No State Left Behind:
A Better Approach to Climate Policy

An E3-SEI Climate Policy White Paper

by

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Introduction

U.S. climate policy is essential to halting global climate change. To succeed in reducing emissions, climate policy must be rigorous and based on sound economic principles. To successfully make its way through Congress, it must address its disproportionate effects on lower-income groups and on the states with the most greenhouse gas emissions per person today.

Our recent study (Stanton and Ackerman 2010) presented a new model of the economic impacts of carbon prices, rebates, and green investments by state and by income group, as well as an overview of the recent economic literature on climate policy. Our most important finding was a pair of rules for the design of climate policy:

- The price of carbon (whether it is a tax, fee, or permit price) determines how much the policy reduces greenhouse gas emissions. As long as a large share of carbon revenues is returned to households, the price of carbon has little effect on equity among states or among income groups.
- In contrast, rebates to households primarily determine how equitable the policy is among states and among income groups. The share of revenues returned to households has little impact on the extent of emission reductions.

In this white paper we discuss our findings in the context of three climate bills recently considered by Congress — the American Clean Energy and Security Act of 2009 (Waxman-Markey), passed by the House in June 2009, and the Carbon Limits and Energy for America's Renewal (CLEAR) Act (Cantwell-Collins) and American Power Act (Kerry-Lieberman), both introduced in the Senate — and set out seven key questions that we, and our elected representatives, should be asking about any climate policy proposal.

Seven Questions for a Good Climate Policy

Our analysis identified several policy measures that are essential to making climate bills successful. That analysis leads to seven questions to ask about any proposed climate legislation.

1. Are the emissions targets low enough to do the job?

Legislation before Congress in 2010 calls for emission reductions below 2005 levels on the order of 17 to 20 percent by 2020, 42 percent by 2030, and 83 percent by 2050. While reaching these targets would represent a big improvement over current practice, there are at least two problems. First, the targets allow a comparatively slow start, assuming that the pace of emission reduction will accelerate sharply after 2030. Second, even an 83-percent U.S. reduction by mid-century may not be enough to achieve the global emission reductions that are needed. It is at the looser end of IPCC recommendations,[1] and current climate science suggests that tighter standards may be needed. In a previous study, we found that lowering carbon dioxide (CO_2) concentrations in the atmosphere from today's 385 parts per million (ppm) to the recommended "safe" level of 350 ppm by 2200 would require reduction in emissions to 98 percent below 2005 by 2050, or massive use of carbon sequestration (primarily reforestation) to remove CO_2 from the atmosphere (Ackerman et al. 2009). Faster reductions will require tighter emission limits and, consequently, higher carbon taxes or

[1] To stabilize atmospheric concentrations at 450 ppm of CO_2-equivalent (roughly comparable to 350 ppm of CO_2 alone), the IPCC's 2007 report projected a need for 80- to 95-percent reductions from 1990 in developed countries (Working Group III 2007, p. 776). For the United States, this is equivalent to an 83- to 96-percent reduction from 2005 levels, because emissions grew by 19 percent from 1990 to 2005 (EPA 2010).

prices, than the current legislative targets. This need not mean greater economic burdens: If household rebates are a large share of revenues, a high carbon price can still lead to net benefits for most households (Stanton and Ackerman 2010).

2. Will price ceilings interfere with emission reductions?

All the recent legislative proposals include low price ceilings, $32 to $41 per metric ton of CO_2 in 2020. Staying below these ceilings will make it impossible to meet even the modest proposed emission reduction targets, unless large-scale non-price efficiency and clean energy measures are also undertaken. We found that achieving a 17-percent emission reduction below 2005 levels by 2020 would require a $75 per metric ton CO_2 carbon price *and* a vigorous program of investment in energy efficiency (Stanton and Ackerman 2010). All three current bills, however, treat their low price ceilings as absolute limits, and would release additional permits when the ceiling is reached; more permits in the system would allow higher emissions, ensuring a failure to hit the reduction goal.

Enforcing a strict emissions cap under a market-based climate policy requires either that the carbon price can vary freely (i.e., without a ceiling) in response to the supply and demand for permits; or that non-price measures such as government regulation and green investments be used to reduce demand if the market hits the price ceiling.

The insistence on price ceilings is based on the mistaken notion that a higher carbon price has to mean a greater economic burden on consumers. Our model shows that even with very high carbon prices, equal per capita rebates of most of the revenue can ensure that there are net benefits to all but the richest households (Stanton and Ackerman 2010). With that in mind, it is worth considering a much broader range of carbon prices. In much of Western Europe, gasoline prices are $4 a gallon higher than in the United States. We would reach that level if we had a carbon price of $400 per metric ton of CO_2 that was passed on in higher prices at the gas pump. European countries with high-priced gasoline have a quality of life much like ours — but they have lower carbon emissions per capita, and use energy much more efficiently than we do.

3. Will a significant share of revenues be rebated to households?

If businesses pass on the costs to their customers, a carbon tax or a system of carbon permits will mean "carbon costs" for every household. At a $75 per metric ton CO_2 carbon price in 2020, we estimate these costs would range from an average of 6.3 percent of income for the poorest tenth of U.S. households, to 2.4 percent of income for the richest tenth. This would be an important increase to many families' budgets, and the impact would be felt most strongly by those with lower incomes and by residents of states that rely primarily on coal for their electricity generation.

To assure that half of all households receive a net benefit from carbon policy, at least 65 percent of all carbon revenues must be returned to households. If 85 percent of the revenues are returned to households, 80 percent of all U.S. households would receive a net dividend, i.e. a rebate greater than their carbon costs (Stanton and Ackerman 2010). Alternatively, part or all of revenues could be returned to households as a reduction to payroll taxes or an increase to the Earned Income Tax Credit or Social Security payments, while still giving a net gain to all working- and middle-class households (Burtraw et al. 2009).

4. Are emission permits given away?

Under a cap-and-trade policy, funds are available for significant rebates to households only if permits are sold rather than given away. This choice — whether to sell permits or give them away — makes little or no difference in how effective legislation is at reducing emissions, but it makes all the

difference to whose pocket the carbon revenues end up in. Carbon prices work by increasing prices on carbon-intensive goods, thereby giving customers an incentive to buy something else instead. When carbon permits are given away, businesses will "pass along" the cost of the permits — even though they didn't pay for them! If permits are sold (or a carbon tax is adopted) and the revenues are rebated to households, the money ends up with households. If the revenues are collected and used for green investments, the money ends up creating new green jobs. But if permits are given away, the revenue goes to private companies in the form of higher profits: Prices paid by customers go up, while costs of production are unchanged.

5. Are large-scale investments made in energy efficiency?

One area in which states with the highest per capita greenhouse gas emissions today may have an advantage is in implementing low- and even no-cost energy efficiency measures. States that have little in the way of an existing green economy — with a long way to go in terms of assisting households and businesses to conserve energy — may find energy efficiency options that are "low-hanging fruit." States that have made the most progress in building a green economy may have already exhausted some of their lowest-cost options. Based on research showing that an investment of 4.5 cents in efficiency measures can reduce energy use by 1 kWh, we model a 15-percent reduction in electricity emissions from energy efficiency by 2020, with investments targeted to the most coal-intensive states. To achieve a 17-percent reduction in total emissions by 2020 while staying below existing bills' carbon price ceilings, our projected level of energy efficiency savings would have to be tripled (Stanton and Ackerman 2010).

6. Is there a strategy for retiring coal plants?

Rebating climate policy revenues back to households is not the only way to protect states and households from high carbon costs. Plowing climate policy revenues into building natural gas and renewable power plants in order to retire coal generation would greatly reduce carbon costs, in exactly the places where it is most needed: the states with the most coal-dependent electricity systems, and therefore the highest per capita emissions. These are the states whose residents will face the highest costs from climate policy, and the smallest net gains (or in some scenarios, net losses) even after receiving their per capita dividends.

Although many activities affect carbon emissions, the use of coal is, not surprisingly, the key to interstate variation in per capita emissions. Electricity generated from coal results in twice the emissions of natural gas generation. Looking at the full life-cycle emissions — from mining materials and building facilities to generating electricity and disposing of wastes — coal is 2.4 times more carbon-intensive than natural gas, 33 times more intensive than photovoltaics, and 105 times more intensive than wind or hydroelectric power.

Nuclear power, sometimes touted as the solution to retiring coal and reducing electricity emissions, is a more problematic alternative. It remains quite expensive, in no small part due to the high cost of numerous essential safety precautions. It requires substantial amounts of cooling water, which will be a scarce resource in a climate-constrained future. And the long-term problem of nuclear waste disposal has not yet been solved (Stanton and Ackerman 2010).

Replacing coal does not have to pose a large economic burden: A detailed scenario for phasing out all coal generation by 2050, while also reducing the use of nuclear power, has been projected to cost just $9.6 billion in 2020 — less than the energy efficiency investment assumed in our model — and would start to save money, on balance, before 2040 (Keith et al. 2010). It is difficult to see how the United States could meet its emission reduction targets without a strategy for replacing coal.

7. Is green investment directed toward the states most affected by climate policy?

Climate policy will not affect all states equally; states differ widely in carbon-intensity of electricity generation, heating and cooling requirements, and transportation needs. Rebating funds to households or states in proportion to their carbon costs would undermine the market incentive for emission reduction – and that incentive effect is the central purpose of a carbon price. A better way to address inequitable impacts is to target green investment, in such areas as energy efficiency and retirement of coal plants, to the states with highest costs from climate policy, simultaneously creating green jobs and lowering their greenhouse gas emissions.

The employment impacts of retiring all coal plants would be negligible – in 2007, coal miners represented 0.05 percent (i.e., 5/100^{ths} of 1 percent) of the U.S. labor force. Even in Wyoming, with the nation's largest share of employment in coal mining, they were only 2.2 percent of the workforce. This means that providing job retraining or other supports for them would be relatively inexpensive; it can be built into plans for green jobs and energy efficiency projects (Stanton and Ackerman 2010).

How do existing climate bills measure up?

After a decade of delays, climate legislation has made it back onto the agenda of both chambers of Congress in 2010. The three highest-profile carbon policies considered in the 111th U.S. Congress are Waxman-Markey in the House, and Cantwell-Collins and Kerry-Lieberman in the Senate. Each bill exhibits some, but not all, of the principles of good climate policy described in the preceding section. All three bills require important revisions to assure that they can make an effective and equitable contribution to reducing global greenhouse gas emissions.

What follows is a brief evaluation of each of the bills, relative to our seven questions. A more complete description of the bills can be found in the appendix.

Waxman-Markey:

1. This bill's greenhouse gas emission caps are too high to meet the goals set by today's climate science.
2. A "safety valve" allows for greater emissions if the carbon prices hit the bill's price ceiling of $41 per metric ton CO_2 in 2020.[2]
3. Starting in 2025, some revenue is rebated to households on an equal per capita basis – about 28 percent in 2030, rising to 55 percent in 2050. Another share of revenue is targeted to households as a rebate on electricity bills – a policy that could tend to negate the incentive effect of a carbon price.[3]
4. The bill would begin by giving away 80 percent of permits to industry, a share that would fall to 30 percent by 2030.
5. Waxman-Markey requires that 20 percent of electricity come from renewables by 2020, along with several measures directing revenues towards energy efficiency investments.
6. There is no explicit provision for rapid retirement of coal plants.

[2] Waxman-Markey allows 5 percent real annual escalation in the ceiling price through 2014, then switches to a more complex escalator. Our calculation assumes that 5 percent annual escalation continues through 2020. All ceiling prices cited in this white paper are in today's dollars; all the bills also allow inflation adjustments.
[3] Waxman-Markey suggests but does not require that these rebates be made as a share of fixed costs of electricity service; nonetheless, distributing rebates through private companies seems administratively problematic.

7. There is no explicit provision for targeting investments toward the most affected states.

Also note that with 80 percent of permits given away in the early years of Waxman-Markey, there will be little revenue to use to support energy efficiency measures, retiring coal, or other green investments to the most affected states.

Cantwell-Collins:

1. The greenhouse gas emissions caps are too high to meet the goals set by today's climate science.
2. The bill contains a safety value to release additional permits when the price reaches its $32 per metric ton CO_2 price ceiling in 2020 (the lowest ceiling among the three bills).
3. Under the Cantwell-Collins "cap-and-dividend" policy, 75 percent of all revenues are returned to households on an equal per capita basis. This is a far larger rebate than in the other two bills, but is still not large enough, according to our model, to assure net benefits from climate policy to the median household in every state.
4. Cantwell-Collins is the only bill in which all permits are auctioned.
5. The remaining 25 percent of revenues (after the 75 percent rebate to households) is available for clean energy and efficiency investments.
6. There is no explicit provision for retiring coal plants; with such a low carbon price it is unclear whether the clean energy and efficiency investments would be sufficient to retire coal.
7. Language in the bill regarding assistance to workers and communities affected by the legislation seems to indicate that investments will be targeted toward the most affected states.

Kerry-Lieberman:

1. Here too, emission caps are not low enough to meet goals set by climate science.
2. A safety value allows for emissions higher than capped levels if the $37 per metric ton CO_2 price ceiling in 2020 is reached.
3. Starting in 2026, a fund is set up to give rebates to households, up to a maximum of 58 percent of total permit revenues in 2035–2050. In addition, 10 to 12 percent of revenues support energy refunds for the poor and a "working families" credit. As in Waxman-Markey, a large share of early-years revenues is targeted toward reducing utility bills — a measure that would work against carbon price incentives.
4. Kerry-Lieberman gives away 77 to 81 percent of permits from 2013 to 2026, and 25 percent after 2030.
5. A small share of revenues goes towards energy efficiency.
6. Much more support goes to expanding nuclear power generation, and research and development on carbon capture and storage technology, with the hope of keeping coal plants running well into the future.
7. With most permits given away through the 2020s, little revenue will be available from this bill to target green investment toward the states most affected by climate policy.

In short, none of these bills meets all of our criteria as written. All three, however, contain language that points towards several of our recommended policy measures and could serve as the basis — after further revisions — for a robust climate policy. The pressing need is for a policy that can get the job

done by reducing greenhouse emissions soon enough to halt the worst effects of climate change, promoting equity among households and states strongly enough to win political acceptance in Congress, and demonstrating to the international community the United States' commitment to building a low-carbon economy.

Appendix: Detailed Description of Three Climate Bills

Waxman-Markey

The American Clean Energy and Security Act of 2009, unveiled in March 2009 by U.S. Reps. Henry A. Waxman (D-Calif.) and Edward J. Markey (D-Mass.) and approved by the House, after major amendments, in June 2009, aims to reduce greenhouse gas emissions by 20 percent below 2005 levels by 2020, 42 percent by 2030, and 83 percent by 2050, targeting seven gases and focusing on major stationary emissions sources, such as power plants and refineries.[4]

Waxman-Markey is a cap-and-trade bill, with a large share of permits given away to businesses; in the first several years, only about 20 percent of allowances are auctioned, though that ultimately rises to about 70 percent in 2030 and beyond. The largest share of giveaways — 37.5 percent of total allowances in 2012, declining to 30 percent in 2016–2025 and phased out in 2026-2030 — would go to electric utilities, which could use their windfall only to directly benefit consumers (preferably, the bill says, as a rebate on fixed costs, or else through lower rates).

Other permits (up to 15 percent of the total, depending on the year) would be given to energy-intensive, "trade-exposed" industries (often said to include industries such as steel, cement and paper producers); states would get permits to promote energy efficiency and renewable energy; auto manufacturers would get permits to help retool factories and deploy electric and hybrid vehicles; and 5 percent of permits would go to power plants and industrial sources that met specific targets with carbon capture and sequestration (CCS) technology.[5] In addition, the bill allows extensive use of domestic and international offsets in lieu of actual emissions reductions, up to 2 billion tons of CO_2-equivalent (CO_2-e) per year, with the share of emissions that can be "traded for" offsets rising from 30 percent in 2013 to 66 percent in 2050. To further assure market stability, the bill includes a price collar, with a floor price set at $10 per metric ton of carbon dioxide (mT CO_2) in 2011, to rise by 5 percent above inflation each year, and a ceiling of $28/mT CO_2 in 2012, rising at 5 percent above inflation until 2014, then set at 60 percent above a rolling 36-month average of the daily closing price of that year's allowances. If prices reach the ceiling, a limited amount of "strategic reserves" are released to help stabilize the market.

Energy efficiency is a big part of Waxman-Markey. The bill requires that 20 percent of electricity come from renewables by 2020, but allows up to 25 percent of those obligations to be met through electricity conservation measures, or up to 40 percent if a state requests it. As noted above, the bill also directly supports states' efficiency and clean-energy initiatives with permit giveaways — 9.5 percent of the total in the initial years. Eligible "clean" sources are wind, solar, geothermal, biomass or landfill gas, some kinds of hydropower, marine and hydrokinetic renewable energy. Hydroelectric, nuclear and CCS generation are not included in base sales, and nuclear power is not explicitly endorsed as a clean-energy option, though an EPA analysis identified nuclear power as a key source of clean energy under Waxman-Markey and envisioned a substantial increase in nuclear generation capacity (EPA 2009).

One major change for states under Waxman-Markey is that all state and regional cap-and-trade programs would be suspended from 2012 to 2017, to allow a stronger start for the federal system. Holders of permits issued by California or any regional cap-and-trade system could exchange them for federal permits. States would still be allowed to set low-carbon fuel standards and other greenhouse gas limits, however, as long as they don't involve cap-and-trade mechanisms. They

[4] Except where otherwise noted, this section is based on materials from the bill sponsors and on a detailed analysis by the World Resources Institute (Larsen et al. 2009).
[5] For a detailed listing, see Larsen et al. (2009).

could also require emitters to use federal emission permits to comply with state regulations to reduce greenhouse gases.

Waxman-Markey specifically bars the EPA from regulating greenhouse gases under most provisions of the Clean Air Act, but makes it the enforcer of most of the standards set by the new law. It also requires the EPA to regulate black carbon;[6] set performance standards for greenhouse gases from uncapped stationary sources emitting more than 10,000 mT CO_2; set emissions standards for some mobile sources; set standards for CCS storage sites, and more.

Along with the early-years allocations to reduce consumers' electricity costs, Waxman-Markey includes two other provisions for returning carbon policy revenues to households:
15 percent of revenue would fund energy tax credits and energy rebates for low-income consumers; and starting in 2025, revenue that isn't set aside for other purposes — about 28 percent in 2030, rising to 55 percent in 2050 — would go into a Climate Change Consumer Refund Account, which would be paid out to taxpayers as annual rebate checks, on a per capita basis.

Cantwell-Collins

The Carbon Limits and Energy for America's Renewal (CLEAR) Act, unveiled in December 2009 by U.S. Sens. Maria Cantwell (D-Wash.) and Susan Collins (R-Maine), is a cap-and-dividend policy; it should also be noted that this is simple, narrowly defined bill and not a comprehensive energy and climate bill like Waxman-Markey or Kerry-Lieberman. The bill, which would only cap CO_2 emissions — not the full array of greenhouse gases — has the same economy-wide greenhouse gas emission reduction goals as Waxman-Markey — 20 percent below 2005 levels by 2020, 42 percent by 2030, and 83 percent by 2050 — but with reductions expected to come from the combination of price incentives and green investments.[7] Capped sources would require permits to emit, but while under Waxman-Markey, most permits are given away for the first several years, under Cantwell-Collins, all permits are auctioned and no trading is permitted. Seventy-five percent of the proceeds are refunded directly to U.S. households in equal per capita monthly dividends.

The remaining 25 percent of auction revenue would fund a Clean Energy Reinvestment Trust (CERT) to support clean energy and efficiency investments; provide aid to energy-intensive and trade-exposed industries; assist workers and communities affected by the legislation; support adaptation to climate change; and finance projects to reduce greenhouse gas emissions from uncapped sources, black carbon, and other pollutants. These measures are a crucial part of the bill: The caps in Cantwell-Collins would cover an estimated 82 percent of GHG and 96 percent of CO_2 emissions, and the legislation's sponsors do not anticipate that enforcing them will be enough to meet the economy-wide targets.

Cantwell-Collins cap and permit system is designed as an "upstream" cap, targeting all the sources of fossil fuels entering the U.S. economy: coal mines, oil and natural gas wells, and importers of fossil fuels — about 2,000 companies, by the sponsors' estimate. Only those "first sellers" of fossil fuels may participate in the permit market, and they are forbidden to participate in a secondary derivatives market. There is, however, one other source of permits: "Midstream" players such as power plants, refineries and mobile sources can earn permits by capturing and sequestering carbon, and then sell them (say, to their coal supplier); those permits are in excess of the annual cap. Like Waxman-Markey, this bill also includes a price collar, starting at \$7/mT CO_2 as a minimum and \$21/mT CO_2 as a maximum in 2012, and rising annually at inflation plus 5.5 percent and 6.5 percent, respectively. Cantwell-Collins also provides for payments towards carbon sequestration but

[6] Better known as soot, black carbon is the product of incomplete burning of fossil fuels, biofuels and biomass., and is an important contributor to climate change (Ramanathan and Carmichael 2008).
[7] This section is drawn from the bill text, supporting materials from the sponsors (Office of U.S. Sen. Maria Cantwell 2009a; 2009b; 2009c), and a Pew Center on Global Climate Change (2010a) analysis.

– unlike Waxman-Markey and Kerry-Lieberman's offsets – these emission reductions are in addition to (and not instead of) reductions in U.S. emissions from burning fossil fuels.

Notably absent from the bill are two other key provisions from Waxman-Markey: The EPA's authority to regulate greenhouse gases is not curtailed, and states' cap-and-trade systems are left untouched, as are any other emissions reduction efforts.

Kerry-Lieberman

The American Power Act, unveiled in May 2010 by U.S. Sen. John Kerry (D-Mass.) and U.S. Sen. Joseph Lieberman (I-Ct.), is a cap-and-trade bill with economy-wide emissions reduction goals that are basically the same as the other two bills': 17 percent below 2005 levels in 2020, 42 percent below in 2030, and 83 below in 2050, plus a short-term goal of 4.75 percent below 2005 by 2013.[8] Like Waxman-Markey, it covers not just CO_2, but also a half-dozen other greenhouse gases, and it focuses on large, stationary emissions sources – specifically, the roughly 7,500 major sources that emit greater than 25,000 mT CO_2-e per year, including power plants and refineries, plus, starting in 2016, natural gas distributors and a limited range of industrial sources; altogether, the capped sectors produce an estimated 85 percent of U.S. greenhouse gas emissions (Doniger 2010).

Like Cantwell-Collins, the bill also limits access to the permit auction market, but less sharply: Along with covered entities, a limited number of "greenhouse gas market participants" regulated under the Commodity Exchange Act may participate in the auction and primary cash markets. A secondary market for derivatives is open to all, but in a highly regulated setting. There is also a price collar, starting with a floor of \$12/mT CO_2-e, rising at 3 percent over inflation annually, and a ceiling of \$25/mT CO_2-e, rising at 5 percent over inflation annually.

Most of the permits in the early years are given away, not auctioned (77 to 81 percent from 2013 to 2026, and 25 percent after 2030, are given away). In the first year, 2013, 51 percent of total permits are given away to electric utilities who are obligated by the legislation to reduce their customers' electric bills; that share drops to 35 percent from 2016 to 2025, then gets phased out by 2030. Natural gas companies also get significant giveaways to pass on to consumers, starting at 9 percent of total permits in 2016 (when their cap begins) and declining to 1.8 percent in 2029.

A smaller, but still substantial share of permits are given away to refiners (4.3 percent of the total in 2013–2015, 3.75 percent through 2025, then phasing out by 2030) and in support of clean energy research and development, industrial energy efficiency, clean-vehicle technology, and to offset electricity and natural-gas rate increases for industrial rate-payers. Energy-intensive and trade-exposed industries get 2 percent of giveaways in 2013 to 2015, then 15 percent through 2025, phasing out by 2030. In addition, states and local areas get free permits to support renewable energy and energy efficiency, transportation emissions reduction, and rural energy savings and adaptation projects, and in early years, to assist home heating oil and propane users. The bill also provides for a "border adjustment mechanism" to impose a surcharge on imports from countries that have not taken action to limit emissions, provided that no global agreement on climate change is reached.

Direct aid to consumers, meanwhile, comes in three forms. To "benefit and protect disproportionately impacted consumers," the bill calls for 10.6 to 12.3 percent of permits to be auctioned in 2013-2029, to support monthly payments to households up to 150 percent of the poverty line, aiming to offset their increased costs, as well as more limited annual tax refunds (up to 2.5 percent of total permits) for households between 150 and 250 percent of poverty; the latter ends in 2029, but the monthly

[8] Except as noted in the text, this section is drawn from the bill text, supporting materials from the sponsors (Offices of U.S. Sens. John Kerry and Joseph Lieberman 2010), and analyses by the Pew Center on Global Climate Change (Pew 2010b), the Georgetown Climate Center (Zyla et al. 2010), the World Resources Institute (Larsen et al. 2010), and Resources for the Future (Morris 2010).

payments continue through 2050, supported by auction revenues from 11.5 to 12.5 percent of permits, depending on the year. In addition, starting in 2026, permits are to be auctioned to support a Universal Trust Fund — the share starts at 8.1 percent of the total and rises to 77.8 percent in 2035–2050; 75 percent of the revenues are returned to households on an equal per capita basis, while the rest is used for deficit reduction. This means that in 2035 and beyond, 58.35 percent of total carbon revenues are paid to households.[9]

Some of the most controversial provisions in Kerry-Lieberman involve nuclear power generation and offshore drilling. To support nuclear energy development, Kerry-Lieberman roughly triples the size of the existing loan guarantee program, to $54 billion, doubles the current regulatory risk insurance program to cover up to 12 reactors, creates a new investment tax credit to spur plant construction, accelerates depreciation for nuclear plants, streamlines aspects of the licensing process, and designates a nuclear waste reprocessing "Center of Excellence." With regard to offshore drilling, the bill creates new protections for coastal states, allowing them to opt out of drilling up to 75 miles from their shores and allowing nearby states to "veto" any drilling as well if they can show they could suffer significant adverse impacts in the event of an accident. However, the bill also generously rewards states that do allow offshore drilling, guaranteeing them 37.5 percent of the federal royalty revenue (up to $500 million per year), with 20 percent of each state's share paid directly to local governments in coastal areas.

Kerry-Lieberman also invests substantially in carbon capture and storage, calling for the creation of a national CCS strategy and setting aside up to an additional 10 percent of total annual permits to provide financial incentives for CCS in electric power generation and industrial operations. It also creates a special funding program managed by the U.S. Department of Energy to support large-scale demonstration projects, funded by a charge on fossil fuel-based electricity (capped at $2 million to $2.1 million per year). In conjunction with the CCS provisions, the bill adds a new title to the Clean Air Act, to be enforced by the EPA, that sets greenhouse gas performance standards for new coal-fired plants. It would be effective four years after CCS-equipped power plants are operational, or no later than 2020; plants permitted after January 1, 2020, would have to have at least 65 percent lower CO_2 emissions than the corresponding cap for such plants in general, while those permitted between January 1, 2009, and December 31, 2019, would have to emit at least 50 percent less.

The EPA's existing power to regulate greenhouse gases under the Clean Air Act would be very sharply curtailed, but states would retain their right to adopt or enforce air pollution limits or standards and limit greenhouse gas emissions. The one thing they wouldn't be allowed to do is have cap-and-trade programs — and unlike the Waxman-Markey ban, which only extends through 2017, the Kerry-Lieberman one would be permanent. As with Waxman-Markey, allowances and offset credits obtained through state or regional programs could be traded in for federal allowances; 1 percent of permits in 2013 to 2015 are set aside for this purpose.

[9] Based on these measures, the Center for Budget and Policy Priorities has found that the bill would protect the typical household in the poorest fifth of the U.S. population from incurring a financial loss due to carbon policy (Rosenbaum et al. 2010). CBPP reached a similar conclusion with Waxman-Markey, but has also warned against distributing consumer relief funds through utilities, as both bills do in the early years (Rosenbaum et al. 2009).

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