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Climate Change: Comparison and Analysis of S. 1151 and the Draft "Climate and Economy Insurance Act of 2005"

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Summary

Climate change is generally viewed as a global issue, but proposed responses generally require action at the national level. In 1992, the United States ratified the United Nations' Framework Convention on Climate Change (UNFCCC) which called on industrialized countries to take the lead in reducing greenhouse gases to 1990 levels by the year 2000. Over the past decade, a variety of voluntary and regulatory actions have been proposed or undertaken in the United States, but carbon dioxide emissions have continued to increase.

Several proposals designed to address greenhouse gases have been introduced in the 109th Congress. Two proposals, S. 1151, introduced by Senators McCain and Lieberman, and a draft alternative, announced by Senator Bingaman, received increased scrutiny in preparation for the Senate's debate on comprehensive energy legislation. During that debate, S. 1151, introduced as S.Amdt. 826, was defeated on a 38-60 vote. In contrast, the draft alternative remains a work-in-progress and has yet to be introduced. This report compares these two proposals.

Both proposals would establish market-based systems to limit emissions of greenhouse gases. However, the proposals differ in how those systems would work. S. 1151 would establish an absolute cap on emissions from covered entities, and would allow entities to trade emissions under that cap. The draft amendment would limit emissions intensity (greenhouse gas emissions per unit of GDP), and establish a cost-limiting safety valve to protect against high compliance costs. Each would set up a tradeable permit program to begin addressing emissions by the year 2010.

In 2004, the Energy Information Administration analyzed an earlier version of S. 1151. Under EIA's analysis, S. 1151 would achieve a 6.7% reduction in overall greenhouse gas emissions in 2010 compared with its projected business-as-usual scenario, but would not return emissions to their 2000 or 1990 levels. This contrasts with the CRS estimate that the draft amendment would reduce overall greenhouse gas emissions 2.5% in 2010 compared with EIA's business-as-usual scenario.

The two proposals represent different answers to the price-versus-quantity issue in reducing greenhouse gases. In general, market-based mechanisms to reduce CO_2 emissions focus on specifying either the acceptable emissions level (quantity) or compliance costs (price) and allowing the marketplace to determine the economically efficient solution for the other variable. If one is more concerned about the possible economic cost (price) of the program, then use of a safety valve to limit costs could appear to some more appropriate, even through it introduces some uncertainty about the amount of reduction achieved (quantity). In contrast, if one is more concerned about achieving a specific emission reduction level (quantity), with costs handled efficiently, but not capped, a tradeable permit program without a safety valve may be viewed as more appropriate. In the case of these alternatives, S. 1151 leans toward the quantity (total emissions) side of the equation; the draft amendment leans more toward the price side. This report will be updated as events warrant.

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Introduction

Climate change is generally viewed as a global issue, but proposed responses generally require action at the national level. In 1992, the United States ratified the United Nations' Framework Convention on Climate Change (UNFCCC) which called on industrialized countries to take the lead in reducing the six primary greenhouse gases to 1990 levels by the year 2000.[1] Over the past decade, a variety of voluntary and regulatory actions have been proposed or undertaken in the United States, including monitoring of power plant carbon dioxide emissions, improved appliance efficiency, and incentives for developing renewable energy sources. But carbon dioxide emissions have continued to increase.

In 2001, President George W. Bush rejected the Kyoto Protocol, which called for legally binding commitments by developed countries to reduce their greenhouse gas emissions.[2] He also rejected the concept of mandatory emissions reductions. Since then, the Administration has focused U.S. climate change policy on voluntary initiatives to reduce the growth in greenhouse gas emissions. This focus is particularly evident in the Administration's 2002 Climate Action Report (CAR) submitted under the provisions of the UNFCCC. Of the over 50 programs summarized in the 2002 CAR, only six are described as "regulatory."[3] These regulatory programs were generally implemented to achieve energy or environmental goals other than the reduction of greenhouse gas emissions, but produced a concomitant greenhouse gas emissions reduction. In this sense, they could be considered the results of a "no regrets"[4] policy where climate change effects resulting

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[1] Under the United Nations Framework Convention on Climate Change (UNFCCC) those gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Other greenhouse gases are controlled under the Montreal Protocol on Substances that Deplete the Ozone Layer, and not covered under this proposed legislation or other international agreements.

[2] For further information, see CRS Report RL30692, *Global Climate Change: The Kyoto Protocol.*

[3] Most of the programs outlined in the report involve research, technical assistance, information gathering, or technical assistance programs initiated by the federal government, or voluntary emissions reduction programs coordinated by the government.

[4] The "no regrets" policy was one of establishing programs for other purposes, that would have concomitant greenhouse gas reductions. Therefore, only those policies that reduced

(continued...)

from related air quality and energy policies are included in the decision-making process on new or modified rules.

A number of congressional proposals to advance programs designed to reduce greenhouse gases have been introduced in the 109th Congress. These have generally followed one of three tracks. The first is to improve the monitoring of greenhouse gas emissions — in order to provide a basis for research and development and for any potential future reduction scheme. The second is to enact a market-oriented greenhouse gas reduction program along the lines of the trading provisions of the current acid rain reduction program established by the 1990 Clean Air Act Amendments. The third is to enact energy and related programs that would also have the added effect of reducing greenhouse gases; an example would be a requirement that electricity producers generate a portion of their electricity from renewable resources (a renewable portfolio standard). This report focuses on the second category of bills, specifically comparing the major provisions of two proposals that received attention during the Senate's debate on the Senate version of H.R. 6 — The Energy Policy Act of 2005.

Proposed Senate Legislation: A Comparison of Two Proposals

In February 2005, Senators McCain and Lieberman introduced S. 342, the Climate Stewardship Act of 2005.[5] The primary focus of the proposed legislation is to reduce U.S. emissions of greenhouse gases through the use of flexible, market-based mechanisms. In May 2005, Senators McCain and Lieberman introduced S. 1151, an expanded version of S. 342 that includes a new title designed to encourage innovation and deployment of less carbon intensive technologies, sequester carbon emissions, or mitigate the effects of climate change. The bill's emission reduction provisions are very similar to S.Amdt. 2028 (to S. 139) of the 108th Congress, which the Senate debated in 2003. That amendment failed on a 43-55 vote. During the debate on the Energy Policy Act of 2005, S. 1151 was introduced as S.Amdt. 826 and defeated on a 38-60 vote.

As summarized in **Table 1**, S. 1151 would require mandatory and economy-wide emission reductions. Using a flexible, market-based implementation strategy, the bill would require economy-wide reductions, but permits participation in pre-certified international trading systems and in carbon sequestration programs to achieve part of the reduction requirement. The bill excludes residential and agricultural sources of greenhouse gases, along with entities that do not own a single

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[4] (...continued)
greenhouse gas emissions at no cost were considered.

[5] At the same time, Representatives Gilchrest and Olver introduced H.R. 759, which is very similar to S. 342.

facility that emits more than 10,000 metric tons of carbon dioxide equivalents annually.[6]

A draft amendment,[7] announced by Senator Bingaman, is based on the report of the National Commission on Energy Policy (NCEP) that called for a mandatory, economy-wide tradeable permit program to begin limiting greenhouse gases.[8] The Climate and Economy Insurance Act of 2005 (hereafter referred to as the "draft amendment") would mandate an accelerated reduction in the greenhouse gas intensity of the country's economy.[9] Between 2010 and 2019, the draft amendment would require a 2.4% annual reduction in greenhouse gas emissions per dollar of projected gross domestic product (GDP). After 2019, this reduction would increase to 2.8% annually.

Implementation would be through a flexible, market-oriented allowance trading program. The total number of allowances each year would be calculated based on the mandated decline in greenhouse gas intensity, and projected GDP growth. However, the draft amendment includes a cost-limiting safety valve that allows covered entities to make a payment to DOE in lieu of reducing emissions. The initial price of such payments would be $7 a ton in 2010.[10] Thus, if a covered entity chooses, it may make payments to DOE at a specific price rather than make any necessary emissions reductions.

The most notable difference between the two proposals is their approach to controlling emissions of greenhouse gases. Both would cover the majority of U.S. greenhouse gas emissions. However, while S. 1151 would place an absolute cap on emissions from covered entities, the draft amendment aims to reduce greenhouse gas intensity. Under S. 1151, while emissions from covered entities would be capped, uncovered emissions would be expected to continue to rise: ultimately, overall U.S. emissions would be expected to grow. Under the draft amendment, if it is assumed that all U.S. emissions are covered, economic growth would determine whether total U.S. emissions grow or decline: if economic growth outpaces the scheduled reductions in emissions intensity, or the proposal's safety valve is invoked, emissions could continue to grow.[11]

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[6] For more information on S. 1151, see CRS Report RS22076, *Climate Change: Summary and Analysis of the Climate Stewardship Act*, by (name redacted) and Brent Yacobucci.

[7] Announced at a press briefing held June 17, 2005, in the Dirksen Senate Office Building. The draft amendment is dated June 16, 2005. It was not introduced as an amendment during debate on the Energy Policy Act of 2005 and remains a work-in-progress.

[8] The National Commission on Energy Policy, *Ending the Energy Stalemate: A Bipartisan Strategy to Meet America's Energy Challenges* (December 2004). For background on the Commission, please refer to their website: [http://www.energycommission.org].

[9] Greenhouse gas intensity is a measure of greenhouse gas emissions per unit of Gross Domestic Product (GDP).

[10] For more information on safety valves, see CRS Report RS21067, *Global Climate Change: Controlling CO_2 Emissions — Cost-Limiting Safety Valves*, by (name redacted).

[11] If GDP growth continues at historic rates (roughly 3% to 4% per year), absolute emissions levels would be projected to increase by roughly 1% per year.

A second key difference is the establishment of a cost-limiting "safety valve" in the draft amendment. Under this proposal, covered entities in need of extra tradeable allowances may purchase them on an open market, or they can make a payment to DOE at a set price (i.e., the safety valve).[12] Under S. 1151, there is no provision to limit the price per allowance that a covered entity would be required to pay.

In addition, the two proposals differ in other ways, as well, including which entities are covered, which agency has primary responsibility for the program, how credits for early action and other activities can be generated, and how proceeds from the sale/auction of allowances will be utilized. **Table 1** compares key topics covered by the two proposals.

Table 1. Comparison of Key Topics Covered by S. 1151 and the Draft Amendment

Topic	S. 1151	Draft Amendment
Emission Reduction / Limitation Scheme	Absolute cap on total emissions from all covered entities.	Emissions target based on a progressively lower limit on greenhouse gas intensity over time and projected economic growth.
Specific Emissions Limits	Emissions from covered entities are capped at their 2000 levels beginning in 2010.	Starting in 2010, through 2019, allowable greenhouse gas intensity decreases 2.4% yearly from projected 2009 levels. After 2019, allowable greenhouse gas intensity decreases 2.8% yearly.
Greenhouse Gases Defined	Carbon dioxide, methane, nitrous oxide (N_2O), hydrofluorocarbons (HFCs), per fluorocarbons (PFCs), and sulfur hexafluoride (SF_6).	Same six gases.

[12] $7 per metric ton of carbon dioxide equivalent in 2010, increasing by 5% annually after 2010. The price is in nominal 2010 dollars.

Topic	S. 1151	Draft Amendment
Covered Entities	In metric tons of carbon dioxide equivalents: any electric power, industrial, or commercial entity that emits from any single facility owned by the entity over 10,000 metric tons carbon dioxide equivalent annually; any refiner or importer of petroleum products for transportation use that, when combusted, will emit over 10,000 metric tons annually; and any importer or producer of HFCs, PFCs, or SF_6 that, when used, will emit over 10,000 metric tons of carbon equivalent.	All "Regulated Fuel Distributors" and "Nonfuel Regulated Entities." Regulated Fuel Distributors include natural gas pipelines, petroleum refineries, natural gas processing plants, and most coal mines, as well as importers of petroleum products, coal, and coke. Nonfuel regulated entities include manufacturers and importers of hydrofluorocarbons, per fluorocarbons, sulfur hexafluoride, and nitrous oxide, as well as cement and lime producers, aluminum smelters, and certain underground coal mines.
Responsible Agency	Environmental Protection Agency (EPA), with the Department of Commerce (DOC)	Department of Energy (DOE)
General Allocating and Implementing Strategy	A tradeable allowance system is established: DOC shall determine allocations based on several economic and equity criteria, including efficiency and impact on consumers. Allowances are to be allocated upstream to refiners and importers of transportation fuel, along with producers of HFCs, PFCs, and SF_6, and downstream to electric generation, industrial, and commercial entities. Allocations to covered entities are provided at no cost.	A tradeable allowance system with cost-limiting safety valve is established: DOE shall determine allocations to covered sectors with special allocations to electric generator and energy intensive manufacturers to protect their profits. Allowances are to be allocated upstream to all Regulated Fuel Distributors and Nonfuel Regulated Entities. Allocations to covered entities are provided at no cost.
Public Sale / Auction of Allowances	DOC shall determine the number of allowances allocated to the Climate Change Credit Corporation (established by the bill). The Corporation may buy and sell allowances, and use the proceeds to reduce costs borne by consumers (see "Revenue Recycling" below).	5% of yearly allowances (increasing to 10% by 2020) to be auctioned by DOE with funds deposited in a Climate Change Trust Fund. (established by the bill). Also, see "Cost-Limiting Safety Valve" above.

Topic	S. 1151	Draft Amendment
Cost-Limiting Safety Valve	No provision.	If the allowance market price is too high, in lieu of submitting an allowance, a covered entity may submit a payment to DOE at the safety valve price. For 2010, the safety valve price is set at $7 per metric ton of carbon dioxide equivalent. After 2010, this price increases 5% annually.
Other Market Trading System Features	Up to 15% of required reductions may be achieved through pre-certified international emissions trading programs, carbon sequestration, reductions from non-covered entities, and borrowing against future reductions.	Credits may be submitted by covered entities in lieu of allowances. Credits may be generated through various means, including geologic carbon dioxide sequestration, fuel exports, and the export or destruction of HFCs, PFCs, SF_6, and N_2O.
Banking	Banking of allowances is permitted — allowances may be saved for use in future years.	Banking of allowances is permitted — allowances may be saved for use in future years.
Early Reduction Credits and Bonus Credits	Entities that reduce emissions before 2010 may receive bonus allowances for 2010 through 2015. Reductions achieved under more stringent mandatory state programs are eligible for bonus allowances. Entities that enter an agreement with EPA to reduce emissions to 1990 levels by 2010 are also allowed to achieve 20% of their reduction requirement (as opposed to 15% — see above) between 2010 and 2015 through international emissions trading, sequestration, or reductions by non-covered entities.	DOE may distribute up to 1% of a total annual allowances for early reduction projects reported under either DOE's 1605(b) program or EPA' s Climate Leaders Program.

Topic	S. 1151	Draft Amendment
Revenue Recycling	Revenue recycling to reduce consumer costs and to assist dislocated workers and affected communities, along with assistance with deploying new technology, is provided through a Climate Change Credit Corporation; however, the methodology and amount is unspecified. Assistance to low-income persons and communities is included. Further, at least 50% of revenue received must be used for technology deployment.	Revenues generated from auctions of allowances and safety valve payments are deposited in a Climate Change Trust Fund. Funds are to be allocated for adaptation, low-carbon energy technologies and vehicles, advanced energy technologies, and sequestration projects. In addition, 1% of allowances available for allocation are to be distributed to organizations that retrain, educate or provide other assistance to displaced workers.
Scope	The provisions cover the 50 states and the District of Columbia.	The provisions cover the 50 states and the District of Columbia.
Penalty for non-compliance	Excess emission penalties are equal to three times the market price for allowances on the last day of the year at issue.	Excess emission penalties are equal to three times the safety valve price for the calendar year at issue.
Other Key Provisions	Provisions include studies of research on abrupt climate change; and creation of a national greenhouse gas database, among others. A new Innovation Administration infrastructure is created, along with program initiatives to promote less carbon intensive technology, adaption, sequestration, and related activities.	Through a joint resolution of the House and the Senate, Congress may amend provisions to change the total number of yearly allowances, the allocation of those allowances, and the safety valve price.

Results: Emission Reductions

As discussed in the next section, emission reduction estimates under both options involve at least some uncertainty, particularly for the draft amendment. Thus the estimates provided in **Table 2** should be considered "ballpark" in nature.

In 2004, The Energy Information Administration (EIA) analyzed an earlier version of S. 1151.[13] Under EIA's analysis, S. 1151 would achieve a 6.7% reduction

[13] Energy Information Administration, *Analysis of Senate Amendment 2028, the Climate Stewardship Act of 2003* (May 2004). S.Amdt. 2028 is very similar to S. 1151 and is used (continued...)

in overall greenhouse gas emissions in 2010 compared with its projected business-as-usual scenario, but would not return greenhouse gas emissions to their 2000 or 1990 levels. This result contrasts with CRS's estimate that the draft amendment would result in a 2.5% reduction in overall greenhouse gas emissions in 2010 compared with EIA's business-as-usual scenario.[14]

CRS did not estimate longer term reductions from either S. 1151 or the draft amendment because of the inherent uncertainty involved in such projections. Qualitatively, it can be stated that emissions of greenhouse gases would likely continue to increase under both options, although somewhat more slowly than business-as-usual. In the case of S. 1151, the percentage of greenhouse gases not covered by the bill would increase and would be uncontrolled by the reduction program. Thus, the initial reduction in emissions achieved in 2010 would be slowly eaten up over time. In the case of the draft amendment, covered emissions would continue to grow to the extent that projected economic growth outstripped the 2.4% annual reduction in carbon intensity (2.8% beginning in 2020), and to the extent that increased costs drove covered entities to invoke the safety valve rather than further reduce emissions. In the longer term, emissions could potentially rise faster under the draft amendment than under S. 1151.

Table 2. Projected Emissions Under S. 1151 and Draft Amendment

(billions of metric tons of carbon dioxide equivalents)

Year	Reference Case	S.Amdt. 2028 (surrogate for S. 1151)	Draft Amendment
1990	6.1	6.1	6.1
2000	7.0	7.0	7.0
2010	8.1	7.6	7.9

Sources: 1990 and 2000 data: U.S. submission to the United Nations Framework Convention on Climate Change, 2010 projections. For S.Amdt. 2028: Energy Information Administration, *Analysis of Senate Amendment 2028, the Climate Stewardship Act of 2003* (May 2004). S.Amdt. 2028 is very similar to S. 1151 and is used as a surrogate here. However, the number of covered entities may be more or less under S. 1151 then assumed here, so the estimates may understate or overstate actual reductions that would be achieved under S. 1151. For the draft amendment, calculations by CRS are based on projected GDP and carbon intensity improvements by Energy Information Administration, *Annual Energy Outlook 2005*, DOE/EIA-0383(2005), February 2005. See text for discussion of uncertainties surrounding the draft amendment's estimate. Estimates do not take into account the potential for carbon sequestration.

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[13] (...continued)
as a surrogate here. However, the number of covered entities may be greater or fewer under S. 1151 than assumed here, so the estimates may understate or overstate actual reductions that would be achieved under S. 1151.

[14] Assumptions for analysis are discussed in the next section.

Analysis: Addressing the Price versus Quantity Issue

Uncertainty in Emission Reductions

The projected emission reductions under the draft amendment are more uncertain than under S. 1151. The primary source of uncertainty for S. 1151 is the precise number of covered entities that must meet the reduction requirements. In EIA's analysis of previous versions of S. 1151, the assumed coverage is about 75%; supporters of the bill have suggested the coverage is about 85%. The difference is significant as higher coverage means more reductions than estimated by EIA and more certainty about their quantity; lower coverage means lower compliance costs, but greater uncertainty about quantity.

Table 3. Factors Potentially Affecting Emission Reductions

	S. 1151	Draft Amendment
GDP Growth	No	Yes
Carbon Intensity Improvement	No	Yes to year 2009
Covered Entities	Yes	Yes
Safety Valve	No	Yes

As indicated in **Table 3**, the draft amendment has several uncertainties with respect to emissions reductions. Unlike S. 1151, which defines a historic emissions baseline which covered entities must achieve, the draft amendment calculates a future baseline from projections of 2009 GDP growth and carbon intensity improvement. Both of those variables are uncertain. In EIA's current projections, economic growth to 2010 is assumed under its three scenarios to range from 2.5% annually (low case) to 3.6% annually (high case) with its reference case set at 3.1% annually. CRS calculations presented in **Table 2** assume the reference case assumption of 3.1% annual GDP growth. However, as indicated here, this estimate could be off by 20%, or more.

Likewise, the carbon intensity improvement projection is uncertain. Based on EIA projections, CRS estimated a 2009 carbon intensity of 165 million metric tons carbon equivalent per million dollars GDP (MMTCE/M$GDP) for its calculations. However, based on the President's Climate Change Initiative, the targeted 2009 carbon intensity is in the range of 159 MMTCE/M$GDP).[15] Likewise, improvement could be less than projected, as current intensity levels are considerably higher than

[15] See CRS Report 98-235 ENR, *Global Climate Change: U.S. Greenhouse Gas Emissions — Status, Trends, and Projections*, by (name redacted) and (name redacted).

those projected under the initiative. The 2002 estimate of carbon intensity is 183 MMTCE/M$GDP.

Like S. 1151, the draft amendment raises some questions as to the exact extent of its coverage. The CRS estimate in **Table 2** assumes 100% coverage. However, there are potentially entities not covered under the draft amendment.

The final uncertainty affecting emissions reductions achieved under the draft amendment is the safety valve. All analysis done of previous versions of S. 1151 indicate that a $7 per ton of carbon dioxide safety valve would be triggered immediately.[16] In contrast, the Energy Information Administration's analysis projects the safety valve would be triggered around the year 2015.[17] As the degree to which reductions could be achieved before the safety valve would be triggered is disputed, another layer of uncertainty is added to the emission reductions achieved under the draft amendment, particularly in the longer term.

Uncertainty in Cost Estimates

The projected cost under S. 1151 is more uncertain than under the draft amendment. A major source of uncertainty for S. 1151 is future growth in greenhouse gas emissions by covered entities. Because S. 1151 establishes a firm cap on greenhouse gas emissions based on the year 2000, any increased emissions resulting from continuing economic growth would have to be offset. The more robust the economic growth, the greater potential for more emissions that would have to be offset to maintain the cap. In general, more emission reductions probably means higher costs. If economic growth is less robust, fewer reductions would have to be made and costs would be less.

S. 1151 cost estimates are affected by several other uncertainties. In three studies conducted on the cost of previous versions of S. 1151, two studies placed the potential permit price in 2010 at $9 a ton (2001$), and one at $15 a ton (2001$). The sources of the differing estimates are different assumptions about the availability of the following: (1) cost effective energy efficiency improvements, (2) cost-effective non-CO_2 greenhouse gas reductions, (3) cost-effective carbon sequestration and international credits, and (4) future natural gas supply. With a program designed to achieve a least-cost solution through a market-based allowance trading system, restricting the availability of options increases projected costs. The range between the two studies indicating $9 a ton and the one indicating $15 a ton illustrates the sensitivity and uncertainty surrounding S. 1151's potential costs.[18]

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[16] See CRS Report RS22076, *Climate Change: Summary and Analysis of the Climate Stewardship Act (S. 342, S. 1151, and H.R. 759)*, by (name redacted) and Brent Yacobucci.

[17] The National Commission on Energy Policy, *Ending the Energy Stalemate: A Bipartisan Strategy to Meet America's Energy Challenges* (December 2004), p. 26. Also: Energy Information Administration, *Impacts of Modeled Recommendations of the National Commission on Energy Policy*, Report SR/OIAF/2005-02 (April 2005).

[18] For more, see CRS Report RS22076, *Climate Change: Summary and Analysis of the Climate Stewardship Act (S. 342, S. 1151, and H.R. 759)*, by (name redacted) and Brent

(continued...)

The draft amendment's cost estimates are not as sensitive to the factors identified above. Partly this is by design, and partly this is because the draft amendment requires less emission reductions than S. 1151. Unlike S. 1151, the draft amendment incorporates economic growth into its emissions limitation target, permitting some increase in future emissions if projected economic growth exceeds the mandated improvement in greenhouse gas intensity. Fewer offsets required translates into lower costs.

Like S. 1151, the draft amendment's projected cost is affected by the assumed availability of cost-effective control measures, such as those noted above — energy efficiency improvements, cost-effective carbon sequestration and non-CO_2 greenhouse gas reductions, along with assumed future natural gas supply. However, the draft amendment does not extend its flexible market implementation program to international credits in the manner that S. 1151 does. Thus, no uncertainty (or possible lower costs) is introduced by the potential for international trading.

The National Commission on Energy Policy placed the permit price of its proposal (on which the draft amendment is based) at $5 a ton in 2010 (2004$). Although there are uncertainties in the draft amendment's potential costs, its safety valve puts a firm limit on its upside risk — $7 a ton (nominal 2010$). Converting these estimates to 2001 dollars, the projected permit price for the draft amendment would be $4.8 - $5.9 a ton (2001$).[19] Besides putting a ceiling on upside cost, the draft amendment's safety valve narrows the band of potential costs substantially. The remaining cost uncertainty is with respect to the lower bound of costs.

Price versus Quantity: The Safety Valve

The purpose of a safety valve is to bound the costs of any climate change control program (price) at the expense of reductions achieved (quantity).[20] In general, market-based mechanisms to reduce CO_2 emissions focus on specifying either the acceptable emissions level (quantity), or compliance costs (price), and allowing the marketplace to determine the economically efficient solution for the other variable. For example, a tradeable permit program sets the amount of emissions allowable under the program (i.e., the number of permits available caps allowable emissions), while letting the marketplace determine what each permit will be worth. Likewise, a carbon tax (or the safety valve contained in the draft amendment) sets the maximum unit (per ton of CO_2) cost that one should pay for reducing emissions, while the marketplace determines how much actually gets reduced. In one sense,

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[18] (...continued)
Yacobucci.

[19] For the safety valve, EIA estimated its 2003 dollar valve at $6.10 a ton. CRS converted it, along with the NCEP cost estimate to 2001 dollars using the GDP implicit price deflator. See Energy Information Administration, *Impacts of Modeled Recommendations of the National Commission on Energy Policy*, Report SR/OIAF/2005-02 (April 2005).

[20] See CRS Report RS21067, *Global Climate Change: Controlling CO_2 Emissions — Cost-Limiting Safety Valves*, by (name redacted).

preference for a pure tradeable permit system or inclusion of a safety valve depends on how one views the uncertainty of costs involved and benefits to be received.

For those confident that achieving a specific level of CO_2 reduction will yield significant benefits — enough so that even the potentially very high end of the marginal cost curve does not bother them — a pure tradeable permit program may be most appropriate. CO_2 emissions would be reduced to a specific level, and in the case of a tradeable permit program, the cost involved would be handled efficiently, though not controlled at a specific cost level. This efficiency occurs because through the trading of permits, emission reduction efforts concentrate at sources at which controls can be achieved at least cost.

However, if one is more concerned about the potential downside risk of substantial control costs to the economy than of the benefits of a specific level of reduction, then including a safety valve may be most appropriate. In this approach, the level of the safety valve effectively caps the marginal cost of control that affected entities would pay under the reduction scheme, but the precise level of CO_2 achieved is less certain. Emitters of CO_2 would spend money controlling CO_2 emissions up to the level of the safety valve. However, since the marginal cost of control among millions of emitters is not well known, the overall emissions reductions for a given safety valve level on CO_2 emissions cannot be accurately forecast. In essence, the safety valve on the draft amendment could be seen as a contingent carbon tax.

Hence, a major policy question is whether one is more concerned about the possible economic cost of the program and therefore willing to accept some uncertainty about the amount of reduction received (i.e., a safety valve); or one is more concerned about achieving a specific emission reduction level with costs handled efficiently, but not capped (i.e., pure tradeable permits). S. 1151 leans toward the quantity (total emissions) side of the equation; the draft amendment leans more toward the price side.

Conclusion

The two proposals — S. 1151 and the draft amendment — would establish market-based systems to limit emissions of greenhouse gases. However, the proposals differ in how those systems would work. S. 1151 would establish an absolute cap on emissions from covered entities, and would allow entities to trade emissions under that cap. The draft amendment would limit greenhouse gas emissions intensity and establish a cost-limiting safety valve to protect against high compliance costs. Under both proposals, short-term U.S. emissions would likely be below a business-as-usual scenario, although reductions under S. 1151 are likely to be larger and more certain. In contrast, the cost of the draft amendment is likely to be less and more predictable. However, under both proposals, total U.S. emissions could be expected to continue their upward trend, albeit at a slower rate than currently forecasted.