border Tax Adjustments Versus Rebates* (Resources for the Future, Discussion Paper 02-09, Feb. 2009).

<sup>358</sup> S. 3036 110th Cong. § 502(f)(3)(B)(i)-(ii) (2008).



Excluded countries are those that the President, with the advice of an interagency group established under section 501(a)(1), determines have taken “comparable action”<sup>359</sup> to reduce greenhouse gas emissions,<sup>360</sup> have been identified by the United Nations as “among the least-developed developing countries”<sup>361</sup>, or that contribute an insignificant amount of global greenhouse gas emissions.<sup>362</sup>

All countries that are not excluded are covered. Beginning in 2020, importers of greenhouse gas intensive primary products<sup>363</sup> from covered countries would have to provide a declaration that the imported good is being accompanied by an appropriate number of international reserve allowances, foreign allowances, foreign credits, or credits for foreign offset projects or that the goods are exempt from the requirements.<sup>364</sup>

The President would determine the pricing and trading requirements for these international reserve allowances, which would come from a special pool of allowances separate from the domestic allowances.<sup>365</sup> The President would be charged with determining a pricing scheme for the international reserve allowances. This pricing scheme would ensure that the price of these special allowances would not exceed the market clearing price of domestic allowances or the program’s “Technology Accelerator Payment” price cap.<sup>366</sup> He would also be charged with designing “a trading system for the sale, exchange, purchase, transfer, and banking of international reserve allowances.”<sup>367</sup> Monies collected from the sale of the international reserve allowances would be deposited into the “International Energy Technology Development Fund” and used for technology transfer to developing countries.<sup>368</sup>

---

<sup>359</sup> See *id.* § 502(d)-(e).

<sup>360</sup> Under section 502(a)(2), comparable action is defined as being “comparable in effect to the action taken by the United States to limit greenhouse gas emissions. . . after taking into account the level of economic development of the foreign country.” Under section 502(d)(f)(4)(B)(ii), S.1766 clarifies “comparable action” to mean a program that “places a quantitative limitation on the total quantity of greenhouse gas emissions of the foreign country (expressed in terms of tons per year) and achieves that limitation through an allowance trading system,” “satisfies criteria that the President shall establish for key requirements related to the enforceability of the cap and trade program, including requirements for monitoring, reporting, verification, procedures, and allowance tracking,” and “is a comparable action.”

<sup>361</sup> S. 1766, 110th Cong. § 502(f)(3)(A)(ii) (2007).

<sup>362</sup> See *id.* § 502(f)(3)(A)(iii). Under section 502(f)(3)(C), the “de minimis” threshold is set at equal to or less than 0.5 percent of global greenhouse gas emissions, though the President is also allowed to consider annual deforestation rates in determining if a country falls below this threshold.

<sup>363</sup> Under section 502, primary products include “iron, steel, aluminum, cement, bulk glass, or paper” or “any manufactured product that is sold in bulk for purposes of further manufacture” and generates greenhouse gas emissions comparable to primary products.

<sup>364</sup> S. 1766, 110th Cong. § 502 (2007).

<sup>365</sup> See *id.* § 502(f)(4).

<sup>366</sup> *Id.* As will be discussed further in Section III on cost-containment, the Bingaman-Specter bill sets a price cap for allowances to limit the compliance costs of the legislation.

<sup>367</sup> See *id.* § 502(f)(4)(A)(v).

<sup>368</sup> See *id.* § 502(f)(4)(A)(vii).

In addition, the President would be responsible for determining the appropriate number of international reserve allowances that must be submitted for the importation of each type of primary product from each foreign country. During the initial compliance year of 2020, the President would take into consideration the following factors: whether the production of a primary product is more energy intensive in a particular country than in the average production process; the quantity of goods produced in the country that year; the number of allowances grandfathered to the domestic industry sector in relation to the domestic emissions for that industry sector; and the economic development of the country from which the goods were imported.<sup>369</sup> In subsequent compliance years, the President would also consider the number of domestic allowances issued under section 201,<sup>370</sup> the extra number of allowances issued due to compliance costs exceeding the TAP,<sup>371</sup> and any other factors deemed relevant.<sup>372</sup>

Because of the challenges associated with this type of legislation, the President would be given considerable discretion in adapting the international reserve allowance requirements to achieve its policy objectives and to conform with international law. The President would have the authority to adjust the international reserve allowance requirements if they were found to conflict with international agreements.<sup>373</sup> Beginning in 2023 and each year thereafter, the President would report to Congress on whether the international reserve allowance requirements were achieving their objectives and be required to make any necessary adjustments to the program.<sup>374</sup>

It is important to note that certain importers of fuel and chemicals would be covered through a separate provision in the Bingaman-Specter bill. Importers of petroleum products, coke, natural gas, as well as non-fuel chemicals and chemical products (hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrous oxide) would be covered under the domestic cap-and-trade program.<sup>375</sup> Under section 301, entities that export non-fuel chemicals and covered fuels would be granted credits for the emissions associated with their products.<sup>376</sup> Thus, fuels and chemicals would already be subject to a type of full border adjustment under the Bingaman-Specter bill.

The Bingaman-Specter bill would also assist companies that produce energy-intensive products by grandfathering allowances to them in the early years of the climate change program. As mentioned in the previous section, the Bingaman-

---

<sup>369</sup> S. 1766, 110th Cong. § 502(f)(6)(A)-(C) (2007).

<sup>370</sup> *See id.* § 201 (establishing the allocation rules for the domestic emissions allowances).

<sup>371</sup> *See id.* § 102(a)(2).

<sup>372</sup> *See id.* § 502(f)(6)(D).

<sup>373</sup> *See id.* § 502(f)(7).

<sup>374</sup> *See id.* § 502(g)(1-3).

<sup>375</sup> *See* S. 1766, 110th Cong. § 3(6)(A)(iv)-(v) (2007).

<sup>376</sup> *See id.* § 301(c)-(d).

Specter program would give away 53 percent of allowances in 2012 to covered entities, though that number would decrease to 25 percent by 2030 and down to 0 by 2043.<sup>377</sup> Each year, the following industry sectors producing greenhouse gas intense primary products would receive a portion of these allowances:

<b>Industry</b>	<b>Percent Allowances to Industry</b>
<i>Refining</i>	7
<i>Nonfuel Entities</i>	4
<i>Carbon-intensive Manufacturing</i>	19
Natural Gas	4
Coal	12
Electric Power	54

The distribution of allowances to carbon-intensive manufacturing companies that produce “iron, steel, aluminum, pulp, paper, cement, chemicals, or such other products as the President may determine” was based on historical emissions levels and employment relative to other firms in the same sector.<sup>378</sup> Companies in other sectors would receive allowances based on historical emission levels.<sup>379</sup> Grandfathered allowances would have to be returned if a company shut-down.<sup>380</sup>

## 2. Lieberman-Warner

The Lieberman-Warner bill included a provision for an international reserve allowance program similar to that in the Bingaman-Specter bill. Beginning on January 1, 2019, the EPA Administrator would begin selling international reserve allowances to importers of greenhouse gas intensive primary products.<sup>381</sup> These international reserve allowances would be in addition to the allowances

<sup>377</sup> See *id.* § 201.

<sup>378</sup> See *id.* § 203.

<sup>379</sup> See *id.* § 202. For non-fuel entities and refining companies, allocation to individual facilities would be based on their emissions relative to eligible existing facilities during the time period from January 1, 2004 through December 31, 2006.

<sup>380</sup> See *id.* §§ 202–203.

<sup>381</sup> S. 2191, 110th Cong. § 6001(5), (10) (2007). Under section 6001(5), the Lieberman-Warner bill defines a “covered good” as a primary product that “generates, in the course of the manufacture of the good, a substantial quantity of direct greenhouse gas emissions and indirect greenhouse gas emissions” and “is closely related to a good the cost of production of which in the United States is affected by a requirement of this Act.” Under section 6001(10), the bill clarifies the meaning of “primary product,” defining it as “iron, steel, aluminum, cement, bulk glass, or paper” or some other type of manufactured product that “is sold in bulk for purposes of further manufacture” and produces greenhouse gas emissions “comparable (on an emissions-per-dollar basis) to emissions generated in the manufacture of products by covered facilities in the industrial sector.”

provided for domestic emissions. The price of these allowances would not exceed the market clearing price for domestic allowances under the cap.<sup>382</sup> The proceeds from the sale of international reserve allowances would be used to mitigate the impacts of climate change in developing countries.<sup>383</sup>

Companies importing such greenhouse gas intensive products would be required to submit enough international reserve allowances, foreign allowances, foreign credits, or credits for international offset projects to cover the emissions of the covered product.<sup>384</sup> The EPA Administrator would create a general formula for determining the number of international reserve allowances that must be submitted for each product in each country. The formula would be based on the following factors: whether the production of a particular primary product in a particular foreign country is more greenhouse gas intensive than in the average production process; the amount of the particular covered good produced in the country that year; the number of allowances grandfathered to the domestic industry sector that manufactures the particular good in relation to the domestic emissions for that industry sector; and the economic development of the country from which the goods were imported.<sup>385</sup>

Exemptions from this provision would be granted to countries for the following reasons: (1) The country has taken actions comparable to those of the United States to limit greenhouse gas emissions;<sup>386</sup> (2) the country has been identified by the United Nations as one of the “least-developed of developing countries”;<sup>387</sup> or (3) the country’s greenhouse gas emissions account for less than 0.5 percent of global greenhouse gas emissions, after accounting for the country’s deforestation rates.<sup>388</sup>

Like the Bingaman-Specter bill, the Lieberman-Warner bill granted considerable discretion to the executive branch. The EPA Administrator would have the authority to adjust the international reserve allowance program, with the advice of the Secretary of State, to ensure the policy complies with international agreements.<sup>389</sup> Beginning in 2023 and every year thereafter, the President would review the program and make any necessary adjustments to achieve the purposes of the program.<sup>390</sup>

<sup>382</sup> See *id.* § 6006(a)(3).

<sup>383</sup> See *id.* § 6006(a)(7).

<sup>384</sup> See *id.* § 6006.

<sup>385</sup> See *id.* § 6006(d).

<sup>386</sup> See *id.* §§ 6004, 6005, 6006(c)(4)(B)(i). “Comparable action” is determined by the President, with the advice of an interagency group. This determination considers the following factors: whether the program places a quantitative limit on greenhouse gas emissions through a cap-and-trade system; utilizes appropriate monitoring and enforcement measures; and amounts to actions comparable to that of the United States (§ 6006).

<sup>387</sup> See S. 2191, 110th Cong. § 6006(c)(4)(B)(ii) (2007).

<sup>388</sup> See *id.* § 6006(b)(2)(B).

<sup>389</sup> See *id.* § 6006(g).

<sup>390</sup> See *id.* § 6007.

The Lieberman-Warner bill would also assist companies that produce energy-intensive products by grandfathering allowances to them in the early years of the climate change program. As mentioned in the earlier discussion of distribution of allowances, the Lieberman-Warner program would have given away 40 percent of allowances in 2012 to covered entities, though that number would decrease to 2 percent by 2035 and down to zero in later years.<sup>391</sup> Each year, the industrial firms would receive 50 percent of the allowances grandfathered to covered entities (equivalent to 20 percent all allowances in 2012, declining to 1 percent in 2035).<sup>392</sup> Allowances would be distributed to carbon-intensive manufacturing firms based on historical emissions relative to other manufacturing companies during the three years prior to enactment of the bill.<sup>393</sup> Grandfathered allowances would have to be returned if a company shut-down.<sup>394</sup>

Unlike the Bingaman-Specter bill, the Lieberman-Warner proposal was unclear regarding how exports would be handled, although imports of transportation fuels and non-fuel chemicals appear to have been covered under the bill. Entities that produce or import petroleum- or coal-based transportation fuels or non-fuel chemicals in quantities sufficient to emit more than 10,000 metric tons of carbon dioxide equivalent annually would be required to report the amount of emissions that will result from the use of their products.<sup>395</sup> Under section 1104, the bill charged the EPA Administrator with determining methods for reporting greenhouse gas emissions for “fossil fuel production, refining, importation, exportation, and consumption.” Although receiving credits for the emissions associated with exports is not specifically mentioned in the bill, the EPA Administrator could decide to include such a provision in the detailed regulations.

### 3. Manager’s Amendment

“[T]o promote a strong global effort to significantly reduce greenhouse gas emissions,” “to ensure, to the maximum extent practicable, that greenhouse gas emissions occurring outside the United States do not undermine the objectives of the United States in addressing global climate change,” and “to encourage effective international action,”<sup>396</sup> the Manager’s Amendment established an international reserve allowance program that was scheduled to begin in 2014.<sup>397</sup>

As with the other bills, companies that import covered greenhouse gas intensive products would have to submit international reserve allowances,

---

<sup>391</sup> See *id.* § 3901.

<sup>392</sup> *Id.*

<sup>393</sup> See S. 2191, 110th Cong. § 3904 (2007).

<sup>394</sup> *Id.*

<sup>395</sup> See *id.* § 4.

<sup>396</sup> S. 3036, 110th Cong. § 1302 (2008).

<sup>397</sup> See *id.* § 1306(c).

foreign allowances, foreign credits, or credits from international offset projects to cover the emissions from the product.<sup>398</sup> The EPA Administrator was charged with developing a trading system for the international reserve allowances. The Administrator would also be charged with determining a method to establish prices for the allowances. The method would involve setting the international reserve price equal to the average of the three “leading publicly reported daily price indices” from the preceding day. The proceeds from the sale of international reserve allowances would be used to mitigate climate change in developing countries.<sup>399</sup> Exceptions would be granted for products imported from countries that have taken comparable action to combat climate change, that are considered by the United Nations as among the “least developed” of developing countries, or fall below the *de minimis* threshold based on their contributions to global greenhouse gas emissions.<sup>400</sup>

The Manager’s Amendment extended the range of covered goods. Whereas both the Bingaman-Specter and Lieberman-Warner bills covered only primary products, the Manager’s Amendment covered each primary product<sup>401</sup> and any “manufactured item for consumption” that results in significant greenhouse gas emissions and “is closely related to a good the cost of production of which in the United States is affected by a requirement of this Act.”<sup>402</sup> The International Climate Change Commission, in consultation with the EPA Administrator, would determine which manufactured items it would regulate based on administrative feasibility and necessity to achieving the objectives of the international reserve allowance requirements.<sup>403</sup>

The Manager’s Amendment included a more stringent test for determining comparable action than its predecessors. First, the International Climate Change Commission would determine if the foreign country achieved greenhouse gas emissions reductions equal to or greater than that of the United States for the time period in question.<sup>404</sup> If the country did not meet this requirement, the Commission would next consider whether the country began using “state-of-the-art technologies” and implemented regulations in an effort to limit greenhouse gas emissions.<sup>405</sup> The Manager’s Amendment also required a more stringent test for the *de minimis* threshold. To be considered exempt from the international reserve allowance provisions, a country must account for less than 0.5 percent of global greenhouse gas emissions, both when accounting for and excluding

---

<sup>398</sup> See *id.* § 1306(a), (e).

<sup>399</sup> See *id.* § 1306(a).

<sup>400</sup> See *id.* § 1306(b).

<sup>401</sup> See *id.* § 1301(15) (expanding the range of primary products to include “iron, steel, steel mill products (including pipe and tube), aluminum, cement, glass (including flat, container, and specialty glass and fiberglass), pulp, paper, chemicals, or industrial ceramics.”).

<sup>402</sup> See S. 3036, 110th Cong. § 1301(7) (2008).

<sup>403</sup> See *id.* § 1301(13).

<sup>404</sup> See *id.* § 1301(4)(B)(i).

<sup>405</sup> See *id.* § 1301(4)(B)(ii).

deforestation rates.<sup>406</sup>

The Manager's Amendment included some additional documentation requirements to prevent gaming of the system. The declaration for imported goods must identify each country an imported good was processed in, what level of processing occurred in each country, and an estimate of the number of international reserve allowances required for the good's importation. The importer may either submit the estimated number of international reserve allowances, foreign allowances, foreign credits, or credits for international offset projects required or deposit a bond, security, or cash to cover the estimated number of allowances required for the good's importation. Within 180 days of the importation, the EPA Administrator would make a final determination regarding the number of international reserve allowances required for the good's importation. The importer must submit additional money or allowances within 14 days of this determination. If extra allowances or money were deposited with the Bureau of Immigration and Customs Enforcement, then any additional allowances or funds would be refunded to the importer.<sup>407</sup>

The methodology used for determining international reserve allowances required for product importation was improved to limit fraud and to conform with international treaties. The calculation method for products processed in one country would consider the following factors: the average greenhouse gas intensity of the category of goods within the country; the number of allowances grandfathered to United States' companies in that sector; the extent to which the country has used state-of-the-art environmental technologies and made attempts to limit greenhouse gas emissions. The bill provided the EPA Administrator with authority to establish different allowance calculation methods for products processed in more than one foreign country. This generally requires the importer to submit the highest number of allowances applicable to any of the countries the product was processed in; however, an importer would have an opportunity to request adjustments to these requirements through an administrative hearing.<sup>408</sup>

The International Climate Change Commission was charged with reporting to the President and Congress if any changes were necessary to achieve the objectives of the international reserve allowances program. The Commission could recommend a change in the stringency of the provisions or make recommendations for improved compliance with international agreements. The EPA Administrator and the Commission were also charged with working together to develop regulations that ensure the effectiveness of the international reserve allowance provisions.<sup>409</sup>

The Manager's Amendment allowed for adjustments for the import and

---

<sup>406</sup> See *id.* § 1306(b)(2)(B)(i).

<sup>407</sup> See *id.* § 1306(c).

<sup>408</sup> See S. 3036, 110th Cong. § 1306(d) (2008).

<sup>409</sup> See *id.* § 1307.

export of natural gas, petroleum- and coal-based fuels, and some non-fuel chemicals. Entities that import natural gas, petroleum- and coal-based fuels, and non-fuel chemicals in quantities sufficient to emit more than 10,000 metric tons of carbon dioxide equivalent annually would be required to cover the emissions associated with these products.<sup>410</sup> The Manager's Amendment provided credits for the emissions associated with exported fuels or non-fuel (non- HFC) chemicals from covered entities.<sup>411</sup> It also called for the development of a parallel regulatory program that would regulate HFCs produced in or imported into the United States and provide credits for HFCs exported to other countries.<sup>412</sup>

As with its predecessors, the Manager's Amendment grandfathered allowances to affected entities to prevent carbon leakage. The Manager's Amendment allocated 44.5 percent of allowances to industry in 2012, declining to 13.5 percent in 2050.<sup>413</sup> In 2012, 25 percent of the allowances given to industry would be given to manufacturing companies and 4 percent of these allowances would be given to refineries. The remaining 71 percent of industry allowances would go to natural gas processing plants and electric generation facilities.<sup>414</sup> Allowances intended for producers of petroleum- and coal-based fuels would be distributed to individual firms based on their relative historical emissions during the three years preceding enactment of the legislation.<sup>415</sup> In the initial compliance year allowances would be distributed to individual companies that manufacture "iron, steel, pulp, paper, cement, rubber, chemicals, glass, ceramics, sulfur hexafluoride, or aluminum and other nonferrous metals" based on their relative emissions for the three years prior to enactment of the bill. Within a year of the bill's enactment, however, the EPA Administrator is to present a proposal regarding the feasibility of distributing allowances to individual manufacturing firms based on "energy-intensity."<sup>416</sup> Facilities that shut down have to relinquish their allowances.<sup>417</sup>

### *B. Discussion and Recommendations*

As a normative matter, the goal of border adjustments should be to ensure that both U.S. and foreign energy-intensive industries most subject to international trade competition will experience similar changes in their cost structures as they compete in U.S. and foreign markets. This will do the most to preserve pre-

---

<sup>410</sup> See *id.* § 202.

<sup>411</sup> See *id.*

<sup>412</sup> See *id.* § 1501.

<sup>413</sup> S. 3036, 110th Cong. §§ 541, 551, 561, 571, 601 (2008).

<sup>414</sup> See *id.* §§ 541, 551, 561, 571, 601. For additional detail, please see RICHARDS & RICHARDS, *supra* note 22, at 52 tbl.5.

<sup>415</sup> See S. 3036, 110th Cong. § 561 (2008).

<sup>416</sup> See *id.* § 542. The term 'energy intensity' is not defined in the language of the bill.

<sup>417</sup> See *id.* § 541.



regulatory competitive positions, while also providing appropriate protection against emissions leakage. However, the design of the border adjustment mechanism must account for both international legal constraints and implementation costs.

The border adjustment policies included in the three bills differed in ways that affect their environmental efficacy, implementation costs, and legal/political feasibility (Table 5). To explore the merits of the approaches adopted in the three Senate bills, we first consider generally the basic mechanisms for border adjustments and how each would affect the cost structure of domestic and foreign firms. Then we review the constraints imposed by the World Trade Organization (WTO) on nations' trade restrictions. We continue with a more detailed discussion of the bills' allowance pools for imports, stated legislative purposes, covered products, allowance price and requirements, regulatory exceptions, and commitment to international negotiations to consider how those provisions impact environmental efficacy, cost-effectiveness, and political and legal constraints.

### 1. Policy Options and their Relative Merits

There are generally five different policy options for addressing leakage and competitiveness issues. Each would apply only to energy intensive industries subject to significant international trade competition.

#### *Grandfathering of allowances*

The first option for addressing leakage issues is grandfathering allowances, based on historical emissions, to sectors at risk for carbon leakage and adverse competitiveness effects.<sup>418</sup>

#### *"Home Rebate"*

The "home rebate" for domestic industries is a subsidy in the form of allowances or payments<sup>419</sup> sufficient to eliminate or compensate all allowance-related costs of production for both domestic and export markets. This "home rebate" is updated annually on the basis of output so allocations rise and fall with level of production.<sup>420</sup>

#### *Adjustment for imports*

An import adjustment places a tax or an allowance requirement on imported goods as a means of internalizing the environmental damage caused by the

---

<sup>418</sup> REINAUD, *supra* note 355, at 79.

<sup>419</sup> The home rebate could also take the form of an exemption from the allowance requirements for the program.

<sup>420</sup> See REINAUD, *supra* note 355, at 79 (referring to this mechanism as an "output based grandfathering of allowances"). See also Fischer & Fox, *supra* note 357, at 13.

production of carbon.<sup>421</sup> Under the U.S. cap-and-trade proposals, the import adjustments have taken the form of international reserve allowance requirements to mirror their domestic counterpart.

#### *Adjustment for exports*

An export adjustment involves giving credit to domestic companies who export greenhouse gas intensive products, essentially removing them from the cap requirements.<sup>422</sup>

#### *Full border adjustment*

A full border adjustment would combine the import and export proposals mentioned above. Thus, any covered goods sold in the United States, whether from domestic or foreign production, would have to internalize the cost of emissions allowances. At the same time, the same goods sold outside the United States would not require allowances – exports from the United States would receive a rebate or subsidy equal in value to the allowances required for their production.<sup>423</sup>

To address both leakage and competitiveness, the primary goal of a border adjustment mechanism is, at least ostensibly, to assure that U.S. produced goods compete with foreign produced goods on an equal basis. This means either both are required to incorporate the cost of allowances or neither are. There are three basic observations that drive the optimal design of border adjustments. First, the United States obviously cannot require that foreign goods, produced and sold in foreign markets, incorporate the costs of emissions allowances. Therefore, in those markets, energy intensive goods produced in the United States for export need to have their emissions-related costs covered by grandfathered allowances, home rebates, or export border adjustments.<sup>424</sup>

Second, for sale of energy intensive goods in U.S. markets, comparable total costs can be maintained by requiring that both domestic and imported goods incorporate the cost of emissions allowances or by exempting both domestic and imported goods. The former can be achieved with tariffs or emissions allowance requirements for imports and no grandfathering of allowances or home rebates for domestic production. The latter can be achieved by complete grandfathering or home rebates for domestic goods and no border adjustment for imports.

The third observation is that the choice between grandfathering allowances and the home rebate approach matters in maintaining comparable cost

---

<sup>421</sup> Joost Pauwelyn, *U.S. Federal Climate Policy and Competitiveness Concerns: The Limit and Options of International Trade Law* 10 (Nicholas Inst., Duke Univ., Working Paper 07-02, 2007); Fischer & Fox, *supra* note 357.

<sup>422</sup> Fischer & Fox, *supra* note 357, at 12.

<sup>423</sup> *Id.* at 12-13.

<sup>424</sup> We discuss below why the home rebate is preferable to the grandfathered allowances.

structures.<sup>425</sup> If, for example, the amount of allowances grandfathered is based on production levels from a year prior to the enactment of the legislation, then nothing the domestic energy intensive firms do will change the amount of allowances they are given. Whether they increase or decrease production for exports, they will receive the same amount of allowances. Alternatively, if the number of allowances given to exporting firms is based on recent production levels, updated each year as it is under the home rebate approach, then firms that increase their share of exports following passage of the climate legislation receive increasing relief. Grandfathering based on a fixed, pre-legislation date, is effectively a lump sum transfer, and any benefits would be purely inframarginal. Home rebate based on current or recent production levels affects marginal costs. The home rebate approach keeps the cost structure for domestic and foreign producers comparable. Whereas under the grandfathered approach domestic firms receive, in essence, a lump sum transfer but pay marginal costs for allowances, foreign producers have no marginal costs for production.<sup>426</sup>

Based on these three observations, there are two systems that preserve comparable cost structures for domestic and foreign firms – (1) a “home rebate” and (2) full border adjustment.<sup>427</sup> The primary difference between these two approaches is that the latter would impose the cost of allowances on both domestic and foreign goods sold in the domestic market, whereas the former would exempt both from those costs. Neither system would impose those costs on goods sold in foreign markets.

Combining this observation with the recommendations for auction of all allowances<sup>428</sup> favors a system in which the sale of any energy intensive goods imported to the United States or exported from the country to markets in covered countries<sup>429</sup> will be subject to full border adjustment. This means that domestic producers of energy-intensive goods do not receive grandfathered allowances for their entire production. Instead, they are given rebates equal to the value the allowances required for production of their exports. Importers of energy-intensive goods have to buy allowances or pay a fee equal to the cost of allowances sufficient to cover the emissions from the production of goods imported to the United States.

---

<sup>425</sup> Fischer & Fox, *supra* note 357, at 7.

<sup>426</sup> *Id.* at 5-6.

<sup>427</sup> While these two options represent the “pure” form of the mechanisms, there is also the possibility of partial home rebates with partial border adjustments. However, there is very little policy justification for that choice.

<sup>428</sup> In other sections of the paper, we have noted several challenges associated with grandfathering allowances to industry, such as interference with the price signal, differential impact on regulated/deregulated states, and the inevitable lobbying that would occur if the issue is politicized.

<sup>429</sup> That is, countries that have not taken comparable actions, are not *de minimis* in emissions levels, and are not among the least developed of developing countries.

## 2. Legal Considerations

Any time a country considers border adjustments it must also consider potential challenges to the policy under prevailing international trade agreements. In the case of climate legislation, the United States may have to defend its border adjustment practices against a WTO challenge.

The border adjustment measures that have been proposed to resolve environmental and competitive issues could be limited by legal constraints. Article III of the General Agreement on Tariffs and Trade prohibits member states from applying taxes to foreign products that are not applied to similar domestic products.<sup>430</sup> Additionally, Article I of GATT prohibits a member state from providing preferential treatment to one Most Favored Nation over another.<sup>431</sup> Of course, exceptions may be granted if the trade restrictions are found necessary “to protect human, animal or plant life or health”<sup>432</sup> or an “exhaustible natural resource.”<sup>433</sup> Therefore, any border adjustment measures included in the U.S. climate change program will need to be carefully crafted to ensure they will pass muster before the World Trade Organization.

If a challenge is made, the United States would likely first try to argue that the provision does not represent an unfair trade restriction disallowed by Article III (National Treatment) or Article I (Most Favored Nation Status) of GATT.<sup>434</sup> In making such a determination, WTO has in the past considered the following factors: “1) the properties, nature and quality of the products; 2) the end-uses of the product; 3) consumers’ perceptions and behavior in respect of the products; and 4) the tariff classification of the products.”<sup>435</sup> To this end, the WTO will likely consider: whether domestic companies received allowances for free; whether the cost of the international reserve allowances is comparable to domestic allowances; if the allowance calculations are based on emissions-intensity or, instead, discriminate against a company based on national origin; whether an adjustment is made to international reserve allowance requirements based on free allocation of domestic allowances; and whether some Most Favored Nations are given preferential treatment to others.<sup>436</sup>

Even if WTO finds that the policy constituted an unfair restriction on trade, it could still be upheld if WTO finds the restriction was “necessary to protect

---

<sup>430</sup> General Agreement on Tariffs and Trade, art. III, § 2, available at [http://www.wto.org/english/docs\\_e/legal\\_e/gatt47\\_01\\_e.htm](http://www.wto.org/english/docs_e/legal_e/gatt47_01_e.htm).

<sup>431</sup> *Id.*, art. I, § 4.

<sup>432</sup> *Id.*, art. XX(b).

<sup>433</sup> *Id.*, art. XX(g).

<sup>434</sup> Article III of the General Agreement on Tariffs and Trade prohibits member states from applying taxes to foreign products that are not applied to similar domestic products. Additionally, Article I of GATT prohibits a member state from providing preferential treatment to one Most Favored Nation over another.

<sup>435</sup> Harro van Asselt, Thomas Brewer & Michael Mehling, *Addressing Leakage and Competitiveness in US Climate Policy* 49 (Climate Strategies, Working Paper, Mar. 5, 2009).

<sup>436</sup> *Id.*

human, animal or plant life or health”<sup>437</sup> or “relating to the conservation of exhaustible natural resources.”<sup>438</sup> To justify an exception under Article XX(b), the U.S. will have to demonstrate a “rational connection” between the policy and its environmental objective. For example, the U.S. could argue that the measure will either provide an incentive for other countries to reduce their emissions or prevent migration of U.S. companies to countries without climate change regulations. It is not necessary to establish a precise causal relationship.<sup>439</sup> Even if the U.S. is unable to meet the burden of proof required under Article XX(b) for an environmental exception, the U.S. can try for an exception under Article XX(g), which requires satisfying the following legal test: 1) Is the atmosphere an “exhaustible natural resource”?; 2) Is the policy related to the “exhaustible natural resource” it is meant to protect?; and 3) Is there a sense of “evenhandedness” to the measure?<sup>440</sup>

If the WTO considers the policy for an Article XX(b) or (g) environmental exception, it will apply the following test to determine if the trade restriction is a “means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade”:<sup>441</sup>

- Does the legislation account for different local circumstances?
- Has the U.S. participated in “serious, across-the-board negotiations with the objective of concluding bilateral or multilateral agreements?”
- Does the policy respect the ideals of “basic fairness and due process?”
- Does the policy include provisions that run counter to its stated environmental objective?

Given the significant legal constraints placed on the resolution of this issue, it is important to keep the WTO process in mind while reviewing the various provisions of the U.S. Senate proposals.

### 3. Comparison of the Bills

Given the recommendation for full border adjustment, coupled with the considerations necessary to pass legal muster with the WTO, it is now possible to evaluate the specific characteristics (Table 5) as well as the relative merits of the three Senate bills with regard to environmental efficacy, cost-effectiveness, and political and legal constraints.

With respect to the choice of basic mechanism, all three bills used some form

---

<sup>437</sup> General Agreement on Tariffs and Trade, art. XX(b), available at [http://www.wto.org/english/docs\\_e/legal\\_e/gatt47\\_01\\_e.htm](http://www.wto.org/english/docs_e/legal_e/gatt47_01_e.htm).

<sup>438</sup> *Id.*, art. XX(g).

<sup>439</sup> van Asselt, Brewer & Mehling, *supra* note 435, at 52-53.

<sup>440</sup> *Id.* at 53.

<sup>441</sup> *Id.* at 54-57.

of partial grandfathering allowances with partial import adjustments. As discussed above, grandfathering of allowances based on pre-legislation levels of production is less effective than the home rebate in maintaining comparable cost structures between domestic and foreign producers. Furthermore, numerous scholars have also pointed out that the grandfathering of allowances may appear to be an unfair subsidy for domestic companies, which could result in a WTO challenge under GATT Article III.<sup>442</sup> Moreover, the home rebate coupled with no border adjustment puts domestic consumption in covered industries outside the cap, running contrary to the earlier conclusion that broader coverage is generally better. For these reasons, grandfathering of allowances should be eliminated from the final climate change bill and a full border adjustment for any goods found to be a significant source of leakage should be employed instead.

The international reserve allowance provisions of all three bills were similar, though the provisions evolved into their most stringent and clear form in the Manager's Amendment. Each bill also created a separate pool of international reserve allowances for importers, thus putting emissions associated with imports of energy-intensive goods outside the cap. Each bill would require importers of greenhouse gas intensive products to purchase international reserve allowances or submit alternative allowances/credits to cover the emissions associated with the production of these imported goods.

As illustrated in Table 5, the Manager's Amendment program would be implemented much sooner than that of the other two U.S. Senate bills. The Manager's Amendment covered primary products as well as manufactured items. All three bills established a price cap for the international reserve allowances that was based on the market clearing price for domestic allowances. The Manager's Amendment included the most stringent tests for "comparable action" and "*de minimis*" emissions. The Manager's Amendment attempted to limit gaming of the system by differentiating between products processed in one versus multiple countries. The Manager's Amendment also set up a more thoughtful declaration system, which would allow regulated companies to deposit allowances, credits, bonds or other securities, or cash with U.S. Customs until the number of international reserve allowances required for a good's importation is determined. The Bingaman-Specter bill and the Manager's Amendment both regulated petroleum- and coal-based fuels and non-fuel chemicals in a manner that required the submission of domestic allowances for imports and credits for exports. The Lieberman-Warner bill was less precise on this issue. All three bills grandfathered allowances to industries as a means of reducing leakage.

---

<sup>442</sup> van Asselt, Brewer & Mehling, *supra* note 435, at 52-53.

#### 4. Separate Pool of International Reserve Allowances

All three U.S. Senate bills set aside a separate pool of international reserve allowances.

If the eventual international reserve allowance system requires the purchase of allowances, it will be necessary to determine whether the allowances come from the pool of allowances under the cap or from a separate pool created specifically for imports. Even assuming that the price of the reserved allowances is based on the market price of allowances under the cap, the choice could be significant from the perspective of environmental efficacy. Having a separate reserved pool allows higher total emissions than if importers are required to purchase allowances under the cap. Moreover, if the allowances are from a separate reserved pool, the purchase of those allowances does not drive up the price of the allowances under the cap. In contrast, if importers have to purchase allowances under the cap, the greater the imports of energy-intensive goods, the higher will be the price of allowances under the cap as importers raise the demand for those allowances.

It is largely a matter of politics whether importers subject to import adjustments buy their allowances from a special reserve or allowances outside the cap or from the same allowance market in which their domestic counterparts participate. To avoid artificial price setting and to keep all U.S. consumers' emissions, both direct and indirect, under one cap, it may be preferable to have importers buy allowances from the domestic market.

#### 5. Stated Purposes for International Reserve Allowance Provisions

All three U.S. Senate bills cited concerns with carbon leakage as the reason for the border adjustments, which could help the adjustments pass WTO muster. Even if the border adjustment system was found to violate certain provisions of GATT, it may still be upheld if the trade restriction is deemed necessary on environmental grounds. The Bingaman-Specter bill stated that the purpose of the international reserve allowance provision was to "ensure that greenhouse gas emissions occurring outside the United States do not undermine the objectives of the United States to address global climate change" and "to encourage effective international action."<sup>443</sup> Similarly, the Lieberman-Warner bill stated that its border adjustment provisions were "to promote a strong global effort to significantly reduce greenhouse gas emissions" and "to ensure...that greenhouse gas emissions occurring outside the United States do not undermine the objectives of the United States in addressing global climate change."<sup>444</sup> Finally, the Manager's Amendment cited the U.S. Senate's desire "to promote a strong global effort to significantly reduce greenhouse gas emissions," "to

---

<sup>443</sup> S. 1766, 110th Cong. § 502(b)(1) (2007).

<sup>444</sup> S. 3036, 110th Cong. §§ 6002(1)-(2) (2008).

ensure. . . that greenhouse gas emissions occurring outside the United States do not undermine the objectives of the United States in addressing global climate change,” and “ to encourage effective international action.”

The reported purposes of the bill will certainly prove critical in a WTO hearing as countries are allowed to establish trade restrictions to protect the environment.<sup>445</sup> As mentioned previously, Article XX(b) of GATT allows trade restrictions “necessary to protect human, animal or plant life or health.” Article XX(g) allows restrictions for the protection of an “exhaustible natural resource.” Although there are clearly environmental and non-environmental reasons for this program, van Asselt et al. suggest that the “hidden” reasons for the measure would not be considered at a WTO hearing as long as there is a rational connection/relation between the policy and its purported objective.<sup>446</sup> To this end, the United States would need to argue that the policy will provide an incentive for companies in other countries to reduce their emissions or discourage domestic companies from moving overseas to countries without national climate change policies.<sup>447</sup> Their cause would certainly be aided by a statement of environmental purpose, such as those provided in the three U.S. Senate proposals.

#### 6. Covered Products

The breadth of border adjustments, i.e., which products are covered and from which nations, needs to be determined by a careful balancing of the drive to limit leakage and preserve competitiveness versus the implementation and administration costs. Determining the amount of emissions that each imported or exported good for which each imported or exported good is responsible will be a demanding process. It should only be required for goods that are both energy intensive and actually (or potentially) subject to a great deal of international trade activity.

The Manager’s Amendment significantly expanded the range of covered products: The Bingaman-Specter and Lieberman-Warner bills covered only greenhouse gas intensive primary products. Both the Bingaman-Specter bill and Lieberman-Warner bill defined “primary product” as iron, steel, aluminum, cement, bulk glass, paper, and any other product that will be manufactured further but generates significant greenhouse gas emissions.<sup>448</sup> The Manager’s Amendment expanded the specific definition of primary products to include “iron, steel, steel mill products (including pipe and tube), aluminum, cement, glass (including flat, container, and specialty glass and fiberglass), pulp, paper,

---

<sup>445</sup> General Agreement on Tariffs and Trade art. XX, available at [http://www.wto.org/english/docs\\_e/legal\\_e/gatt47\\_01\\_e.htm](http://www.wto.org/english/docs_e/legal_e/gatt47_01_e.htm).

<sup>446</sup> van Asselt, Brewer & Mehling, *supra* note 435, at 52-53.

<sup>447</sup> *Id.* at 53.

<sup>448</sup> S. 1766, 110th Cong. § 502(a)(12) (2007); S. 2191, 110th Cong. § 6001(10) (2007).



chemicals, or industrial ceramics” in addition to any other unfinished good whose production results in significant greenhouse gas emissions.<sup>449</sup> Furthermore, the Manager’s Amendment allowed the International Climate Change Commission to determine other finished goods whose production results in significant greenhouse gas emissions when the cost of production of a like good in the United States is affected by this legislation.<sup>450</sup>

Calculating the amount of carbon used to produce a primary product promises to be extremely difficult. Some have suggested that making this calculation for manufactured products would be next to impossible.<sup>451</sup> The process of ascribing emissions to specific goods from specific companies and countries will also likely engender significant disagreement.

Moreover, while there is significant uncertainty about carbon leakage, the general consensus is that carbon leakage will not be a major issue.<sup>452</sup> Reinaud (2008) suggests that greenhouse gas intensive primary product industries, including aluminum, cement, pulp and paper, refineries, iron, steel, and chemical can expect some carbon leakage, though leakage rates would generally be higher in industries that are more heavily traded such as aluminum and steel.<sup>453</sup> McKibben and Wilcoxon (2009) suggest the most significant leakage will occur in oil markets,<sup>454</sup> which is an industry that would be subject to full border adjustment under the domestic cap-and-trade program of the Bingaman-Specter bill and the Manager’s Amendment.<sup>455</sup>

At the same time there will be significant pressure on Congress to protect the competitive position of energy intensive industries. Labor, capital owners, and suppliers of those companies are understandably concerned about the survival of these industries, as are the officials and politicians from the states in which the industries are located. At the same time, reinforcing WTO rules, there is also considerable pressure from U.S. trading partners not to raise artificial barriers to trade.

Congress should resist the inevitable domestic political pressure to expand the list of covered products. This is because leakage is likely to be minimal for all industries, especially those outside the primary, energy-intensive products, and because of the significant costs associated with implementing the adjustment mechanisms. The International Climate Change Commission (ICCC) should

---

<sup>449</sup> S. 3036, 110th Cong. §1301(15) (2008).

<sup>450</sup> *Id.*

<sup>451</sup> REINAUD, *supra* note 355.

<sup>452</sup> *See id.* at 91; van Asselt, Brewer & Mehling, *supra* note 435, at 49; Warwick J. McKibben & Peter J. Wilcoxon, *The Economic and Environmental Effects of Border Tax Adjustments for Climate Policy* (Lowy Institute for International Policy, Working Paper No. 1.09, 2009).

<sup>453</sup> REINAUD, *supra* note 355, at 4.

<sup>454</sup> McKibben & Wilcoxon, *supra* note 452.

<sup>455</sup> S. 1766, 110th Cong. § 3(6)(A)(iv) (2007); S. 3036, 110th Cong. §§ 202, 1501 (2008). Both bills also provide full border adjustment for non-fuel chemicals under S. 1766, § 3(6)(A)(v) and S. 3036, §§ 202, 1501.

conduct further studies through 2013 regarding the leakage associated with various industry subsectors based on level of international trade, the ability to pass-through increased costs of production, and market structure.<sup>456</sup> Armed with this information, the ICCC should make the final decision regarding subsectors to which the border adjustment should be applied.

#### 7. Price of Allowances

All three bills based the cost of international reserve allowances on the market clearing price of domestic allowances, any of which would help the eventual national climate change bill pass muster from the WTO. The Bingaman-Specter bill specified that the price is not to exceed the market clearing price or the Technology Accelerator Payment level.<sup>457</sup> The Lieberman-Warner bill stated that the price of international reserve allowances was not to exceed the market clearing price for allowances under the cap.<sup>458</sup> The Manager's Amendment required the identification of three "leading publicly reported price indices" and would make the price of international reserve allowances equal to the average of these three indices on the preceding day.<sup>459</sup>

Article III of the General Agreement on Tariffs and Trade prohibits member states from applying taxes to foreign products that are not applied to similar domestic products.<sup>460</sup> All three of the bills show an attempt to apply consistent pricing to domestic and foreign goods, which is certainly consistent with GATT. However, the manner in which allowance requirements are calculated (i.e. based on average emissions of country of origin) and the exclusion of certain countries from the policy are likely to be found sufficiently discriminatory to outweigh the good intentions of the pricing mechanism mentioned above.<sup>461</sup> Nevertheless, the pricing mechanisms included in all three bills demonstrate a good faith effort to adhere to the principles of international trade law.

#### 8. Number of Required Allowances

All three bills consider similar factors in determining how many international reserve allowances are required for a good's importation. The Bingaman-Specter and Lieberman-Warner bills appeared to give more consideration to level of economic development, while the Manager's Amendment placed more emphasis on the types of environmental policies that have been implemented in

---

<sup>456</sup> For a discussion of the variables that impact carbon leakage, see REINAUD, *supra* note 355, at 4.

<sup>457</sup> S. 1766, 110th Cong. § 502(f)(4)(A)(iii) (2007).

<sup>458</sup> S. 2191, 110th Cong. § 6006(a)(3)(B) (2007).

<sup>459</sup> S. 3036, 110th Cong. § 1306 (2008).

<sup>460</sup> General Agreement on Tariffs and Trade, art. III, available at [http://www.wto.org/english/docs\\_e/legal\\_e/gatt47\\_01\\_e.htm](http://www.wto.org/english/docs_e/legal_e/gatt47_01_e.htm).

<sup>461</sup> van Asselt, Brewer & Mehling, *supra* note 435, at 49.

the country. The Bingaman-Specter bill and the Lieberman-Warner bill were similar in how they calculate the number of required allowances. They both intended to consider<sup>462</sup> the average greenhouse gas intensity for the sector in the country, while making adjustments for the number of allowances grandfathered to domestic companies in the same industry and each country's level of economic development.<sup>463</sup> The Manager's Amendment included a similar calculation that considered greenhouse gas intensity, allowances grandfathered to domestic companies, and an "economic adjustment ratio" that was based on the regulatory programs and technology the country has adopted to mitigate climate change.<sup>464</sup> In addition, importers of products that were processed in more than one country would have to submit the highest number of allowances required by any one of the countries in which the product was processed unless determined otherwise through an administrative hearing.<sup>465</sup>

The fact that the initial allowance requirements were based on the average greenhouse gas intensity for a sector in a particular country would appear to violate Article I of GATT, which prevents discrimination based on country of origin. The calculation method for exports was based on a country's sector average rather than individual company emissions, whereas domestic allowances are based on individual company emissions.<sup>466</sup> To avoid charges of discrimination, the emissions from the imported products may have to be estimated based on the "predominant method of production" or the "best available technology" in the United States as a means for dealing with the absence of missing individual company data.<sup>467</sup> However, the provision should remain unchanged for now in case the provision qualifies for an Article XX exemption.

Furthermore, this provision creates an economic disincentive to make environmental improvements at individual plants, which may be seen as inconsistent with the goals of the policy. If the policy is considered for an environmental exception, this provision may become a challenge since WTO considers whether the policy includes provisions that seem to run counter to its stated objectives in determining whether a policy constitutes "arbitrary or

---

<sup>462</sup> In defining baseline emissions to which a country's emissions from a particular product production will be compared, the Lieberman-Warner bill (in section 6001) mistakenly refers to "the total average annual greenhouse gas emissions attributed to a category of covered goods of a foreign country during the period beginning on January 1, 2012, and ending on December 31, 2014" rather than identifying the baseline as a measure of greenhouse gas intensity (which would be average emissions per unit).

<sup>463</sup> S. 1766, 110th Cong. § 502 (2007).

<sup>464</sup> S. 3036, 110th Cong. § 1306(d) (2008).

<sup>465</sup> *Id.*

<sup>466</sup> van Asselt, Brewer & Mehling, *supra* note 435, at 49.

<sup>467</sup> "Predominant method of production" is the standard applied to imported chemicals regulated under Superfund. See Pauwelyn, *supra* note 421, at 31, 42.

unjustifiable discrimination.”<sup>468</sup>

Although there may be some objections to the use of an industry average, the other factors considered in this calculation may help the measure pass muster before the WTO. For example, the second criterion all three U.S. Senate bills considered was the number of allowances grandfathered to domestic companies. While there have been disagreements about whether giving allowances to domestic companies constitutes an unequal treatment of domestic and foreign products, some have argued that the inclusion of this factor helps create a sense of equal treatment of foreign and domestic products.<sup>469</sup> Of course, this debate could be avoided if the final climate change policy moves to a full border adjustment for exports and imports as a means for leveling the playing field rather than imposing import adjustments and grandfathering allowances to domestic companies.

In addition, the inclusion of an economic adjustment indicator in all three of the bills may also have helped the policy qualify for an environmental exception. As mentioned previously, if the policy is considered for an environmental exception under Article XX of GATT, WTO will consider whether the policy allows for differing local conditions. The inclusion of an adjustment based on local economic conditions would certainly help the U.S. case for such an exception.

The opportunity to contest the required number of allowances created a sense of “basic fairness and due process” under the Manager’s Amendment plan, and would certainly help the U.S. case for an environmental exception. Under the Manager’s Amendment, importers of goods that are processed in more than one country would be required to submit the maximum number of allowances required by production in any single country. However, an importer is allowed to challenge that requirement in an administrative hearing. This provision would allow for due process, which may work in the United States’ favor if the issue is brought before WTO. While the provisions for determining the number of allowances involved in specific border adjustments described in the Manager’s Amendment may need some adjustment, they are fundamentally sound.

## 9. Exclusions

All three bills would have placed international reserve allowance requirements on countries that trade with the United States unless it has been determined that the country has taken “comparable action” to mitigate climate change, is considered to be one of the “least developed” of the developing countries, or makes an insignificant contribution to global greenhouse gas emissions.

---

<sup>468</sup> van Asselt, Brewer & Mehling, *supra* note 435, at 49.

<sup>469</sup> *Id.*

### ***Comparable Action***

On its face, the Manager's Amendment appeared to contain the most stringent methodology for determining "comparable action," though it is not clear whether the results of the determination would have been any different under the other two bills. The standard under the Bingaman-Specter bill was simply that the country has a cap-and-trade program that limits greenhouse gas emissions appropriate to its level of economic development.<sup>470</sup> Under the Lieberman-Warner bill, the President would consider whether the actions taken by a foreign country are "comparable in effect" to those actions taken by the United States after taking into account the country's level of economic development.<sup>471</sup> The Manager's Amendment included a two-part test under which the International Climate Change Commission would consider whether the foreign country has achieved comparable emissions reductions to the United States. If the country's actions are not found to be "comparable" under this test, the ICCC would consider whether the country has adopted technologies and regulations in an attempt to curb greenhouse gas emissions.

### ***"Least Developed" of the Developing Countries***

All three bills included a provision that excludes the countries that have been identified by the United Nations as the "least developed" of the developing countries. A comparison of global greenhouse emissions against the United Nations "least developed" list<sup>472</sup> suggests there is overlap between countries with "*de minimis* emissions"<sup>473</sup> and classification as "least developed." It is not clear that this provision is more than a statement of political intent.

### ***De Minimis Emissions***

To avoid significant administrative costs to develop border adjustment data for trade where leakage and competitiveness are truly insignificant, all three bills provide exemptions for countries with *de minimis* emissions. The Manager's Amendment included the strictest determination of *de minimis* emissions. The Bingaman-Specter and Lieberman-Warner bills allowed the President to consider deforestation rates. The Manager's Amendment requires the country meet this standard both with and without consideration of deforestation rates.

The mere fact that the United States would exempt some countries from the

---

<sup>470</sup> S. 1766, 110th Cong. § 502(a)(2) (2007).

<sup>471</sup> S. 2191, 110th Cong. § 6001(2) (2007).

<sup>472</sup> United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, <http://www.un.org/special-rep/ohrlls/lde/list.htm> (last visited Nov. 1, 2009).

<sup>473</sup> Detailed information about carbon dioxide emissions by country may be found at NationMaster.com, [http://www.nationmaster.com/red/pie/env\\_co2\\_emi-environment-co2-emissions](http://www.nationmaster.com/red/pie/env_co2_emi-environment-co2-emissions) (last visited Nov. 14, 2009).

border adjustment and not others constitutes a GATT Article I violation.<sup>474</sup> As a result, the United States will likely have to justify the policy on environmental grounds, in which case consideration of country emissions and economic development such as that found in the three bills will be well-received because of its respect for differing local conditions. The provision could, however, be strengthened by providing opportunities to appeal “comparable action” and “*de minimis*” emissions decisions.<sup>475</sup> With that proviso, however, the Manager’s Amendment provided a fundamentally sound approach to categorizing countries as covered and excluded.

#### 10. Implementation Date

The three U.S. Senate bills gradually pushed back the implementation date of the program. Bingaman-Specter envisioned an implementation date of 2020; Lieberman-Warner, 2019; and Manager’s Amendment, 2014. The 2014 implementation seems appropriate because it provides other countries an opportunity to implement domestic climate change policies without providing enough time for the United States to experience significant leakage. Studies of the first phase of European Union Emissions Trading Scheme (EU ETS) have not shown any evidence of leakage during the first few years of the program, although scholars expect that leakage may become more of an issue as the emissions reductions goals become more stringent.<sup>476</sup> One lesson to be learned from the EU experience is that there is a lag time between policy implementation and carbon leakage. This two year lag will provide enough of a gap so that domestic companies will not likely be harmed by any leakage that may occur. At the same time, it provides enough of a lag to provide opportunities for continued international negotiation and domestic action by other countries.<sup>477</sup> Thus, the final climate change bill should retain the 2014 implementation date of the Manager’s Amendment.

#### 11. Role of Negotiations

The Bingaman-Specter bill reaffirmed the U.S. Senate’s commitment to negotiating “multilateral or bilateral agreements on the reduction of greenhouse gas emissions.”<sup>478</sup> Similarly the Lieberman-Warner bill stated that “[i]t is the policy of the United States to work proactively under the United Nations Framework Convention on Climate Change and, in other appropriate forums, to establish binding agreements committing all major greenhouse gas-emitting nations to contribute equitably to the reduction of global greenhouse gas

---

<sup>474</sup> Pauwelyn, *supra* note 421, at 32.

<sup>475</sup> van Asselt, Brewer & Mehling, *supra* note 435.

<sup>476</sup> Fischer & Fox, *supra* note 357.

<sup>477</sup> van Asselt, Brewer & Mehling, *supra* note 435, at 49.

<sup>478</sup> S. 1766, 110th Cong. § 502(c)(2) (2007).

emissions.”<sup>479</sup> The Manager’s Amendment expanded upon the negotiations approach included in its predecessors. It clarified that if the U.S. and other nations cannot come to terms on an international agreement for addressing greenhouse gas emissions, the U.S. will make preparations for border adjustments. The U.S. would also encourage other countries who have taken domestic action to implement similar border adjustment policies and request foreign countries to take comparable action, and provides an estimate of the greenhouse gas emissions reductions the U.S. expects to achieve through its actions.<sup>480</sup> The Manager’s Amendment was very clear about what actions the U.S. will take with regard to international negotiations. This exceptionally clear approach suggested the likelihood of “serious, across-the-board negotiations,” which would certainly help the U.S. in a WTO challenge. Therefore, the final climate change program should adopt the international negotiation tactics of the Manager’s Amendment.

In sum, the final national climate change bill should reconsider whether the international reserve allowances will be under or separate from the cap and eliminate the grandfathering of allowances. It should adopt a full border adjustment for subsectors the International Climate Change Commission finds it necessary to regulate, but given the implementation and administrative costs associated with that activity, both Congress and the Commission should attempt to keep the list of covered products narrow. Congress should incorporate additional opportunities for appeal of decisions regarding coverage under the international reserve allowance provisions, particularly for decisions about “comparable action” and “*de minimis*” emissions.

## VII. SYNTHESIS AND CONCLUSIONS

This article tracks the development of proposed climate legislation in the 110<sup>th</sup> U.S. Congress to examine how the bills have evolved, particularly with respect to key policy evaluation criteria. The underlying question is whether the bills are moving in a direction that is likely to achieve their stated goals in the most cost-effective manner, given the prevailing legal and political environment.

The Manager’s Amendment, S. 3036, was more than an amended version of the initial Lieberman-Warner bill, S. 2191. The Manager’s Amendment combined features of both the Lieberman-Warner and Bingaman-Specter bills and addressed aspects of climate change legislation neglected by both previous bills.

Moreover, there are signs that the evolution of the bills has been generally positive. The changes embodied in the Manager’s Amendment, taken as a whole, represented important improvements over either of the previous bills. For example, the inclusion of the Deficit Reduction Fund demonstrated an

---

<sup>479</sup> S. 2191, 110th Cong. § 6003 (2007).

<sup>480</sup> S. 3036, 110th Cong. § 1303(b)(1) (2008).

inclination to follow economists' prescription to auction allowances and use the revenues to support the public finance system. The bill also eliminated the initial Bonus Allowance balance and fixes the borrowing provisions of the Lieberman-Warner bill, modified the Technological Accelerator Payment ("safety valve") scheme of the Bingaman-Specter bill, and added what is effectively an environmental safety valve.

However, there is substantial room for improvement over the Manager's Amendment. Based on the analysis in the previous sections, there are several principles that Congress should observe as it develops the next generation of cap-and-trade climate legislation.

#### **Address Cost-Effectiveness, Environmental Efficacy, Law and Politics**

The analysis in the previous sections of this report is anchored in good policy principles, motivated by an efficiency-seeking orientation. The philosophy here is that whatever goals Congress sets for the country, those goals should be pursued in the most cost-effective manner. This requires a design that would minimize the social cost of abatement, public finance and implementation, subject to environmental efficacy requirements and political and legal constraints. The analysis in this report tends to emphasize cost minimization and place less emphasis on political constraints. Ultimately, it is up to Congress to determine the extent to which cost-effectiveness must be compromised to accommodate political reality.

#### **Avoid Sudden Forced Reductions in Emissions**

The Lieberman-Warner bill would have required a reduction of nearly 11 percent in annual emissions between 2011 and 2012, whereas the Manager's Amendment required just over a seven percent reduction during the same time. In this sense the Manager's Amendment would have reduced the impact of the transition. Gradual transitions generally involve lower costs.

#### **Clarify the Role of the CAA**

Unlike its predecessors, the Manager's Amendment at least acknowledged the important relation between new climate change legislation and the Clean Air Act. Given the recent Supreme Court ruling in *Massachusetts v. EPA*,<sup>481</sup> it is possible that EPA could be petitioned, and even be forced by the courts, into a dual regulatory system that would be both burdensome and counterproductive. Congress should clarify that the new legislation is intended to supersede the CAA in matters of GHG emissions.

#### **Allow the Price Signal to Work**

One of the primary advantages of cap-and-trade systems like those employed

---

<sup>481</sup> *Massachusetts v. U.S. Envtl. Prot. Agency*, 549 U.S. 497 (2007)



in the three bills is that they use prices to distribute CO<sub>2</sub> emissions allowances to their highest-valued users—they promote economic efficiency even as they protect the environment. Consequently, Congress should be careful to avoid provisions that might compromise the power of the price signal. While the Manager's Amendment may have moderated some of the provisions that would compromise the price signal, there is still room for improvement. There are three particular aspects of allowance allocation in the Manager's Amendment that should be addressed.

First, the Manager's Amendment would have allocated allowances to the electric power sector without discriminating between regulated and restructured states. Under the ratemaking procedures in the regulated states it is likely that utilities will be unable to include in their rate base the value of the allowances that have been freely allocated to them under these programs. As such, rates in regulated states will not reflect the real cost of electricity, which includes the value of the allowances required for generation. Conversely, consumers in states that have restructured are likely to pay more for electricity, something closer to real cost because prices are not regulated. In those states the stockholders will be the primary beneficiaries of the allowances allocated to the electric power sector.

Second, the Manager's Amendment continued the practice of awarding bonus allowances for CCS, albeit at a lower rate. The purpose of the CCS program incentives is to encourage firms to make investments in the research and development that will be needed to deploy the technology. By giving bonuses for the amount of CCS, the program runs the potential of encouraging firms to process more carbon than is efficient. It also runs the risk of programmatic lock-in to a particular technology. Given the goals of the program, it would be more consistent for the government to invest directly in research, development, deployment and information programs that would reduce the cost of engaging in CCS. The Manager's Amendment would have, in fact, provided additional funding to develop the technology in the near term.

Congress should also avoid the temptation to influence entry and exit in the manufacturing and electricity generation sectors. The Manager's Amendment subsidized new entrants to the electric power and manufacturing sectors by establishing an annual allocation of allowances for those entities. These subsidies should be eliminated as they could encourage inefficient new entities that are not bearing the full cost of their operations.

Similarly, Congress should avoid the mistaken practice of insisting that any entities that shut down must return the allowances allocated to them. This could potentially induce inefficient firms to remain in business even though their best option is to liquidate their assets to make way for more efficient firms.

Finally, programs that ease the economic burden of the climate change program on low-income families should be implemented carefully, avoiding programs that effectively subsidize energy use. Some of the provisions in the

bills would have allocated allowances for the purpose of providing rebates or subsidies to low-income electricity ratepayers. Better to auction the allowances and use the revenues to offset tax cuts to those same low income families (at least to the extent that they pay taxes), allowing them to spend the money on any number of beneficial uses, not only electricity.

#### **Auction Allowances and Direct the Revenues to the General Fund**

The Manager's Amendment at least acknowledged the benefits of auctioning allowances and assigning them to the general fund. Many of regulatory design problems—price distortions, unanticipated distributional effects, technological and programmatic lock-in—can be ameliorated or eliminated by adopting a more principled approach: auction of all allowances and assignment of all revenues to the federal government's general fund. The programs and projects supported by the bill could then compete on an even footing with other important public investments and goals, including the reduction of taxes that distort market price signals and impose inefficiencies in the system of public finance.<sup>482</sup>

All three bills would have allocated, rather than auctioned, a substantial portion of allowances. Some degree of direct allocation may be necessary to ensure passage of cap-and-trade legislation, but direct allocation should be minimized. By auctioning allowances it is possible to reduce distortionary taxes, such as the income and payroll taxes, and at the same time maintain government revenue. This also suggests that Congress should avoid multi-decadal earmarking. Climate change programs, like all activities for which Congress appropriates funds, should be subject to regular review, and to competition with the many other important socially beneficial programs that the government must support.

One objection that has been raised to the auction of allowances is that it reduces the ability of the federal government to help the states that will experience the greatest costs of compliance, particularly those that produce and consume the most coal. However, it is also possible to direct the proceeds of the auction to state treasuries, thereby offsetting state taxes. This would preserve the revenue recycling function of the auction while increasing the political palatability.

#### **If Allocation and Earmarking are Unavoidable, Keep it Simple**

The Manager's Amendment introduced an unnecessarily complicated scheme for supporting state level programs and promoting technology development and adaptation. All three of those categories are supported through both direct allocation and earmarking of auction revenue. While neither of these approaches is favored on policy grounds, if they must be used, Congress should

---

<sup>482</sup> See discussion *supra* Section I.C.

choose one or the other to promote administrative simplicity.

### **Regulate Upstream for Broad Coverage and Lower Administration Costs**

Focusing the cap-and-trade provisions further upstream limits the number of covered entities even as it provides broader coverage, more opportunities for low cost emissions abatement, and simpler administration. The Manager's Amendment wisely adopted a largely upstream approach to covered entities, focusing on oil refineries, natural gas processors and coal-fueled electric utility plants. The breadth of coverage could be further improved by covering coal mines rather than electric utilities.

### **Carefully Weigh Environmental Efficacy against Cost Containment**

The Lieberman-Warner bill provided no cost relief measures beyond banking, borrowing and, of course, trading of allowances. In contrast, the Bingaman-Specter bill provided a price ceiling on allowances to contain the cost of allowances. The Lieberman-Warner bill provided relative certainty regarding the quantity of emissions in any given year, while the Bingaman-Specter bill could have potentially experienced great variability in annual emissions, but more predictable costs.

The Manager's Amendment introduced a mechanism that combined (1) a system to set aside reserve allowances from previous years' allocations in the case of high prices with (2) a floor on the price the government would accept in the annual auction. These differences among the bills illustrate the tradeoffs that Congress will have to make between control of costs and low uncertainty in annual level of emissions.

Like emissions targets themselves, the tradeoff between cost containment and emissions variability is largely a political decision. However, Congress should think carefully about the implications for integration in an international climate agreement. The dominant paradigm for international cooperation, reflected in the Kyoto Protocol, has been to place limits on national annual emissions. If the United States opts for a system with lower costs but greater annual variability in annual emissions, it may be difficult to enter into the multilateral international program.

### **Address Potential Problems with Cost Containment Provisions**

If Congress chooses to use a cost containment mechanism similar to the one in the Manager's Amendment, it will be necessary to address particular design problems with the proposed system. First, the mechanism is not a true auction because the bids are derived from a modeling exercise rather than being based on actual bids, and there is a price ceiling on the extra allowances. Combined with the limited number of allowances available, the price ceiling could lead to excess demand.

Second, the Manager's Amendment restricted its cost containment auctions to

the sale of allowances taken from future years' budgets only. This avoids flooding the market with off-budget allowances, but introduces questions about intergenerational equity. The final bill should consider this trade-off. Perhaps more importantly, borrowing from future years' allocations raises the specter that a future Congress could decide not to respect the additional reduction in allocated allowances. Certainly other nations would be concerned about this possibility and it might make it difficult for the United States to engage in an international trading program.

If Congress retains a cost-containment auction similar to the one employed in the Manager's Amendment, the allowances should be subject to a simple auction each year without a price cap. This would facilitate the movement of the allowances to their highest value users and avoids the possible excess demand that could otherwise emerge.

### **Redesign the Banking and Borrowing System**

Banking provisions provide covered entities the opportunity to save allowances for subsequent years when the firms believe the costs of pollution abatement will be higher. Borrowing provisions allow interannual shifting of allowances to overcome temporary shocks. We reach two conclusions regarding these mechanisms. First, the banking system should pay interest on saved allowances to encourage the postponement of damages. Second, just as in financial systems, there should be a link between the interest rate offered on allowances and that paid on borrowing. This interest should be carefully derived, accounting for market rates of return on other financial transactions and the expected changes in the price of allowances.

None of the bills contained provisions for paying interest on banked allowances. And while the borrowing provision in the Manager's Amendment was an improvement compared to the one described in the original Lieberman-Warner bill, it still employed a rather arbitrary, and arguably high, annual interest rate of 10 percent.

All three bills involved substantial direct allocation of allowances. While this report recommends against that practice, it is also true that a promise of future allocations of allowance provides a pool of allowances against which firms could borrow. However, there will be many instances when firms with no allocation may need to borrow allowances. The final bill should address how the program will protect against borrowers who present substantial default risks. Congress should consider the possibility of requiring some form of collateralization of allowance loans.

### **Develop a Clearer Approach for Offsets**

The bills did not cover, and indeed no bill could cover, all activities that affect GHG emissions. As such, the bill stipulates provisions to encourage activities with expected positive effects on emissions. The bill uses two primary sources

for rewards: allocating allowances from the annual schedule (on-budget rewards) and creating new allowances in addition to the amounts in the annual schedule (off-budget offsets).

It is important that Congress protect against compromising the environmental efficacy of whatever emissions cap it adopts. To this end, it is necessary that there be real reductions in emissions or increases in sequestration equal to or exceeding any new allowances created in an offset program. The Manager's Amendment not only directed the Administration to develop rules to assure the environmental efficacy of the proposed offset systems, but required that the methods employed for estimation produce results that are consistently reproducible by independent teams of evaluators. This is a step in the right direction and should be adopted by any offset program.

Unfortunately, the Manager's Amendment retained some ambiguity with regards to the role of the new estimation methods. At no point was the role of the offset estimation methods clearly stated. Congress should clarify the role that the offset estimation methods play. Moreover, international offset projects should be subject to the same set of rules, including rigorous estimation methods leading to independently reproducible results, as the domestic offset program.

In general, the best arrangement is one in which offset projects are encouraged and the estimation methods used to evaluate the projects are highly credible and low cost. Unfortunately, this outcome seems unlikely, at least for some types of projects. To protect against compromising the environmental efficacy of the program, Congress can adopt two options. The first is to limit the amount of allowances that can be issued under the offset provisions combined with stringent methods that lead to independently reproducible estimates for project outcomes. The second is to only reward these projects with on-budget allowances. The first approach may compromise the cost-effectiveness of the program by limiting the number of truly effective projects. The latter, by allocating allowances to an offset category, runs counter to the previous prescription to auction all allowances and recycle the revenue into the U.S. Treasury's General Fund or related public finance purpose such as tax reductions.

This creates a tension among the goals of the program that Congress will have to resolve. One possibility is to use off-budget credits for those projects that are most likely to meet the rigorous standards discussed above and to pay for the inputs to projects where estimation is more likely to be a problem.

#### **Drop Early Action Awards**

Early action provisions in the bills should be dropped. They have no positive effects on behavior and will distract the government from effective implementation of more credible programs.

#### **Use Full Border Adjustment on a Limited Basis to Address Leakage and**

**Competitiveness**

This article examines a number of different provisions for border adjustment, arriving at two fundamental conclusions. First, avoid direct allocation of allowances, either grandfathering of allowances based on historical emissions or "home rebate" based on current output levels. Second, use full border adjustment to address leakage and competitiveness issues. For imports, this would entail requiring producers of energy intensive primary products to acquire allowances equivalent to the emissions involved in the production of the goods. For exports of energy intensive primary products, full border adjustment would provide subsidies or some other form of rebate equivalent to the value of the allowances that were required for production process.

It appears that aside from a few key industries, leakage is a fairly limited problem. The primary driver behind the concerns with trade effects seems to be competitiveness, and more basically, maneuvering for protection. However there are substantial legal barriers and implementation costs associated with developing trade restrictions such as full border adjustments. To ensure environmental efficacy, Congress should consider whether the international reserve allowance program will be under or separate from the cap. To address the legal barriers, Congress should include a clear statement that the provisions are designed for environmental protection and incorporate additional opportunities for appeals. To contain implementation costs, Congress should include border adjustments only for those energy intensive industries subject to the greatest international trade competition.

**Double Check the Bill**

Congress often has to work quickly to adjust bills to reflect new ideas or agreements. It is easy to make mistakes, and the implications of such mistakes can be significant. Consider three examples from the case of the Lieberman-Warner bill. First, the borrowing provisions in S.2191 §2303 were likely intended to adopt a 10 percent annual compound interest rate. However, by incorrectly specifying the terms, the system would have led to a 110 percent annual simple interest rate for all but the first year.

Second, in its treatment of agriculture and forestry projects under S.2191, §3702, the Lieberman-Warner bill took its language on the development of soil carbon sequestration estimation directly from the Bingaman-Specter bill's section on agriculture projects in S.1766, §205(a)(2). Unfortunately, the soil carbon methods developed for agriculture would not be an appropriate basis for evaluating forestry projects. The drafters of the Lieberman-Warner, however, bill did not adjust the requirements when they expanded the scope of the coverage.

Finally, to develop the standards for border adjustments, it is necessary to determine the emissions intensity of covered goods, measured in unit of greenhouse gas emissions per unit of product. But the Lieberman-Warner bill,

in §6001, mistakenly referred to “the total average annual greenhouse gas emissions attributed to a category of covered goods of a foreign country during the period beginning on January 1, 2012, and ending on December 31, 2014,” a measure of absolute emissions, not emissions intensity.

All three bills are complex, each more than its predecessor. Bills often contain significant errors. A unified committee mark-up process could be an opportunity to identify and correct mistakes. Indeed, all three of the major errors in the Lieberman-Warner bill identified above were corrected in the committee mark-up leading to the Manager’s Amendment. However, when a bill is subject to multiple committee mark-ups and subsequent floor debate and amendment, there will be ample room for internal conflicts and mistakes.

Given the significant impacts that climate legislation could have on both the environment and the economy, Congress should take extraordinary measures to protect against clear errors. A detailed third-party, interdisciplinary, expert review or similar provision may be appropriate in this context.

### **Think Broadly**

Like its predecessors, the Manager’s Amendment reflected a technology-oriented, supply-side emphasis on mitigation of GHG emissions. Little is offered in the way of understanding and changing consumer demands for polluting goods and services. In some cases, the bill was antithetical to reducing energy-related emissions. Moreover, the bill did not place sufficient emphasis on the adaptation to climate change that would be required even if the United States and other nations mount an aggressive mitigation program.

To be truly comprehensive, Congress’ bill should not only try to encourage “technological fixes” such as increased energy efficiency and alternative fuels, but incorporate substantial programs for public education, research in the psychology of consumption and satisfaction, and adaptation as well.

APPENDIX OF TABLES

Table 1: Climate Change Bills and Regulated Facility Coverage

Energy Source	S. 1766 Low Carbon Economy Act (Bingaman-Specter)		S. 2191 America's Climate Security Act (Lieberman-Warner)		S. 3036 Manager's Amendment to America's Climate Security Act	
	Direction of Regulation	Facilities Regulated	Direction of Regulation	Facilities Regulated	Direction of Regulation	Facilities Regulated
Coal	Downstream	Coal facilities that emit or convert coal into synthetic fuels. Entities that consume more than 5,000 metric tons of coal annually	Downstream	Electric Utilities Large Consumers that emit more than 10,000 metric tons CO <sub>2</sub> annually	Downstream	Electric Utilities Any entity that consumes more than 5,000 metric tons of coal annually in the United States
Natural Gas	Upstream	Natural gas processors and importers	Downstream	Facilities that emit > 10,000 metric tons CO <sub>2</sub> ; <i>includes electric utilities</i>	Upstream	Natural gas processing plants in the United States (but not in the State of Alaska); natural gas producers in the State of Alaska or the Federal waters of the Alaska Outer Continental Shelf; natural gas importers
Oil	Upstream	Oil refineries and importers	Upstream - transportation fuel; Downstream - industrial	Oil refineries that produce transportation fuel; large industrial companies that emit more than 10,000 metric tons CO <sub>2</sub>	Upstream	Facilities that produce or import petroleum-based liquid fuel
Nonfuel Chemicals	Upstream	Facilities that produce or import nonfuel chemicals, including aluminum smelters and manufacturers	Upstream (Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrous oxide)	Facilities that produce or import nonfuel chemicals and that emit more than 10,000 metric tons CO <sub>2</sub>	Upstream	Facilities that manufacture or import nonfuel, non-HFC chemicals that emit more than 10,000 metric tons CO <sub>2</sub> equivalent
Emissions Regulated		85 percent		80 percent		84 percent
Emissions Excluded		15 percent <i>Non-electric coal Small electric coal</i>		<i>Non-electric coal Small electric coal Small natural gas/oil Small non-fuel entities</i>		16 percent <i>Non-electric coal Small electric coal Some non-fuel chemical manufacturers/producers</i>



Table 2: Incentives for Mitigation Outside the Emissions Cap: S.1766, S.2191, and S.3036

Proposed Bill	Accounting Mechanism	Method of Measurement	
		Input-Based	Output-Based
S. 1766 (Lieberman-Specter)	On-Budget	Early Action - § 206	Agricultural Projects - § 205 Carbon Capture and Storage Bonuses - § 207
	Off-Budget	Methane Offset Projects - § 303(b) Unclassified Offset Projects - § 303(c)(2)	Carbon Capture and Storage Offsets - § 302 Use of Fuels as Feedstocks - § 301(b) Exports of Covered Fuels or HFCs - § 301(c) and (d) Credits from Foreign Markets - § 501(d) International Offset Projects - § 501(e)
S. 2191 (Lieberman-Warner)	On-Budget	Domestic Agriculture and Forestry - § 3701 Early Action - § 3301	Carbon Capture and Storage Bonuses - § 3601 International Forestry - § 3803
	Off-Budget		Agricultural and Rangeland Offset Projects - § 2403(b) Afforestation, Reforestation, and Forest Management Offsets - § 2403(b) Manure Management Offset Projects - § 2403(b) Fugitive Emissions Offset Projects - § 2403(b) Credits or Allowances from Foreign Markets - § 2501 Carbon Capture and Storage Bonuses (3.9 b Initial Balance)* - § 3601

**Table 3: Allowance Distribution under Proposed Climate Change Bills**

	% Total Allowances directed to purpose		
	Bingaman-Specter	Lieberman-Warner	Manager's Amendment
<b>2012</b>			
Worker Training	0.00%	1.00%	1.00%
Energy Assistance	4.00%	5.00%	3.50%
Adaptation	8.00%	5.00%	9.00%
Technology	12.00%	13.00%	11.25%
Forest Carbon	0.00%	3.00%	1.00%
States	9.00%	9.00%	10.00%
CCS	8.00%	4.00%	4.00%
Early Action	1.00%	5.00%	5.00%
Agriculture	5.00%	5.00%	4.25%
Industry	53.00%	50.00%	44.50%
Climate Security Act	0.00%	NA*	0.75%
Deficit Reduction	0.00%	0.00%	5.75%
<b>2030</b>			
Worker Training	0.00%	3.00%	3.00%
Energy Assistance	5.00%	11.00%	12.00%
Adaptation	22.00%	11.00%	15.50%
Technology	26.00%	31.00%	10.50%
Forest Carbon	0.00%	3.00%	1.00%
States	9.00%	9.00%	16.25%
CCS	8.00%	4.00%	4.00%
Early Action	0.00%	0.00%	0.00%
Agriculture	5.00%	5.00%	4.25%
Industry	25.00%	22.00%	19.00%
Climate Security Act	0.00%	NA*	0.75%
Deficit Reduction	0.00%	0.00%	13.75%
<b>2050</b>			
Worker Training	0.00%	4.00%**	3.00%
Energy Assistance	5.00%	15.00%**	15.00%
Adaptation	35.00%	15.00%**	20.00%
Technology	39.00%	40.00%**	5.50%
Forest Carbon	0.00%	3.00%	1.00%
States	9.00%	9.00%	18.75%
CCS	8.00%	4.00%	1.00%
Early Action	0.00%	0.00%	0.00%
Agriculture	5.00%	5.00%	4.50%
Industry	0.00%	10.00%	13.50%
Climate Security Act	0.00%	NA*	1.00%
Deficit Reduction	0.00%	0.00%	16.75%

Table 4: Detailed Distribution of Auction Revenues  
*(Bold figures in parentheses indicate allocation of auction revenues in 2012 and direction of change, if any over subsequent years)*

Lieberman-Warner (§ 2191)	Bingaman-Specter (§ 1766)	Managers' Amendment (§ 3036)
<p><b>Energy Assistance Fund (20 percent)</b>                      50 percent low-income home energy assistance                      25 percent Weatherization Assistance                      25 percent rural energy assistance                      (§ 4501)</p>	<p><b>Energy Assistance Fund (17 percent and decreasing)</b>                      50 percent low-income home energy assistance                      25 percent Weatherization Assistance                      25 percent rural energy assistance (§ 403)</p>	<p><b>Energy Assistance Fund (14 percent and increasing to 25.5 percent)</b>                      Funds are to be used to formulate a tax policy that assists consumers with increases in energy and related costs.                      (§ 581 - 585)</p>
<p><b>Climate Change Worker Training Fund (5 percent)</b>                      Job training, temporary wages and healthcare, transportation to interviews, relocation                      (§ 4601 - 4605)</p>	<p><b>Climate Change Worker Training Fund</b>                      Not applicable</p>	<p><b>Climate Change Worker Training Fund (4 percent and increasing)</b>                      60 percent for Climate Change Worker Assistance program wages, healthcare, and training for displaced workers                      10 percent for Workforce Training Safety, aimed at keeping US university and colleges at forefront of science education and research and to train workers in zero and low carbon energy technologies                      30 percent for Energy Efficiency and Renewable Energy Worker Training Program established by the Green Jobs Act of 2007                      (§ 531 - 534)</p>
<p><b>Adaptation Fund (20 percent)</b>                      40 percent to Interior for fish and wildlife conservation strategies                      20 percent to Interior for existing strategies (i.e. endangered species, migratory birds, etc.)                      5 percent for cooperative grant programs                      5 percent for Agriculture for adaptation activities by National Forests and National Grasslands                      12.5 percent for EPA for ecosystems                      12.5 percent to Army Corps of Engineers for ecosystems                      5 percent to Commerce for restoration and conservation                      (§ 4702)</p>	<p><b>Adaptation Fund (33 percent and increasing)</b>                      25 percent for coastal regions                      20 percent for contiguous United States                      25 percent for northern latitudes (Alaska)                      30 percent for fish and wildlife conservation                      (§ 402)</p>	<p><b>Adaptation Fund (24.5 percent and increasing)</b>  <b>State Wildlife Adaptation Fund</b>                      78 percent for Secretary of Interior and made available to States for adaptation efforts                      22 percent for Land and Water Conservation Fund                      (§ 631)  <b>Bureau of Land Management Emergency Firefighting, Forest Service Emergency Firefighting, and Federal Wildlife Adaptation Fund</b>                      \$300,000,000/year to Bureau of Land Management                      \$800,000,000/year to Forest Service                      Remainder goes to National Wildlife Adaptation                      (§ 1202)  <b>International Climate Change Adaptation</b>                      Development of adaptation plans, technology transfer, capacity-building, etc. (§ 1331)</p>



Table 5: Summary of International Reserve Allowance Provisions

U.S. Senate Bill	Date of Effect	Goods Covered	Market Price	Use of Proceeds	Exemptions	Methodology for Determining Allowances Required	Declaration Process
Bingaman-Specter (S. 1766)	2020	Primary Products	Not to exceed market clearing price or TAP price	"International Energy Technology Deployment Fund" for transfer for technology to other countries.	Comparable Action (Determined by President) Programs, monitoring and enforcement measures taken, when considering the economic development of the country. "Least Developed" of Developing Countries <i>De Minimis</i> Global Emissions Less than 0.5 percent of global emissions; President can consider deforestation rates	Initial Compliance Year Average excess greenhouse gas emissions in that country for category of goods; Allowances grandfathered to domestic sector; Economic development of country Subsequent Years TAP payments/extra allowances issued and other factors deemed relevant by the President.	Submit international reserve allowances, foreign allowance, foreign credits, or credits for international offset projects to U.S. Customs.
Lieberman-Warner (S. 2191)	2019	Primary Products	Not to exceed market price of domestic allowances	Climate change mitigation in developing countries	Comparable Action (Determined by President) Cap-and-trade program that limits emissions; appropriate monitoring and enforcement; program amounts to comparable action. "Least Developed" of Developing Countries <i>De Minimis</i> Global Emissions Less than 0.5 percent of global emissions; President can consider deforestation rates	Average excess greenhouse gas emissions in that country for category of goods; Allowances grandfathered to domestic sector; Economic development of country	Submit international reserve allowances, foreign allowance, foreign credits, or credits for international offset projects to U.S. Customs.

Table 5 cont.

Date of Effect	Goods Covered	Market Price	Use of Proceeds	Exemptions	Methodology for Determining Allowances Required	Declaration Process
2014	Primary Products; Manufactured Items Identified by International Climate Change Commission (ICC) as feasible and necessary	Preceding day's average of three "leading publicly reported daily price indices"	Climate change mitigation in developing countries	Comparable Action (Determined by ICC) is greater than or equal to that of the United States Use of state-of-the-art technologies and regulatory programs "Least Developed" of Developing Countries De Minimis Global Emissions Less than 0.5 percent of global emissions, with and without deforestation rates	Produced in One Country greenhouse gas intensity of country for category of goods; Allowances grandfathered to domestic sector; Economic adjustment ratio that incorporates use of state-of-the-art technology and greenhouse gas regulatory programs. Processed in Multiple Countries Based on highest required allowances of any country in which product is processed, unless determined otherwise through administrative hearing.	Submit international reserve allowances, foreign credits, or credits for international offset projects to U.S. Customs. Alternatively provide bond, other security, or cash deposit to U.S. Customs. Account reconciled within 180 days. Balance due within 14 days of reconciliation. Overage refunded.

U.S. Senate  
Bill  
Manager's  
Amendment  
(S. 3036)