

## Chapter 23

### U.S. Climate Change Law and Policy: Possible Paths Forward

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#### I. Introduction

The chapters in this volume survey the legal landscape of climate change in the United States as of 2013. They describe the international context in which U.S. climate policy is developing, and chronicle the array of legal and regulatory tools that the federal, state and local governments are using to mitigate greenhouse gas (GHG) emissions and promote adaptation (or what is coming, in policy circles, to be called climate “preparedness” or “resilience”). A number of chapters explain how climate change is testing the limits of existing statutes—from pollution laws to corporate and securities laws. Other chapters explore the increasing integration of climate change and energy law. The latter part of the book introduces legal frontiers that only now are coming into view because of technologies that may require wholly new regulatory regimes, including carbon capture and sequestration, and geoengineering.

It is possible to mistake U.S. climate policy development since 2008 as a period of failure: failure to reach a binding international agreement to reduce global greenhouse gas emissions, and failure to craft domestic legislation to price carbon. International political action to address climate change appears to have stalled during this period. The U.N. process has not produced a new binding legal agreement to replace the Kyoto Protocol, as many had hoped it would. On the domestic front, the 111th Congress failed to produce comprehensive climate and energy legislation. As detailed by John Dernbach and Robert Altenburg in Chapter 3, in June 2009, the U.S. House of Representatives passed a bill to reduce America’s GHG emissions

seventeen percent below 2005 levels by 2020.<sup>1</sup> The bill that had passed the House foundered in the Senate, however.

Although Democrats controlled both Chambers from 2008-2010, successfully passing the climate and energy bill would have required a filibuster-proof sixty votes in the Senate. The votes were not there. Momentum on climate legislation was stalled by the deep recession and by concerns about the costs of imposing GHG controls, including the potential for higher energy prices. Support for the legislation split along regional lines, with Democrats from coal and manufacturing states opposed to requirements that they claimed would disadvantage U.S. industry.<sup>2</sup> Some in Congress objected to the “trade” in cap and trade for fear it could give rise to market abuses through speculation and derivatives trading.<sup>3</sup> Others took the stance that the United States should not price carbon unless and until other large economies took the same step.<sup>4</sup> Meanwhile, throughout this period, the Administration’s focus remained primarily on passing the health care bill, the Affordable Care Act. The White House never sent blueprint climate legislation, or even a list of principles, to the Hill, leaving Congress to draft with limited guidance. Some industry trade associations lobbied hard against the legislation, arguing that it amounted to an energy tax and would kill jobs. And Republicans remained united in opposition—as much to the President’s agenda as to this specific legislation. Getting climate and energy legislation over the finish line proved, in the end, too much.<sup>5</sup>

Yet as the chapters in this volume make clear, we are, in fact, witnessing a great deal of legal and regulatory activity in the U.S., and significant government-led and private sector-led investment and innovation in low-carbon technologies. Although this more dispersed regime of climate initiatives may not be as effective at reducing greenhouse gas emissions as a comprehensive, economy-wide approach would be, these efforts may lay the necessary

foundation for taking later and larger steps. Smaller-scale policy experiments by state and local governments (e.g., state and regional cap-and-trade regimes, or renewable energy programs) will not only yield important information to guide broader future policy efforts, but they may also help to build political support for such policies in the jurisdictions where they are tried. It is worth noting too that climate change is only one of the drivers of these policy experiments—some jurisdictions pursue “clean energy” policies as much for their economic benefits as for their climate effects.

In any event, it would be a mistake to conclude that the U.S. is failing to address climate change simply because a major cap-and-trade bill went down to defeat in the 111th Congress.<sup>6</sup> The Obama Administration responded to that defeat by turning to other tactics, primarily by using its existing executive authorities. Federal agencies began issuing regulations under existing statutes to reduce greenhouse gases in the transportation and the electric power sectors, and to promote energy efficiency in the consumer appliance and building sectors. EPA created a greenhouse gas reporting program for major sources, which is a necessary foundation for any future efforts to cap this pollution. The Administration has also sought to expedite siting and permitting of renewable energy, such as wind and solar, on federal lands, and has promoted incentives to stimulate renewable energy deployment. Although these executive actions cannot match what might be accomplished if there were a federal price or cap on greenhouse gases, they have yielded some significant results. And President Obama’s renewed call for action to address climate change in June 2013 suggests that more progress is yet to come during his second term.<sup>7</sup>

Still, it is clear that the scale of the climate challenge will require congressional action. Existing federal laws, such as the Clean Air Act (CAA), were largely designed without climate change specifically in mind, and must be adapted to regulate greenhouse gases. While necessary

and at times effective, such adaptation can lead agencies to adopt new legal interpretations that risk judicial invalidation, or to craft policies that may be less cost-effective or flexible than would be possible under a new, more targeted law. For example, it may not be possible under the CAA to authorize emissions trading among stationary sources on a broad scale, which would be a more sensible approach than asking all emitters to meet the same standard regardless of what it would cost them to do so. Such limitations are not the fault of the implementing agency, which must work with the statute it has. Another challenge is to ensure that domestic emissions reduction programs work compatibly with international climate agreements, for instance by harmonizing standards for measuring reductions, and enabling U.S. sources to offset some portion of their emission by investing in pollution reduction programs in other countries. Yet existing statutes may not authorize approaches that would integrate easily into an international regime. In the end, an optimally flexible, cost-effective, durable program for reducing U.S. GHG emissions over the long term requires new legislation designed specifically to address climate change, which must come from Congress. This concluding chapter identifies the dominant policy instruments that Congress might choose to adopt, should it decide to take that step.

## **II. Tracking Political Progress on Climate Change**

December 2013 marks the fourth anniversary of the 15th session of the Conference of the Parties (COP-15) to the United Nations Framework Convention on Climate Change.<sup>8</sup> For most, this milestone will pass unnoticed; for a few, it is a reminder of how much momentum had been lost since 2009.

As Kyle Danish explains in Chapter 2, expectations had run high for a comprehensive climate agreement at COP-15 in Copenhagen, given movement on the issue in the U.S. and abroad. With President Barack Obama's election in 2008, the U.S. chose a leader who had spoken prominently about climate change on the campaign trail, and pledged to engage with the international community to reduce greenhouse gas emissions. Indeed, President Obama received the 2009 Nobel Peace Prize in part because of his stated commitment to climate change work.<sup>9</sup> Meanwhile, the U.S. Congress was advancing legislation to address GHG emissions. The House had passed the Waxman Markey bill, and the Senate was drafting its own bill. In this context, in November 2009, in advance of the Copenhagen meeting, President Obama announced a U.S. GHG reductions commitment that matched the House-passed bill,<sup>10</sup> and China pledged to cut its carbon intensity forty to forty-five percent from 2005 levels by 2020.<sup>11</sup>

In the wake of these announcements, many observers believed that negotiators at COP-15 might at last overcome the impasse in international climate negotiations, and replace the Kyoto Protocol with a new binding agreement. And yet, the conference failed to meet these heightened expectations. What's more, many of the factors that contributed to Copenhagen's lackluster results – a deep recession in the United States and around the world;<sup>12</sup> so-called Climategate<sup>13</sup> and other attacks on climate science; and the ongoing battle between historic GHG emitters and rapidly developing countries over which countries should act first and bear more of the cost of mitigation<sup>14</sup> – continue to pose enormous obstacles to action at home and abroad.<sup>15</sup>

American political events in 2010 further chilled domestic efforts to address climate change. The 2010 mid-term elections saw the House of Representatives flip to Republican control, and the anti-government Tea Party grow in strength. Central to the Republican/Tea Party agenda was the de-funding and dismantling of climate programs, now characterized as

“job-killing.”<sup>16</sup> In fact, in 2012, the Republican Party amended its national platform to state its opposition to “any and all cap and trade legislation” to curtail GHG emissions, and to demand that Congress “take quick action to prohibit the EPA from moving forward with new GHG regulations.”<sup>17</sup> (This represented a notable shift from the Party’s position only a few years earlier, when Senator John McCain campaigned for president in 2008 on a platform that included a promise to address climate change.) When the 112th Congress recessed on January 3, 2013, it went down in history as the least productive Congress since 1949, when political scientists began measuring legislative productivity.<sup>18</sup> As of November 2012, the House of Representatives had voted to prohibit Administration action on climate change and other environmental issues 317 times.<sup>19</sup>

At the same time, as described by Jonathan Martel and co-authors in Chapter 4, the Obama Administration took a number of important steps during this period to reduce GHG emissions: issuing a GHG emissions endangerment finding under the Clean Air Act,<sup>20</sup> crafting historic vehicle fuel efficiency standards,<sup>21</sup> requiring measures to reduce air emissions at oil and gas wells,<sup>22</sup> and strengthening appliance efficiency standards.<sup>23</sup> However, the Administration reacted to the political shift suggested by the 2010 mid-term elections by muting its call to address climate change. President Obama’s 2010 State of the Union had included support for “a comprehensive energy and climate bill;” in fact, the President was “eager to help advance the bipartisan effort in the Senate.”<sup>24</sup> One year later, the President failed to mention climate change at all.<sup>25</sup> Moreover, in 2011 and 2012, federal agencies were forced to play defense on environmental and energy programs in congressional budget and policy debates. In the face of resistance from Republicans in Congress and business groups, the Administration was hesitant to open up more fronts for attack, and delayed rules to limit GHG and other air pollution.<sup>26</sup> The

Office of Information and Regulatory Affairs in the White House, which must approve agency rules before they are finalized, delayed a number of climate related efficiency and air pollution regulations, in one prominent example rejecting EPA's proposed new standards for ozone, on grounds they would be too costly.<sup>27</sup> Reluctance to speak about, let alone tackle, climate change continued into the 2012 presidential election, which turned out to be the first time since 1984 that climate change was not mentioned in the U.S. presidential or vice presidential debates.<sup>28</sup>

And yet, important countervailing trends suggest that climate change may return to the forefront of federal policy. Expert reports have strengthened the scientific consensus on climate change and its risks, and underscored the urgency of acting now to forestall severe consequences. As discussed in Chapter 1, in January 2013, the United States National Climate Assessment and Development Advisory Committee published its new draft Climate Assessment report, stating that, "evidence for a changing climate has strengthened considerably since the last National Climate Assessment report, written in 2009"<sup>29</sup> and projecting that "choices made about emissions in the next few decades will have far-reaching consequences for climate change impacts in the middle to latter part of this century."<sup>30</sup> In mid-2013, the most recent Report by the Intergovernmental Panel on Climate Change—the most authoritative international assessment of the risks of climate change, which is updated roughly every five years—warned that sea levels could rise more than three feet by the end of the century if emissions continue on current trends, and reporting with at least ninety-five percent confidence that human activities are the dominant cause of observed warming since the mid-20<sup>th</sup> century.<sup>31</sup>

Even before these reports appeared, public concern about climate change had rebounded four percentage points between 2011 and 2012 (from fifty-one percent to fifty-five percent).<sup>32</sup>

The American public may be reacting to a spate of physical disasters; catastrophes that seem to

bring home the potential for devastation if climate change remains unaddressed. The year 2012 was the warmest on record for the continental United States.<sup>33</sup> Moreover, in 2012, the United States endured the most severe and extensive drought in twenty-five years.<sup>34</sup> By August 2012, 24.1% of the contiguous United States had fallen into the federal government's worst drought categories (D3-D4, extreme to exceptional), the highest percentage on record with the U.S. Drought Monitor.<sup>35</sup> August 2013 data indicated that the drought persisted throughout much of the West.<sup>36</sup>

One dramatic weather event made climate change a presidential campaign issue after all. In October 2012, a late season cyclone grew up out of the Caribbean and slammed headlong into the path of a nor'easter, pounding the Atlantic Coast of the United States.<sup>37</sup> Hurricane Sandy claimed more than 100 lives,<sup>38</sup> and caused more than forty-two billion dollars in property damage in New York State alone.<sup>39</sup> The devastation, while not directly attributable to climate change, starkly illustrated the vulnerability of coastal communities to extreme flooding. Just five days before the 2012 election, New York City Mayor Michael Bloomberg endorsed President Obama primarily because he wanted to “vote for a President to lead on climate change.”<sup>40</sup> Perhaps because public opinion had begun to shift, or perhaps because the President was unleashed from the demands of campaigning and was looking towards his legacy, he spoke after winning re-election about responding to the threat of climate change. In his second inaugural address, the President promised executive action even if Congress remained inert, stating that “[w]e will respond to the threat of climate change, knowing that the failure to do so would betray our children and future generations.”<sup>41</sup> The President's party picked up two seats in the Senate,<sup>42</sup> and nine in the House.<sup>43</sup> Many of these candidates had supported action on climate change

during their campaigns,<sup>44</sup> and in February 2013, a group of Senators once again introduced comprehensive climate change legislation.<sup>45</sup>

Five months into his second Term, President Obama unveiled his own program to address climate change, primarily through regulatory action. The president's Climate Action Plan proposes a series of steps to address domestic carbon pollution, assist local communities and key economic sectors as they prepare for climate impacts, and further international efforts to address global climate change.<sup>46</sup> EPA rulemaking lies at the heart of the President's plan. He directed the agency "to put an end to the limitless dumping of carbon pollution...and complete new pollution standards for both new and existing power plants."<sup>47</sup> The President instructed EPA to release a new proposal for future power plants no later than September 20, 2013 and to issue a final rule "in a timely fashion."<sup>48</sup> He further charged EPA with proposing carbon pollution standards for existing power plants no later than June 1, 2014, with a June 1, 2015 deadline for issuing final standards.<sup>49</sup> EPA sent a draft GHG emissions rule for new plants to the White House six days later.<sup>50</sup> And while EPA has yet to propose how it would reduce GHGs from existing power plants—a more controversial proposition—organizations have begun making proposals about how it might do so cost-effectively.<sup>51</sup>

Predictably, proponents lauded the president's plan as an ambitious move to slash emissions and improve air quality, while critics attacked it as increasing energy costs and killing American jobs.<sup>52</sup> The impending EPA rules will almost certainly face legal challenges from parties on both sides—those who say the federal government is not taking sufficient action to address climate change, as well as those alleging government overreach.<sup>53</sup> With Congress on the sidelines, the fate of the president's climate agenda may wind up in the hands of the Supreme Court.<sup>54</sup>

Meanwhile, as described by Eleanor Stein in Chapter 9, David Hodas in Chapter 10, Lesley McAllister in Chapter 11 and John Nolan in Chapter 15, many state and local governments have continued to make progress in mitigating GHG pollution, deploying clean energy and adopting land use and transportation initiatives to both limit GHGs and enhance resilience to climate change impacts. Even in the absence of comprehensive federal climate legislation, these efforts could result in substantial GHG emission reductions. Moreover, this work could foster “climate constituents” at the state level who demand federal action, or prompt industry to ask Congress and the Administration for national standards to preempt state and local requirements. As the chapters on state and local initiatives explain, as of mid-2013, thirty-one states and Washington, D.C. have renewable or alternative energy standards, and another seven states have renewable energy goals.<sup>55</sup> Sixteen states and Washington, D.C. offer rebates for renewable energy installation.<sup>56</sup> Nine Northeastern states participate in a regional carbon trading program for utilities,<sup>57</sup> and in 2013, California launched a GHG trading program pursuant to the state’s Global Warming Solutions Act, or Assembly Bill 32 (AB32).<sup>58</sup> Numerous local jurisdictions have used their land use authority to adopt density and public transportation initiatives to reduce long commutes, thereby reducing emissions as well.

Likewise, some in industry are assuming a leadership role on climate issues. The reinsurance industry, for instance, has spoken very publicly about its conclusion that climate change is behind the rise in extreme weather events.<sup>59</sup> Many corporations are also making voluntary GHG reduction commitments in the absence of federal requirements. Walmart, the largest company in the world,<sup>60</sup> had pledged in 2005 to reduce GHG emissions twenty percent from 2005 levels by 2012.<sup>61</sup> The company reached its goal a year early, cutting emissions 20.02% from 2005.<sup>62</sup> Moreover, Walmart has committed to eliminating twenty million metric

tons of GHG emissions from its global supply chain by 2015.<sup>63</sup> In addition, the United Nations project called Caring for Climate, which requires participating companies to make GHG reduction commitments and report annually on their progress, has signed many major U.S. companies including Cisco Systems, DuPont, Dow Chemical Company, PepsiCo, Coca-Cola Company, Manpower Group, and Newmont Mining.<sup>64</sup> While these initiatives are not regulatory in that they are not enforceable by government, they may be prompted in part by mandatory corporate disclosure laws, by emissions reporting regulations, and by a sense in industry that binding carbon constraints, however delayed, will inevitably come. They are a potentially significant part of the emerging climate regime in the U.S.

Despite slowed progress in 2011 and 2012, the Executive Branch is continuing to build on steps it took to address climate change in the president's first term. In addition to EPA regulations under the CAA, the Administration has implemented standards and procedures that incorporate climate change into everyday government operations. As noted by John C. Dernbach and Robert Altenburg in Chapter 3, in October 2009, President Obama signed Executive Order 13514, setting government fleet efficiency, energy, water, and waste reduction, and other sustainability goals for federal agencies.<sup>65</sup> As discussed by Paul Weiland, Robert Horton, and Erik Beck in Chapter 5, in 2010, the White House Council on Environmental Quality issued draft guidance that, if and when finalized, will direct all federal agencies to consider climate change impacts in NEPA planning documents.<sup>66</sup> Branches of the Armed Services have committed to aggressive GHG reduction and clean energy deployment goals.<sup>67</sup>

There is more, too, that EPA could do, beyond implementing the power plant regulations at the heart of the president's renewed climate plan. The agency may, in addition, promulgate NSPS for GHG pollution from other new sources.<sup>68</sup> In addition, along with direct GHG

regulation, EPA has promulgated rules to address conventional air pollutants, which have GHG reduction co-benefits.<sup>69</sup> In President Obama's second term, EPA may continue that trend by finalizing rules to require cooling towers at power plants,<sup>70</sup> or to enhance coal combustion waste disposal,<sup>71</sup> which could hasten the retirement of older, less-efficient coal-fired plants.

In addition, as described by Jim Rossi and Thomas Hutton in Chapter 13 and David B. Spence and Emily Hammond in Chapter 14, the Federal Energy Regulatory Commission (FERC), though technically an independent agency, has pursued policies aligned with the president's climate agenda. Using its authority under the Federal Power Act to regulate wholesale electricity rates and interstate transmission, under Chairman Jon Wellinghoff, FERC has issued a series of orders to incentivize renewable energy development and integration into the grid. The Commission has sought to promote greenhouse gas reductions by authorizing state and regional bodies engaged in transmission planning to consider "public policy requirements," such as state renewable portfolio standards and energy efficiency requirements established by state or federal law, which may facilitate building more transmission to connect renewable power to the grid.<sup>72</sup> The Commission also has required changes to standard interconnection agreements to facilitate grid integration of renewable energy resources.<sup>73</sup> FERC has notably declined to use its enforcement authority against states setting favorable "avoided cost" rates for renewable energy;<sup>74</sup> and it has adopted pricing policies to incentivize the integration of demand response resources at prices equivalent to those paid for generation.<sup>75</sup> Despite a change in leadership at the Commission, implementation and expansion of these initiatives is expected to continue throughout President Obama's second term.<sup>76</sup>

Finally, on the international front, there is additional potential for executive action. EPA might work with the Department of State to reduce short-lived but potent GHGs under the

Montreal Protocol and Section VI of the CAA. Former Secretary of State Hilary Clinton began these efforts, and current Secretary John Kerry, who included a detailed section on taking measures to reduce these GHGs in the proposed Clean Energy Jobs and American Power Act,<sup>77</sup> will continue that work. Efforts may already be paying off – in September 2013, leaders attending the G-20 summit in St. Petersburg, Russia, announced an agreement to phase down the use of hydrofluorocarbons (“HFCs”), refrigerants that are also highly potent greenhouse gases.<sup>78</sup> It is unclear whether Congress will support, or at least refrain from prohibiting, executive action on short-lived GHGs, but more bipartisan support exists for addressing these pollutants than carbon dioxide.<sup>79</sup>

The president is also likely to continue to pursue bilateral climate agreements with other countries, either as a supplement or alternative to the ongoing U.N.-convened negotiations to replace the Kyoto Protocol, as described by David Hunter in Chapter 22. In 2009, the U.S. signed a number of agreements with China to cooperate on clean energy technology and innovation, including initiatives to establish a joint Clean Energy Research Centre, an electric vehicles initiative, a joint energy efficiency action plan and a renewable energy partnership.<sup>80</sup> A year before, the two nations had entered into a broad, Ten Year Framework for Cooperation on Energy and the Environment, which included terms for bilateral “EcoPartnerships.” To date, China and the U.S. have brokered eighteen agreements under this partnership.<sup>81</sup>

The U.S.-China relationship has continued to evolve toward closer cooperation on climate issues. In April 2013, the two countries established the U.S.-China Working Group to develop and implement bilateral cooperation on climate change. In June 2013 Presidents Obama and Xi agreed at a U.S.-China summit to phase down consumption and production of HFCs.<sup>82</sup> And in June 2013, at the fifth round of the U.S.-China Strategic and Economic Dialogue, the two

nations agreed to combat climate change by cooperating on a variety of initiatives: reducing emissions for heavy-duty trucks and other vehicles by raising fuel efficiency standards and introducing cleaner fuels; promoting “smart” grid technology; developing carbon capture technologies; increasing energy efficiency in buildings and industry; and improving reporting of GHG emissions. As China and the U.S. account for more than forty percent of global GHG emissions, their ability to broker effective agreements could lead to significant reductions and forge a path for the rest of the world to follow.<sup>83</sup>

China and the U.S. are cooperating in other ways, too; for instance, in joint research and development of monitoring, warning and risk assessment technology for severe weather and climate events, in order to improve resilience and effective response. Finally, the governments have agreed to promote cooperation in the development of unconventional energy resources such as shale gas, including through a series of technical workshops in China.<sup>84</sup> Shale gas could drive down use of coal to generate electricity and if produced and transported to minimize methane leakage, could reduce carbon dioxide emissions from the power sector.

The U.S. has also pursued a bilateral relationship on climate issues with India. In June 2013, the two countries announced that they would establish a new Working Group on Climate Change. This builds on a 2009 U.S.-India Memorandum of Understanding on clean energy, energy efficiency, energy security and climate change, under which the two nations agreed to cooperate on research and deployment of clean energy technologies, renewable energy, and shale gas development, among other things.<sup>85</sup>

In addition to bilateral accords, governments may turn increasingly to sectoral agreements as an alternative or supplement to a more comprehensive international climate agreement. Proponents of such an approach argue that targeted measures aimed more narrowly

at reducing emissions from specific sectors (such as electric power, transportation, or energy intensive manufacturing) will be simpler to negotiate than broader agreements, more straightforward to implement, and could potentially address international competitiveness concerns by increasing participation by stakeholders and countries.<sup>86</sup>

### III. What to Expect from Congress

As the effects of climate change become more evident, and as forces outside of Congress – states, significant portions of the business community, EPA – take action in response, Congress may feel renewed pressure to act. While the precise timing and nature of legislative action on climate change are not clear, developments in the 112th and 113th Congress, and energy trends on the ground, suggest a path forward. Consider that:

- At the end of the 112th Congress, thirty-three Republican Senators and eighty-five Republican House Members voted to let federal tax cuts expire for the top tax brackets. This “fiscal cliff” vote marked the first time in two decades that a significant number of Republicans voted for a tax increase.<sup>87</sup> So long as political backlash is not too severe, and in exchange for federal spending cuts, offsetting tax cuts, or entitlement reforms, some Republicans might entertain future deficit reduction packages that included a price on carbon.
- The fiscal cliff vote also included a \$1.2 billion tax credit extension for the wind industry. At a time when many federal programs are facing deep cuts, this extension demonstrated the growing clout renewable energy industries have with both parties.<sup>88</sup> Perhaps, then, it is not beyond the realm of possibility that an agreement could be forged to roll back some fossil fuel tax breaks to fund incentives for emerging renewable technologies.
- The 113th Congress began with a heated battle over emergency funds to compensate victims of Hurricane Sandy and prepare coastal states for future extreme storms. This may have marked the first serious congressional climate adaptation debate, and demonstrated to Republican leadership the backlash they face for ignoring this issue.<sup>89</sup>
- Meanwhile, there are “deal sweeteners” that, in combination with other factors, might bring additional members of Congress to the table. First, America’s shale gas boom is growing the number of “energy state” Senators. Those Senators want Congress and the Administration to approve pipelines and natural gas export terminals, encourage natural

gas fueling infrastructure, and grow domestic demand with clean air rules that benefit gas at the expense of coal.

- Second, as states and EPA move forward in regulating GHGs, industries previously reluctant to entertain climate legislation might prod some members of Congress to seek a comprehensive climate solution in exchange for preemption of state and the EPA authorities.

All of these forces could culminate in a “grand bargain” that might include measures to tackle climate change. If such a bargain were to be contemplated by the United States Congress, leadership might consider the following components:

- Carbon tax
- Clean energy incentives
- Renewable or Clean Energy Standard
- Modified cap and trade
- Renewable fuel standard reform, or a Low Carbon Fuel Standard
- Climate preparedness/resilience (adaptation)

These policy instruments raise a number of common issues: how to balance cost containment measures with program effectiveness; how to address the differential impacts that increased costs may pose (across regions of the country, or within specific industries and demographics); and whether to preempt or halt other existing climate change authorities in exchange for legislative action. In the Senate, progress will be complicated further by jurisdictional issues. Legislation that crosses committee boundaries faces much tougher hurdles to passage, and comprehensive climate legislation could fall within the jurisdiction of the Senate Agriculture, Appropriations, Commerce, Energy and Natural Resources, Environment and Public Works, Finance, and Foreign Relations Committees.

We spend the next part of this chapter describing proposal-specific debates, identifying the perceived pros and cons of each policy tool, and suggesting how Congress might react.

#### **A. Carbon Tax<sup>90</sup>**

A carbon tax assesses a predetermined fee on each unit of GHG pollution, increasing the costs of more carbon-intensive fuels relative to low- and no-carbon alternatives. Proponents of a carbon tax support the concept's simplicity compared to a carbon-trading program, which creates a new commodity and requires a fairly complex accounting system. They argue that a carbon tax is less disruptive of the market than a hard cap or command-and-control requirements, and provides cost certainty. That said, some congressional experts believe that comparing a simple tax to past cap-and-trade proposals is misleading; were a carbon tax seriously contemplated by the legislative body, attempts to allocate costs and benefits more evenly across society would result in legislation that would approximate the complexity of cap-and-trade legislation.

Many economists support the idea of a carbon tax to correct the market's failure to account for health costs and other potential economic harm caused by GHG pollutants.<sup>91</sup> Among these are a number of politically prominent economists who identify with the Republican Party, including former Reagan economic advisor Arthur Laffer,<sup>92</sup> Gregory Mankiw, former Chair of President George W. Bush's Council of Economic Advisors,<sup>93</sup> and Kevin Hassett, economic advisor to Republican nominee Mitt Romney in the 2012 presidential campaign.<sup>94</sup> Against the backdrop of concerns about the United States' debt and deficit, voices across the political spectrum have suggested carbon tax proposals as a way to increase federal revenues.<sup>95</sup> These revenues could be significant – the Congressional Budget Office has determined that by 2020, the revenues could offset more than half of the deficit, according to one plausible projection.<sup>96</sup> However, during the 111th Congress (2009-10), because of significant opposition to any tax increase, cap-and-trade emerged as the preferred mechanism for GHG reductions.<sup>97</sup> Carbon tax proposals were introduced in that Congress, but did not proceed.<sup>98</sup>

With the failure of cap-and-trade legislation in 2010, and the emergence of strenuous opposition to the concept of trading, some policymakers began to revisit carbon taxes.<sup>99</sup> A few conservative think tanks and energy companies began exploring the feasibility of a carbon tax, in meetings attended by congressional staff.<sup>100</sup> Absent a real legislative proposal, it was difficult to gauge how serious these talks were. However, unlikely proponents of federal regulation or taxation<sup>101</sup> publicly lent support to the concept, and the press gave the issue significant attention in 2012.<sup>102</sup> Following the budget sequestration that went into effect in 2013, discussion outside of Congress shifted toward the idea of a revenue-neutral carbon tax that would encourage use of cleaner energy sources and rely on existing government agencies such as the Social Security Administration or the Internal Revenue Service for its implementation.<sup>103</sup> Of course, a revenue-neutral carbon tax would not increase receipts to the federal government, making it less likely to play a role in any Congressional deficit reduction deal.

Obstacles to a carbon tax remain. Several members of the 112th Congress introduced resolutions to censure the concept, including a Republican Senator who voted to let tax cuts expire at the end of 2012.<sup>104</sup> Even among the concept's supporters, neither members of Congress nor the president want to take the lead,<sup>105</sup> since the principal proponent of a carbon tax likely will face the brunt of opposition from several fronts: those who do not want to raise taxes, those who oppose any action on climate change, and those who worry that Congress would pass a carbon tax too small to drive the market to lower-carbon technologies, while preempting existing and more effective climate mitigation authorities in the process. In addition, although a carbon tax has the benefit of providing certainty as to price, it would create uncertainty as to the amount of pollution reduction to be achieved. (A cap and trade regime offers certainty on pollution reduction, at the risk of uncertain cost.)

If a critical mass of leaders were to support the general concept, it might make headway, but at least three components of carbon tax design are crucial—the tax rate, the entities or activities to be taxed, and the use of any revenues.<sup>106</sup> The disposition of these three elements will either impede progress or provide the opportunity to reach common ground. First is the disagreement over price. On the one hand, a minimum price is required to achieve stated goals (i.e., reduce the deficit, fund renewable energy research and development, reduce GHG emissions). On the other hand, too high a price may stagnate the economy or threaten the competitiveness of trade-exposed industries. Seeking to thread this needle, many proposals have suggested a slow ramping up of the price in an attempt to meet both concerns.<sup>107</sup>

Second, opinions differ as to where in the stream of commerce the tax should be applied, which may affect the complexity of the program and drive different market responses. For instance, a program applying a carbon tax to power plant emissions might be relatively easy to administer because there are fewer electric generating units than mines and wellheads; moreover, power plants already report carbon dioxide emissions to government pursuant to EPA's mandatory reporting rule, and in fact have measured these emissions through continuous emissions monitoring systems for decades. However, focusing on the combustion stage would ignore the GHG emissions associated with the production or mining of a fuel source and therefore might fail to encourage measures to control those emissions.

Third, proponents debate how any tax revenues should be used. While the press has focused on carbon tax proposals as a method for deficit reduction, recent legislative proposals have suggested different uses for the funds. Some support investing the revenues in renewable energy and energy efficiency projects, to offer more low- and no-carbon energy alternatives in the marketplace and to keep costs down.<sup>108</sup> Still others suggest using the funds to reduce the

impact of higher energy prices on consumers and industry, particularly in those regions of the country disproportionately reliant on high-carbon energy.<sup>109</sup> Finally, some “revenue-neutral” advocates, including Exxon, want the carbon taxes to be offset by a corresponding cut in other taxes.<sup>110</sup> A successful proposal may need to combine these suggestions.<sup>111</sup>

## **B. Clean Energy Initiatives**

As described in Chapter 13, the federal government has provided funding and other incentives to clean energy since the 1970s.<sup>112</sup> However, funding increased dramatically in 2009, most notably through the American Recovery and Reinvestment Act (ARRA), which injected a record (estimated) ninety billion dollars into the clean energy sector.<sup>113</sup> These incentives included grants for renewable energy deployment, consumer tax credits for installing energy efficiency and renewable energy technologies in their homes, and funding for extensive energy retrofits of federal installations. The federal government could continue to fund or incentivize the research, development, and deployment of clean energy technologies, through tax preferences, outright grants, and loans to energy generators and consumers.

Like many carbon tax proponents, clean energy supporters argue that incentivizing deployment of clean energy can level the playing field for these technologies. Some economists argue that the market fails to build health-related and other costs into the price of more polluting energy sources, rendering these sources artificially cheap and able to undercut cleaner sources of energy.<sup>114</sup> In their view, taxing dirtier fuels or incentivizing cleaner fuels are two approaches to the same goal – bringing prices of different energy sources more in line with one another, and ensuring they accurately reflect their true cost. However, critics argue that clean energy incentives further distort the market by artificially deflating the cost of otherwise uneconomic clean energy.<sup>115</sup>

Those in favor of federal clean energy incentives sometimes invoke international competitiveness. They point to other industries where the U.S. has been a global market leader – including the aviation, computer, and battery industries – and argue that these sectors owe their success to significant initial government investment.<sup>116</sup> Proponents of subsidies claim that while private investors can be difficult to attract in the early, high-risk stages of product development and deployment, early investment can carry high rewards.<sup>117</sup> They also point to clean energy investments being made by other national governments that recognize the benefit of investing in this emerging market.<sup>118</sup> In 2009 Senate testimony, venture capitalist John Doerr voiced his concern that “[w]e do not have adequate sustained R&D to be a serious competitor in this huge [global] business.”<sup>119</sup> These arguments seem to resonate with the Obama Administration – the President himself has argued that “[o]ther countries...are going all in to invest in clean energy technologies and clean energy jobs. But I don’t want other countries to win the competition for these technologies and these jobs. I want American to win that competition.”<sup>120</sup>

As the renewables sector grows in the United States, a constituency in support of clean energy incentives grows as well. Installed generation of non-hydro renewable energy sources nearly doubled between 2007 and 2012, growing 44,000 megawatts (MW) to nearly 86,000 MW.<sup>121</sup> By 2010, the wind industry employed more workers in the United States (85,000) than the coal mining industry (80,000).<sup>122</sup> The U.S. military believes that energy efficiency and renewable energy shorten supply lines and make American forces safer on the battlefield.<sup>123</sup> Large corporations have invested heavily in their renewable energy manufacturing capabilities since 2009, despite a weak global economy.<sup>124</sup> Elected officials from both parties have warmed to the idea of renewable energy incentives as those technologies have been deployed in their states. For instance, from 2008 to 2012, installed wind capacity in Iowa jumped by more than

forty percent, to 5137 MW.<sup>125</sup> Over that same four-year period, installed wind capacity grew by forty percent in Colorado, fifty percent in Kansas, and sixty-six percent in Oregon.<sup>126</sup> In late 2012, Iowa Republicans Governor Branstad and Senator Grassley, along with Governor Brownback of Kansas, joined Democratic Governors Hickenlooper of Colorado and Kitzhaber of Oregon in public support of the federal wind tax credit.<sup>127</sup> Similarly, in 2011, Republican Governor Chris Christie celebrated the installation of New Jersey's 10,000th solar array, boasting that "[t]his ground-breaking achievement is the latest example of New Jersey's leadership as one of the largest and fastest growing solar energy markets in the United States."<sup>128</sup>

At the same time, there are many detractors of federal clean energy subsidies. Critics express concerns about the government picking energy "winners and losers."<sup>129</sup> They point to Spain's renewable energy industry crash as evidence that renewable energy sources will never be able to stand on their own, requiring permanent federal subsidies to survive.<sup>130</sup> The Obama Administration faced heavy criticism after two beneficiaries of significant federal loan guarantees filed for bankruptcy.<sup>131</sup> More generally, clean energy incentives face opposition due to pressure to cut the federal budget. Programs such as Section 1603 of the American Recovery and Reinvestment Tax Act of 2009, which issues grants to eligible energy projects in lieu of tax credits (since many such projects do not have sufficient tax liability to use tax credits), suffered in the wake of the budget sequestration of 2013. Projects awarded funds between March 1, 2013 and September 30, 2013 suffered an 8.7% drop in their award amounts.<sup>132</sup>

Despite vocal opposition during the 112th Congress, bipartisan support existed to continue certain clean energy investments. The Senate Energy and Natural Resources Committee reported a number of bills to support clean energy with strong bipartisan support, including the Advanced Vehicle Technology Act of 2011,<sup>133</sup> and the Hydropower Improvement

Act of 2011.<sup>134</sup> Meanwhile, the Senate Energy Appropriations Subcommittee unanimously approved the FY2013 budget, which cut spending overall for the Department of Energy but boosted funding for clean energy.<sup>135</sup> Finally, as mentioned above, in late 2012 a significant number of Republicans voted for a package that extended the wind tax credit for one year.

Clean energy incentives have been short-term and intermittent, making it difficult for private sector players to rely on them when making long-term investment decisions.<sup>136</sup> Today, only four major energy tax preferences are permanent – three of these are directed to fossil fuel production, while one supports nuclear energy.<sup>137</sup> When renewable energy companies are forced to agree to a phase-out of a tax credit as part of a bargain to extend the credit over the short-term,<sup>138</sup> some question why the world's largest energy companies still need assistance from the federal government. In fact, in recent years, Congress has held a number of votes on proposals to roll back some of these subsidies for the top oil producers in the world. Despite stiff resistance from conventional energy producers, a majority of senators voted in 2012 to roll back a four billion dollar package of oil subsidies.<sup>139</sup> The measure would have directed some of the savings into clean energy incentives. Although the measure failed, it is likely that Congress will revisit this type of subsidy-shifting proposal.

Otherwise, clean energy incentives that promote private investment, rather than promise public funds, are more likely to succeed in the current budgetary climate. With the notable exception of the 2009 ARRA, direct investment in energy technologies has generally declined over the past thirty years, from ten billion dollars (in 2011 dollars) in 1980 to \$3.4 billion in 2012 and 2013 (approximately half of the 2013 dollar amount went to clean energy technologies).<sup>140</sup> Therefore, Congress and the executive branch will look to other ways to stimulate and support

clean energy deployment; for instance, by expediting permitting timelines,<sup>141</sup> or expanding definitions of investment structures that enjoy lower tax rates.<sup>142</sup>

### **C. Renewable or Clean Energy Standard**

As described in Chapter 13, a federal renewable energy standard (RES) or clean energy standard (CES)<sup>143</sup> would require a certain percentage of electricity sales to come from low- or no-carbon energy sources. In most proposals, electric distribution companies (known as local distribution companies or LDCs) must show credits for these eligible energy sources on a given date each year. The LDCs may acquire the credits through direct purchases of electricity, or by purchasing the credits on the market. If a company does not hold the necessary amount of credits, that company typically is directed to pay an “alternative compliance payment,” often to a fund that pays for renewable energy R&D and deployment. In many ways, a federal RES operates much as a utility-sector cap-and-trade program might, although inverted – an RES provides a floor for clean energy rather than a cap for pollution.

States have operated renewable energy standard programs for years – Iowa was the first state to establish such a program, in 1983.<sup>144</sup> Since then, thirty-nine states and Washington, D.C. have implemented standards or goals (non-binding standards) for retail purchases by utilities in their states.<sup>145</sup> These programs vary in terms of how they define eligible energy; how aggressive their standards are; whether their goals ramp up over time automatically or require new legislation to increase; which utilities must meet the requirement; the level of alternative compliance payments; and how those payments are used. As a result, policymakers drafting federal renewable energy standards have a suite of real-world options to evaluate and from which they might choose.

Following the states' lead, several members of Congress have proposed a national RES. These proposals demonstrate the biggest sticking point to an RES (or, more likely, a CES) deal – defining what energy should be eligible for inclusion. For example, in late 2006, Senator Coleman (R-MN) proposed a CES that increased to twenty percent in 2025 and every year thereafter. Senator Coleman's proposal gave full credit for renewable energy, and partial credit for new nuclear power plants and coal plants using carbon capture and sequestration (CCS).

The 2009 House-passed climate bill contained an RES that, in contrast, excluded fossil fuels and nuclear. The proposal was relatively modest – six percent in 2012 through 2013, increasing to twenty percent over the period from 2020 through 2039 – and allowed utilities to implement energy efficiency programs to meet the RES.<sup>146</sup>

When Senator Graham (R-SC) joined Senators Lieberman (I-CT) and Kerry (D-MA) to craft a Senate climate bill in 2009, he pushed for inclusion of a CES. After their comprehensive effort failed, Senator Graham introduced a stand-alone CES bill.<sup>147</sup> This bill proposed a CES that increased incrementally to fifty percent in 2050.<sup>148</sup> The proposal gave credit for renewable energy, energy efficiency, coal plants with CCS systems capturing at least sixty-five percent of the plant's emissions, coal-mined methane, and new nuclear plants.<sup>149</sup> A utility could receive partial credit for retiring old coal plants, too.<sup>150</sup> These examples suggest the potential for variability among such proposals—variability that could make it relatively easier or harder to come to agreement.

As a sign of what might happen with similar plans in the future, inclusion of coal and nuclear in the Coleman and Graham CES proposals drew considerable criticism for potentially undermining the otherwise strong pro-renewables market signal that the measure might send. Yet an RES that would drive massive coal-fired plant retirements is unlikely to pass Congress.

Coal-producing states as well as states heavily reliant on coal for their electricity worry that an RES could result in a transfer of wealth, in the form of RES credits, from coal-heavy regions (such as the Midwest) to regions with a fuel mix that is less dependent on coal.

In January 2011, President Obama called for a national CES of eighty percent by 2035.<sup>151</sup> He intimated that the CES could include natural gas, coal with CCS, and nuclear; however, the Administration did not detail what energy would be eligible, even after Senate Energy and Natural Resources Chairman Bingaman (D-NM) and Ranking Member Murkowski (R-AK) requested this information.<sup>152</sup>

In 2012, Chairman Bingaman tried to sidestep the issue of identifying “eligible” energy, by introducing a CES based on carbon intensity. Full credit would be given to zero-carbon renewable energy sources, while partial credit (up to eighty-two percent, based on carbon intensity) would be given to any natural gas or coal plant with fewer carbon emissions than that of a supercritical coal plant.<sup>153</sup> The CES would ramp up to eighty-four percent by 2035.<sup>154</sup> The EIA projected that by 2035, the Bingaman CES would cut electricity sector emissions twenty percent from 2005.<sup>155</sup> Despite Senator Bingaman’s facial inclusion of some coal, the Energy Information Administration projected that his proposal “significantly reduc[es] the role of coal-fired generation.”<sup>156</sup> Therefore, to overcome strong political opposition from coal states, future versions of this legislation may need to accommodate more coal, or be combined with a generous public investment in CCS. Again, this experience provides some guidance into the kinds of compromises that might be necessary for such legislation to succeed in the future.

With the exception of the 2009 ACES proposal and Senator Graham’s 2010 CES, missing from most RES and CES proposals is the eligibility of energy efficiency. And yet, energy efficiency is the most cost-effective way to reduce greenhouse gas emissions.<sup>157</sup> A few

states include energy efficiency in their RES or have complementary energy efficiency standards; those programs could provide a model for the national discussion.<sup>158</sup>

The Obama Administration has continued to express support for a CES, though it was not mentioned in the President's June 2013 speech or his Climate Action Plan.<sup>159</sup> Still, there appears to be some appetite for this type of measure. Economists conducted a poll in the spring of 2012 and determined that the average American citizen was willing to pay thirteen percent more for electricity to meet a national CES that required eighty percent clean energy by 2035.<sup>160</sup> At the same time, legislative proposals have been introduced in several states seeking to roll back RES and CES and, as noted in Chapter 9, numerous lawsuits have been filed seeking to strike down these laws as unconstitutional, for discriminating against interstate commerce in electricity.<sup>161</sup> While state battles could chill efforts to set a national CES, a more likely outcome might be the survival of most state laws and an ensuing push to preempt them. However, many states will resist preemption, particularly where the state laws confer economic benefits on in-state constituencies. Those states may call on their federal representatives to protect their standards, or at the very least use their concerns to push for a more stringent national CES.<sup>162</sup> How this plays out remains to be seen, but in the near term, a CES may be the most likely legislative avenue for action on climate change, beyond some continued funding for clean energy technologies.

#### **D. Modified Cap-and Trade**

In the wake of the Senate's failure to enact climate legislation in 2010, conventional wisdom inside the beltway was that "cap-and-trade" is dead.<sup>163</sup> The term, as detailed by Lesley K. McAllister in Chapter 11, describes a program where the government sets a cap on the amount of pollution to be emitted across an industrial sector or across the economy each year,

and then relies on the market to determine where the cheapest reductions can be made by allowing sources to trade pollution “allowances.” The concept, first used by EPA on a smaller scale during the 1970s to “net” out emissions from units operating under a “bubble” concept, was first deployed by Congress on a large scale in the 1990 CAA amendments, which established a cap and trade program to limit acid rain pollution from power plants.<sup>164</sup>

Policy leaders across the political spectrum express serious concerns about cap-and-trade programs. Some take issue with the uncertain costs to consumers and industry – while a carbon tax is set in advance, the value of each GHG credit in a trading program will fluctuate over time.<sup>165</sup> Others oppose trading schemes on normative grounds, because by creating pollution credits, they confer economic value on pollution. And giving away valuable allowances for free, even initially—as was done by Congress to launch the acid rain program, and which would likely be politically necessary to build political support for a GHG control regime—raises hackles among those who believe that industry should internalize the full costs of their pollution. Still others question the effectiveness of particular trading programs as currently designed. These problems were discussed in Chapter 11. For example, emissions reductions may be modest if banking and offsets provisions offer too many cheap alternatives to actual source reductions, frustrating the program’s overall effectiveness.<sup>166</sup> Finally, some oppose the creation of a new derivatives market for emissions, worrying about market abuses of the kind witnessed during the financial crisis of 2007-08.<sup>167</sup> Indeed all of these objections were raised in the debate over the ill-fated Waxman-Markey bill in 2009-2010.

However, there are methods for addressing most of those concerns; for instance, by setting a floor and a ceiling for GHG credit prices.<sup>168</sup> This design feature, known as a price collar, makes a cap-and-trade regime more like a tax, by moderating concerns about uncertainty

over price. Meanwhile, when the term “cap-and-trade” is not used, many in industry support the concept of averaging emissions over a large group of sources, to enable the regulated community to find those reductions that are the least expensive to make.<sup>169</sup> In fact, many economists and policy analysts believe that of all the pollutants that might be traded, GHGs may make the most sense, since high concentrations of GHGs do not create local “hotspots.”<sup>170</sup> For this reason, a cap-and-trade program may yet be adopted by Congress in another guise, despite the antipathy toward the term itself displayed by the 112th Congress.<sup>171</sup> Just months after federal cap-and-trade legislation expired, California voters rejected a ballot initiative that would have ended the state’s fledgling carbon trading program<sup>172</sup> and the state ran its first carbon auction in 2013. Moreover, there are plans underway to link California’s program to Quebec’s emission trading program.<sup>173</sup>

In addition, the Northeast Regional Greenhouse Gas Initiative (RGGI), launched in 2008 and described in detail by Eleanor Stein in Chapter 9, has been trading carbon credits and funding energy efficiency projects since early 2009. By 2013, RGGI consisted of nine member states, having lost one member state when New Jersey withdrew,<sup>174</sup> and was nearly halfway through its second compliance period, having completed nineteen carbon auctions.<sup>175</sup> Auctions in the first three-year compliance period raised \$912 million for member states, which used these funds for various purposes, including energy efficiency and renewable energy projects, and to defray energy costs for low-income residents.<sup>176</sup>

Moreover, even as most Republicans in the 111th Congress rejected the concept of a carbon cap-and-trade program, a number of prominent Senate Republicans joined Senator Carper’s proposed multi-pollutant trading program for power plants.<sup>177</sup> This proposal had been launched seven years earlier in response to the second Bush Administration’s Clear Skies

legislation. In 2010, Senator Carper's legislation proposed averaging or trading emissions of mercury, sulfur dioxide (SO<sub>2</sub>), and nitrogen oxide (NO<sub>x</sub>); earlier versions had included carbon trading as well. The Clean Air Act Amendments of 2010 failed, however, for lack of support from the conservative wing of the Republican Party, and because certain Democratic Senators believed that two pending rules by EPA would drive deeper reductions in the three pollutants.<sup>178</sup> However, one of the ensuing EPA rules has since been struck down by the D.C. Circuit, and the Supreme Court subsequently granted review.<sup>179</sup> If Congress were to respond with another power sector emissions-trading proposal, some Republicans might wish to revisit mercury pollution. This could lead to a showdown around EPA's Utility MACT standard, which as currently promulgated is scheduled to begin limiting mercury emissions from power plants by 2015.<sup>180</sup> Meanwhile, some members might see an opportunity to advocate a modest power plants-only carbon-trading program as part of this framework.

The bipartisan "cap-and-dividend" proposal from the 111th Congress is another modified version of cap-and-trade that Congress might reconsider. Senators Cantwell (D-WA) and Collins (R-ME) crafted their proposal to address concerns about the trading part of cap-and-trade, and to help people absorb the costs of any energy price increases that might follow from the cap. In their legislation, all proceeds from the purchase of carbon credits towards a cap would flow back to U.S. taxpayers in the form of an annual dividend.<sup>181</sup>

#### **E. Renewable Fuel Standard Reform/Low Carbon Fuel Standard**

The Renewable Fuel Standard may be best described as a CES for mobile sources. And, like a CES, a Renewable Fuel Standard is often caught between what is necessary to drive meaningful GHG reductions, and what can meet competing political pressures. As discussed by Brent Yacobucci in Chapter 16, the program has been attacked at different times by the oil

industry, agricultural interests, and environmental groups concerned about the GHG and other environmental impacts of corn-based ethanol. Moreover, as shown below, a number of high profile fraud cases in the biodiesel credit market have shaken confidence in the program. However, although Congress will continue to weigh in on EPA decisions under the RFS program, it is unlikely to step in to reform the program. Nor is it likely, as some have suggested, that Congress would replace the program with a Low Carbon Fuel Standard.

Section 211 of the Clean Air Act provides the framework for EPA's regulation of motor vehicle fuels and fuel additives.<sup>182</sup> As recounted in Chapter 16, the 2005 Energy Policy Act amended Section 211 to establish the Renewable Fuel Standard program, requiring that transportation fuels in the U.S. contain, on average, some amount of renewable fuel.<sup>183</sup> While not named in the legislation, the largest source of eligible fuel in the U.S. is corn-based ethanol. The Energy Independence and Security Act of 2007 (EISA) created new categories of "renewable fuels," setting annual volumetric targets for three non-ethanol fuel types: biomass-based diesel; advanced biofuels; and cellulosic biofuels.<sup>184</sup> EISA required that biodiesel and advanced biofuels have at least fifty percent fewer life cycle GHG emissions, and cellulosic biofuels at least sixty percent fewer emissions, than the "baseline" fuel (i.e., gasoline or diesel). EISA further required that new renewable fuel facilities produce fuel with at least twenty percent lower life cycle GHG emissions than baseline fuel. However, in a nod to the agricultural lobby, existing renewable fuel – mostly ethanol produced from corn – did not need to meet a GHG standard. Corn ethanol represented eighty-eight percent of the volumetric targets in 2010 for all RFS fuels, undermining the environmental effectiveness of the program.<sup>185</sup>

Further, as also explained in Chapter 16, each year, EPA receives transportation fuel use projections from the Energy Information Administration, and then sets annual targets, expressed

as a percentage of overall expected fuel use, for each of the four renewable fuels.<sup>186</sup> While EPA must start from the volumetric targets set forth in statute, EPA can adjust the volume for cellulosic biofuels,<sup>187</sup> or for biomass-based diesel<sup>188</sup> downward to reflect the availability and cost of these fuels in the marketplace. If EPA makes downward adjustments of volumetric targets for biomass-based diesel, in the same calendar year EPA may likewise adjust the advanced fuel or overall renewable fuel targets by the same or lesser amount.<sup>189</sup> Moreover, EPA can waive any of the renewable fuel requirements,<sup>190</sup> or lower GHG reduction requirements,<sup>191</sup> under certain circumstances. While enabling EPA to respond to economic realities, this flexibility saddles EPA with the political baggage of every decision made under the RFS program. For instance, in 2012, Congress lobbied EPA to waive the RFS to keep corn prices down for livestock producers,<sup>192</sup> while ethanol producers fought the waiver.<sup>193</sup> That same year, the American Petroleum Institute sued EPA successfully over the setting of an aggressive cellulosic ethanol standard.<sup>194</sup> In November 2013, EPA was roundly criticized by biofuel supporters when it adjusted 2014 renewable fuels targets downward for the first time since EISA's enactment.<sup>195</sup>

EISA also directs EPA to make life cycle GHG emissions calculations for new kinds of non-petroleum based transportation fuels. These determinations are quite contentious as they determine whether a new fuel is eligible for the RFS program. For instance, Southeast Asian countries have pressured EPA to find that new palm oil has twenty percent lower life cycle GHG emissions than gasoline or diesel, so that palm oil can enter the RFS market.<sup>196</sup> While the U.S. wants to work with that region, deforestation to make way for palm oil and other plantations poses serious challenges. Indonesia, the world's top palm oil producer,<sup>197</sup> has become the third largest GHG emitter, largely owing to deforestation.<sup>198</sup> EPA's life cycle GHG calculations also

determine whether a new eligible fuel must compete with corn ethanol, or fall into one of the more GHG stringent but less competitive niche markets of advanced or cellulosic biofuels.<sup>199</sup> Further complicating the RFS program were a few highly publicized fraud cases in the biodiesel market. Each year, oil refiners must submit renewable fuel credits (Renewable Identification Numbers, or RIN) equal to the required percentage of their sales to EPA. One RIN should represent a gallon of a renewable fuel. However, beginning in 2011, EPA began identifying several large RIN sellers – amounting to 140 million credits in the market – which had never produced any renewable (in these instances, biodiesel) fuels.<sup>200</sup> In response, the National Biodiesel Board created a task force to prevent fraud.<sup>201</sup> Moreover, Congress has proposed that EPA certify the authenticity of RIN sellers to build confidence in the market.<sup>202</sup> Not wanting to assume that responsibility directly, in January 2013, EPA proposed a voluntary quality assurance program. Third party auditors would certify the authenticity of RINs, and if a refiner relied on those auditors, that refiner would not be liable for penalties if the RIN turned out to be fraudulent.<sup>203</sup> It remains to be seen what the congressional response to this proposal will be. Congress and EPA should be able to address the fraud issue. However, deeper concerns about the program may not be so easy to reform. Since its inception, the RFS program has been beset with competing interests. No doubt, industry and members of Congress will continue to lobby for or against waivers, or for particular GHG emissions determinations.<sup>204</sup> However, it is unlikely that Congress would step in to further reform the RFS program, given that any substantial reform would anger the oil industry, the agricultural lobby, or both.

Some have suggested that Congress replace the production mandates of the RFS with a Low Carbon Fuel Standard (LCFS).<sup>205</sup> Under this approach, EPA would make life cycle GHG determinations for different types of fuel, set one fuel standard for the year, and let the market

determine which fuels should be used to meet that standard. A LCFS could offer for mobile sources the same benefits as a cap-and-trade program for stationary sources, in that it would be technology-neutral and provide refiners with compliance flexibility. However, a number of obstacles make a federal LCFS unlikely. First, there are concerns that truly low-GHG biofuels cannot scale up in time to meet an LCFS.<sup>206</sup> Second, any program that would sharply reduce the amount of corn ethanol eligible for blending into transportation fuels could not muster the votes in Congress to pass. Third, Congress might find it difficult to identify a winning formula for making a life cycle GHG analysis.

One factor that might drive discussion of a federal LCFS is the outcome of litigation over California's proposed LCFS. Out-of-state ethanol refiners, mostly located in the Midwest, sued California on constitutional grounds, claiming that the state's life cycle GHG analysis discriminates against interstate commerce, because it inherently penalizes ethanol trucked in from out of state and produced in refineries powered by coal. In September 2013 the Ninth Circuit Court of Appeals reversed the lower court's conclusion that the state's ethanol provisions were facially discriminatory and impermissibly regulated extra-territorial activity.<sup>207</sup> The Ninth Circuit remanded the case for further proceedings to determine if the LCFS discriminates against interstate commerce in "purpose or effect,"<sup>208</sup> or, if not, whether it survives the Supreme Court's balancing test set forth in *Pike v. Bruce Church*.<sup>209</sup> If the California LCFS were ultimately to survive legal challenge, the state might drive the renewable fuels market to the point where a national LCFS becomes more palatable.<sup>210</sup> Oil and ethanol refineries might request a national LCFS in the near term, to preempt a tougher LCFS in California.

## **F. Climate Adaptation**

Until recently, mitigation has dominated U.S. debates over climate policy. By comparison, the public discussion of adaptation has lagged behind. This is not by accident. Prevailing wisdom held that the world had plenty of time to slow GHG emissions before the effects of climate change would force changes in human settlement patterns and lifestyles.<sup>211</sup> In addition, proponents of mitigation were concerned that discussion of adaptation, or what is increasingly being called climate preparedness and resilience, would concede defeat on efforts to reduce emissions.<sup>212</sup> This began to change in the 111th Congress.<sup>213</sup> ACES and the Senate climate bills designated some of the proceeds from carbon credit auctions to adaptation programs.<sup>214</sup> Adaptation was raised in many other legislative vehicles as well; all told, the Center for Climate and Energy Solutions has calculated that seventy-four bills, amendments, and resolutions containing adaptation provisions were introduced that Congress.<sup>215</sup> While climate adaptation still played a minor role relative to mitigation, the concept was at least mentioned in about one-third of the testimony offered in climate change hearings before the Senate Environment and Public Works Committee in 2009.<sup>216</sup>

Since then, climate “resilience” has continued to move to the forefront of the U.S. climate change policy debate, as both of the reasons for past reticence dissolve. First, the world is witnessing tangible changes in the climate, sparking the realization that we may not have as much time as we had thought to respond to its effects.<sup>217</sup> An October 2012 study by the reinsurance giant Munich Re noted that, “[n]owhere in the world is the rising number of annual natural catastrophes more evident than in North America,” most likely due to the value of property damage from each natural disaster that occurs on this continent.<sup>218</sup> Nearly every U.S. state declared a major natural disaster between 2009 and 2012.<sup>219</sup> Although no one natural disaster can ever be attributed entirely to climate change, the rise in these occurrences fits the

patterns predicted by climate models. Summarizing the conclusions of several peer-reviewed studies, the EPA has stated that as average global surface temperatures increase, northern parts of North America are predicted to get warmer and wetter, while southern parts, especially to the west, are predicted to become drier; that heavy precipitation events will likely become more frequent; and that the intensity of Atlantic hurricanes is likely to increase.<sup>220</sup> Even if the world stopped burning fossil fuels tomorrow, we are locked in to some climate change based on the GHGs already in our atmosphere.<sup>221</sup>

As the need to address the effects of climate change grows, most proponents of mitigation no longer see discussion of adaptation as distracting from the need to reduce GHG emissions. Leading voices on climate change mitigation have come to embrace adaptation,<sup>222</sup> and studies show that discussions of adaptation may in fact encourage thinking about mitigation, because people become aware of the costs associated with doing nothing.<sup>223</sup> Moreover, businesses are recognizing the risks of climate change on operations and supply chains, and are taking steps to adapt to those risks.<sup>224</sup> These actions may spur congressional action.

In the meantime, states—particularly coastal states—facing increased risk of inundation and storm surges as the sea level rises, have taken the lead to prepare for a changing climate. As discussed by J.B. Ruhl in Chapter 20, many states are engaged in some phase of adaptation planning. According to the Georgetown Climate Center, twenty-four states have adopted climate adaptation plans, or have incorporated climate change impacts into long-range planning documents.<sup>225</sup> Eight states – Alaska, Arizona, Delaware, New Hampshire, New Mexico, New York, Tennessee, and Vermont – have addressed climate change explicitly in their Wildlife Action Plans.<sup>226</sup> Some states have moved beyond planning to provide guidance and assistance to local governments; for instance, California has published an “Adaptation Planning Guide” to

assist regional and local adaptation efforts,<sup>227</sup> and Rhode Island has been using Light Detection and Ranging (remote sensing) data to map potential sea level rise and storm surge patterns, for local governments to use when updating zoning codes.<sup>228</sup> However, as Chapter 20 recounts, states have hesitated to regulate directly to address climate adaptation – for example, by requiring changes to local building codes or preventing development on land that might be inundated in fifty years – because these measures could implicate constitutional (takings) concerns.<sup>229</sup> Moreover, such regulation could face broad political opposition. For instance, in 2012, North Carolina enacted legislation delaying state efforts to “define rates of sea level change for regulatory purposes” (including coastal development rules) until July 2016.<sup>230</sup>

As described in more detail in Chapter 20, the federal government under the Obama Administration also began with a non-regulatory approach to climate adaptation, educating and providing support to the states while incorporating adaptation considerations into agency decision-making. In the spring of 2009, the Administration organized an Inter-Agency Climate Change Adaptation Task Force. Executive Order 13514, signed by President Obama in October 2009, directed this Task Force to develop recommendations for a federal adaptation strategy within one year. The Executive Order further directed each agency to submit a climate adaptation plan.<sup>231</sup>

In Congress, Senators Baucus (D-MT) and Whitehouse (D-RI) introduced adaptation legislation in the 112th Congress that directed the executive branch to incorporate climate adaptation in its wildlife and public lands programs, and encouraged states to do the same.<sup>232</sup> While the Obama Administration was already doing this, the legislation was intended to provide a backstop, making it more difficult for future administrations to abandon these efforts. In 2013, the Government Accountability Office (GAO) began publishing a series of climate adaptation

reports, focused on different sectors of the economy, to raise awareness on this issue and drive discussion in Washington, D.C.<sup>233</sup> Climate adaptation also featured prominently in the Obama Administration's 2013 Climate Action Plan, which called for expanded effort and investment at the federal, state, and local level.<sup>234</sup>

Going forward, Congress might consider incorporating climate adaptation into existing infrastructure programs. While some proposed projects have been criticized for their expense, the costs of recent disasters put those costs in perspective.<sup>235</sup> The 2014 federal transportation bill (the last bill funded the Federal Highway Trust Fund through September 2014)<sup>236</sup> could require that federally funded bridges and roads be designed in anticipation of modeled sea level rise, or that federal dollars be conditioned on changes in state and local building codes to accommodate climate change. Likewise, Congress could try to use the Water Resources Development Act (WRDA) – the legislation that authorizes projects for the Army Corps of Engineers – to implement climate adaptation policy. WRDA is intended to be authorized every two years; the last authorization was in 2007. In May 2013, the Senate passed a WRDA bill that did not mention climate adaptation.<sup>237</sup> Alternatively, or in addition, NEPA could be used more aggressively, requiring each agency to specifically study how projects will be affected by anticipated climate change throughout their useful lives.

Opponents to federal climate adaptation measures may see this as another example of government overreach. To them, investments in preparedness or resilience will look like the federal government is finding another way to spend money on infrastructure, or is dictating land use development to state and local governments, interfering in their traditional domain. Therefore, a less controversial area of federal adaptation policy might focus on removing federal

subsidies to development in certain areas, rather than funding new projects, prohibiting activities, or conditioning general federal funding to changes in state law.

For instance, Congress might revisit public crop insurance and flood insurance programs. Unlike their private counterparts, which are incorporating climate modeling into their pay-out predictions, the public insurance programs merely extrapolate from historic events. The public programs may be vastly underestimating the potential costs of their programs in future years, thereby threatening their solvency.<sup>238</sup> In 2012, Congress discussed this during the re-authorization of the federal flood insurance program, and made some modest changes in response,<sup>239</sup> but more remains to be done. Finally, Congress could update and expand the Coastal Barrier Resources Act, which discourages building in coastal zones by prohibiting the use of federal dollars in demarcated areas.<sup>240</sup>

#### **IV. Looking Forward: Integrating Energy and Climate Change Policy**

We conclude this chapter, and this book, by describing key trends in climate change policy. First, there is increasing recognition that U.S. energy and climate policy go hand-in-hand. Indeed, Secretary of State John Kerry said in 2013 that “[e]nergy policy is the solution to climate change.”<sup>241</sup> Of course the two are intertwined: the rapid increase of atmospheric concentrations of GHGs in the post-industrial era is primarily the result of fossil fuel combustion for human energy consumption. Historically, however, U.S. energy and climate policy have not been well integrated. Every U.S. president starting with Richard Nixon has made American energy “independence” a goal, and yet none has proposed a comprehensive energy policy that might achieve this aim, let alone an energy policy that would also address the environmental harms associated with fossil fuel extraction and consumption. And it is not just presidents who

have come up long on rhetoric and short on policy. Congress has at best muddled through, with occasional bursts of activity to promote energy efficiency (during times of constrained oil supply, as in the wake of the 1973 Arab oil embargo), and with intermittent subsidies for renewable energy like wind and solar, while maintaining long-term support, primarily through the tax code, for fossil fuels.

Moreover, energy *independence* is arguably not a coherent policy goal. As an initial matter, it is important to distinguish between the electric power and transportation sectors. As of mid-2013, the U.S. is virtually independent in producing the nation's electricity supply, importing a relatively small share of natural gas and hydro-power primarily from Canada and Mexico.<sup>242</sup> However, U.S. dependence on oil for transportation is another story. The U.S. has been the world's largest net oil importer since the 1970s, with imports peaking at over sixty percent of U.S. oil consumption in 2005.

In part, energy "independence" for the transportation sector is elusive because oil is a commodity that trades in a global market. U.S. production is a small share of the world total and thus cannot by itself significantly influence the world price. Thus, even reducing U.S. imports substantially (through demand-side reductions as a result of economic recession; through policies like higher fuel efficiency standards or other initiatives to reduce vehicle miles traveled; or by increasing the U.S. share of oil production, which has occurred in recent years due to the shale oil boom) would not immunize U.S. consumers from fluctuating oil prices. For this reason, although the appeal of "energy independence" rhetoric has proven irresistible for politicians, many experts believe that a better term would be "energy resilience" or "energy security" since reducing imports might help to improve the U.S.'s ability to withstand oil price volatility, but not inoculate it from this vulnerability entirely.<sup>243</sup>

From 2001-2008, the George W. Bush Administration pursued an energy policy focused on expanding and diversifying fossil fuel production, both at home and abroad, coupled with a climate policy that eschewed mandatory GHG limits.<sup>244</sup> The Obama Administration has embraced a somewhat broader “All of the Above” energy policy, supporting the growth of renewable energy and approving the first new nuclear reactors since the 1970s, while promoting onshore and offshore drilling for oil and gas.<sup>245</sup>

Rapid advances in horizontal drilling and hydraulic fracturing have resulted in dramatic increases in domestic production of unconventional oil and gas resources, primarily from shale. The Obama Administration has championed natural gas as a “bridge fuel” to a lower carbon economy, spurring its displacement of coal for electricity generation, and embracing hydraulic fracturing, necessary to access natural gas in shale formations, as part of that strategy. The Administration has approached hydraulic fracturing gingerly, largely deferring to the states,<sup>246</sup> never requesting that Congress lift the exemptions fracking enjoys from numerous federal environmental requirements, and imposing only modest constraints on fracking operations on federally owned lands.<sup>247</sup>

At the same time, U.S. oil imports have reached their lowest level in twenty years. According to the EIA, largely as a result of the shale boom, U.S. oil imports were down from a high of just over sixty percent in 2005 to forty percent in 2012.<sup>248</sup> The International Energy Administration’s 2012 World Outlook projects that, by 2020, the U.S. will become the largest global oil producer (overtaking Saudi Arabia) and that, partly as a result of stronger fuel efficiency standards lowering demand, North America will become a net oil exporter around 2030.<sup>249</sup> Of course, tight oil cannot claim the climate or clean air benefits of shale gas, complicating the picture for development of this fossil fuel.

Over the same period, there has been a dramatic turnaround in the U.S. outlook on natural gas. While in 2005, the U.S. expected to import increasing amounts of natural gas, in 2013, domestic production has soared, prices have plummeted,<sup>250</sup> and U.S. energy companies are seeking federal approval to convert liquefied natural gas (LNG) terminals originally designed for import into export terminals.<sup>251</sup>

Finally, while coal at least temporarily lost its position as the top source of electricity generation in the U.S. in April 2012 (facing historic low prices for natural gas, and pending new air pollution rules from EPA),<sup>252</sup> U.S. coal exports hit all-time highs in 2013, driven by increasing demand in Asia.<sup>253</sup> As the United States shifts electricity generation from coal to natural gas, coal producers are pushing for even greater access to export markets. Illustrating the likely political brawls to come, the Army Corps of Engineers (Corps) has undertaken Environmental Assessments of individual coal export terminals in the Pacific Northwest; advocacy groups have requested that the Corps delay approval of all terminals until it completes a regional “programmatic” review of the cumulative impact of the multiple proposals;<sup>254</sup> and Governors from the Pacific Northwest have asked that any review consider not only the direct air pollution effects of transporting so much coal through the region, but also the climate impacts of sending coal to Asian markets.<sup>255</sup>

Thus, a key question for U.S. energy policy going forward is the extent to which the federal government should continue to promote domestic fossil fuel production through policies friendly to onshore and offshore drilling, fracking, and mountain top mining, and whether the government should encourage the export of fossil fuels by authorizing LNG export terminals, spurring more coal leasing on federal lands, supporting coal exports and lifting restrictions on the export of crude oil. Under current federal law, with few limited exceptions, U.S. crude oil

exports are generally not permissible without an export license, or unless authorized by a presidential finding.<sup>256</sup> The debate has already begun over whether, in the face of so much domestic production, such restrictions should now be lifted.<sup>257</sup>

How future presidents and Congresses answer these questions will have significant implications not just for energy policy, but for global climate policy as well. This is because, while in the short to medium term, the world is expected to remain overwhelmingly dependent on fossil fuels (the EIA expects fossil fuels to provide over three-quarters of the world's energy in 2035),<sup>258</sup> avoiding the worst risks of climate change will ultimately require a dramatic reduction in just these sources of energy, and a transition to cleaner ones.

The conflict over the Keystone XL pipeline—still unresolved as this volume goes to press—illustrates the challenge. The proposed pipeline would carry heavy bitumen from the Canadian oil sands in Alberta, through Montana, South Dakota and Nebraska, to an existing pipeline that would ultimately deliver it to the U.S. Gulf for refining. Under an Executive Order, such international pipelines must be approved by the State Department with input from other agencies, including EPA.<sup>259</sup> Opponents of the pipeline argue that it is inconsistent with the president's stance on climate change to approve a pipeline that will carry such "dirty" oil, which because of its viscosity has been shown to be more GHG intensive to produce than standard crude.<sup>260</sup> Proponents argue that the pipeline is in the U.S.'s strategic interest—that Canada is our largest trading partner, that the oil will be shipped directly to Asia if it does not come to the U.S., and that the pipeline itself will not produce significant GHG emissions.<sup>261</sup> In any event, proponents argue, nothing the U.S. does will prevent the Canadian government from developing this valuable resource—in other words, the gigatons of carbon embedded in the oil sands will be emitted whether we like it or not.

The Keystone XL dispute is symbolic of the larger and deeper conflicts to come. If we take seriously that the world cannot burn all of the currently proven reserves of fossil fuels without spiking the planet's temperature into a very dangerous range,<sup>262</sup> then governments face very hard choices. Either they must leave some of these immensely valuable and politically strategic resources in the ground, or develop and deploy technologies that can capture and sequester carbon emissions from their combustion. Yet currently, there is no sign that national oil companies (which own over two-thirds of the world's proven reserves)<sup>263</sup> are prepared to abandon their holdings, nor have governments shown any appetite to limit exploration and production by the major private oil companies (which control a much smaller share). And carbon capture technology, while technically demonstrated, has not yet been shown to be scalable, something that will be difficult without a meaningful carbon price. We have barely begun to address the geologic, economic and legal challenges of long-term sequestration. The Keystone XL conflict, like the disputes over siting LNG terminals, ramping up coal exports and loosening restrictions on oil exports, are all, ultimately, about the same thing: how to integrate a U.S. energy policy that has traditionally been focused on expanding fossil fuel production with a climate policy that must be aimed its contraction.

We may be running out of time to find the right balance between these two tensions. The fundamental question remains whether we can overhaul our energy system rapidly enough to avoid severe climate disruption. However, some scientists claim that it may be possible to extend the timeline for action through intentional manipulation of the climate to counteract some of the effects of climate change, using techniques collectively known as geoengineering. Research on geoengineering is in its infancy, as Albert Lin makes clear in Chapter 21. Indeed, the viability of solar radiation management or carbon dioxide removal techniques remains highly

speculative, with costs still unknown, and side effects unpredictable. The ethical and legal implications of geoengineering, moreover, have yet to be fully explored. And the potential for international conflict, were one or a small group of countries to unilaterally attempt to control the earth's thermostat, seems high. Moreover, as its proponents are quick to note, geoengineering techniques would be *at best* a delay tactic—a means of temporarily slowing the felt effects of warming to buy time for the world's governments to finally muster the will to address its underlying cause, by reducing GHG emissions. As described in Chapter 21, efforts that go beyond addressing the symptoms of climate change, to directly remove carbon dioxide from the atmosphere, are premature and face large technical obstacles. Of course, in the event of a technological breakthrough, some geoengineering proponents might shift gears and offer these approaches as a *substitute* for mitigation. At this point, geoengineering is a long bet, under conditions of extreme uncertainty.

Notwithstanding all of these caveats, given the world's current emissions trajectory, the appeal of geoengineering is undeniable. It may emerge as an important component of climate policy going forward. As the effects of climate change are increasingly felt, pressure will mount on politicians to do something, or to be seen doing something, to stave off its impacts. Already, there are calls to pursue geoengineering research aggressively now, so that we will be in a position to use it if necessary, as a "last resort." To do this responsibly, however, will require the U.S. to participate in the development of an international governance regime as well as a domestic framework that would apply to U.S.-based scientists and private actors. None of this architecture exists as of 2013.

If current projections about temperature increase and sea level rise hold true, a third emerging theme may be the need for other new international agreements to address climate

change impacts. For instance, the global community will need to identify international migration rights of climate-displaced people. Currently, neither international climate change law nor human rights law adequately provides for the millions of people who may wind up displaced due to climate change. Some scholars have argued that a new international convention is therefore necessary;<sup>264</sup> others have disagreed.<sup>265</sup>

Meanwhile, while some island nations may disappear as a result of climate change, other frontiers may open up, for better or worse.<sup>266</sup> Researchers have predicted that the Arctic Ocean could be ice-free and open for shipping during some months of the year by mid-century.<sup>267</sup> The region is rich in fossil fuels and mineral resources; for instance, the United States Geological Survey has estimated that about 30% of the world's undiscovered gas and 13% of its undiscovered oil may be found in the Arctic.<sup>268</sup> As temperatures warm and ice recedes, countries may be able to access these resources. The race to exploit the Arctic's resources could cause tensions among the countries that stake a claim in the Arctic – Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the U.S. In April 2013, five of these countries came together to discuss a possible agreement to regulate commercial fishing in the region;<sup>269</sup> in May 2013, the eight members of the Arctic Council agreed to broker a climate change agreement for the region.<sup>270</sup> These talks could provide a basis for discussions about future allocation of the resources in the Arctic, and protections against environmental risks such as spills, and they may also forecast areas of potential conflict.

Responding to global climate change demands not only technological innovation but legal innovation as well. The need for durable yet flexible legal institutions capable of addressing the implications of climate change over the long term is acute. The U.S. government will face hard choices in the decades to come. Lawyers will be involved every step of the way,

helping to adapt existing regulatory regimes to new challenges, design entirely new frameworks and institutions, and advise governments and private actors of their rights, responsibilities, and liabilities. As this volume has shown, there is already a tremendous amount of U.S. “law” related to climate change. Yet it represents just a snapshot of this dynamic, fast-moving field. Given the intensity and variety of economic activity, technology innovation and policy experimentation related to climate change, we expect law in this domain only to expand, and to grow more interesting, over time.

## Notes

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<sup>1</sup> H.R. 2454, 111th Cong. (2009).

<sup>2</sup> John M. Broder, *Climate Bill is Threatened by Senators*, N.Y. TIMES (Aug. 6, 2009), available at [http://www.nytimes.com/2009/08/07/us/politics/07climate.html?\\_r=1&](http://www.nytimes.com/2009/08/07/us/politics/07climate.html?_r=1&).

<sup>3</sup> Katherine Ling & Ben Geman, *Senate Dems Wrestle over Carbon Market Regs, Oversight in Climate Bill*, N.Y. TIMES (July 24, 2009), available at <http://www.nytimes.com/cwire/2009/07/24/24climatewire-senate-dems-wrestle-over-carbon-market-regs-91367.html?pagewanted=all>.

<sup>4</sup> *This Week With George Stephanopoulos* (ABC television broadcast June 28, 2009) (interviewing Senator Charles Grassley (R-NE), who said “if the United States moves ahead by itself [on a climate bill], we’re not only going to lose . . . jobs, but the point is, after 30 or 40 years, we’re going to reduce CO<sub>2</sub> by less than 1 percent. So we’ve got to do it on an international basis, George”).

<sup>5</sup> See generally Ryan Lizza, *As the World Burns*, THE NEW YORKER (Oct. 11, 2010).

<sup>6</sup> Carl Hulse & David M. Herszenhorn, *Democrats Call off Climate Bill Effort*, N.Y. TIMES (July 22, 2010), available at <http://www.nytimes.com/2010/07/23/us/politics/23cong.html>.

<sup>7</sup> Executive Office of the President, *The President’s Climate Action Plan* (June 2013) [hereinafter “President’s Climate Action Plan”], available at <http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>.

<sup>8</sup> U.N. Framework Convention on Climate Change, *Copenhagen Climate Change Conference – December 2009*, available at [http://unfccc.int/meetings/copenhagen\\_dec\\_2009/meeting/6295.php](http://unfccc.int/meetings/copenhagen_dec_2009/meeting/6295.php).

<sup>9</sup> Press Release, The Norwegian Nobel Committee, *The Nobel Peace Prize for 2009* (Oct. 9, 2009) (recognizing *inter alia* that, “[t]hanks to Obama’s initiative, the USA is now playing a more constructive role in meeting the great climatic challenges the world is confronting”).

<sup>10</sup> E.g., John M. Broder, *Obama to Go to Copenhagen with Emissions Target*, N.Y. TIMES (Nov. 25, 2009), available at <http://www.nytimes.com/2009/11/26/us/politics/26climate.html?pagewanted=all>.

<sup>11</sup> Juliet Eilperin, *China Says It Will Cut its Carbon Emissions by up to 45 Percent by 2020*, WASH. POST (Nov. 27, 2009), available at <http://www.washingtonpost.com/wp-dyn/content/article/2009/11/26/AR2009112600519.html>. Carbon intensity is a measurement of carbon

emissions relative to economic growth; the goal pledged a serious commitment to energy efficiency without necessarily capping overall emissions.

<sup>12</sup> Although the Great Recession began in December 2007 and formally ended in June 2009, the economic recovery proved to be sluggish. See The Nat'l Bureau of Econ. Research, *Business Cycle Dating Committee* (Sept. 20, 2010), available at <http://www.nber.org/cycles/sept2010.pdf>. Moreover, unemployment lagged other economic indicators, peaking in the United States in October 2009, at ten percent. As of June 2013, unemployment stood at 7.6%. See News Release, Bureau of Labor Statistics, Dep't of Labor, *Regional and State Employment and Unemployment—June 2013* (July 18, 2013), available at <http://www.bls.gov/news.release/pdf/laus.pdf>; see also Lyle Scruggs & Salil Benegal, *Declining Public Concern About Climate Change: Can We Blame the Great Recession?*, 22 *Global Env'tl. Change* 505, 505-15 (2012) (finding a correlation between belief in climate change in public opinion polls and economic indicators, including the unemployment rate).

<sup>13</sup> During the fall of 2009, never identified persons hacked into the servers at the University of East Anglia, and stole hundreds of emails exchanged by prominent American and British climate scientists. Jeremy Lovell, *U.K. Police Close Climategate Inquiry*, *SCIENTIFIC AMERICAN* (July 20, 2012). Three weeks before COP-15, the hackers published some of the emails, including several which purportedly described efforts by climate scientists to hide data that undermined the theory of human-driven global warming. Andrew C. Revkin, *Hacked E-Mail is New Fodder for Climate Dispute*, *N.Y. TIMES* (Nov. 20, 2009), available at [http://www.nytimes.com/2009/11/21/science/earth/21climate.html?\\_r=0](http://www.nytimes.com/2009/11/21/science/earth/21climate.html?_r=0). Eventually, several reviews cleared the scientists of any wrongdoing and concluded that nothing in the emails shook the consensus in the scientific community around climate change. See Kelly Levin, World Resources Inst., *Summarizing the Investigations on Climate Science* (July 12, 2010), available at <http://www.wri.org/stories/2010/07/summarizing-investigations-climate-science>.

<sup>14</sup> See, e.g., Nina Chestney, *Factbox: Climate Negotiating Positions of Big Greenhouse Emitters*, *REUTERS* (Nov. 22, 2012), available at <http://www.reuters.com/article/2012/11/22/us-climate-talks-emitters-idUSBRE8AL0PO20121122>.

<sup>15</sup> See generally Joeri Rogelj, et al., Letter, *Probabilistic Cost Estimates for Climate Change Mitigation*, 493 *NATURE* 79 (2013) (modeling probability of preventing average global surface temperatures from rising two degrees Celsius, and describing that of all of the model inputs, political willingness to initiate mitigation efforts is the most uncertain); Steve Hatfield-Dodds, *All in the Timing*, 493 *NATURE* 35 (2013).

<sup>16</sup> Press Release, Congressman Steve Scalise (R-LA), *Scalise Passes Amendment on House Floor Blocking Reckless Climate Change Regulations* (June 16, 2011), available at <http://scalise.house.gov/press-release/scalise-passes-amendment-house-floor-blocking-reckless-climate-change-regulations>; see also Friends of Coal, *Stop EPA from Imposing Job Killing Climate Regulations – Write Your Senators Today* (Feb. 19, 2010), available at <http://www.friendsofcoal.org/uncatgorized/stop-epa-from-imposing-job-killing-climate-regulations-write-your-senators-today.html>.

<sup>17</sup> GOP.com, *2012 Republican Platform: America's Natural Resources*, available at [http://www.gop.com/2012-republican-platform\\_home/](http://www.gop.com/2012-republican-platform_home/); see also Brad Plumer, *GOP Platform Highlights the Party's Abrupt Shift on Energy, Climate*, *WASH. POST WONKBLOG* (Aug. 30, 2012), available at <http://www.washingtonpost.com/blogs/wonkblog/wp/2012/08/30/gop-platform-highlights-the-partys-drastic-shift-on-energy-climate-issues/>. Of course, some Democrats, particularly those representing fossil fuel energy production states, have also expressed concern about the potential economic effects of a price on carbon. See, e.g., Juliet Eilperin, *Manchin Lobbying White House on 'Totally Unreasonable' Coal Standards*, *WASH. POST POLITICS BLOG* (Aug. 1, 2013), available at <http://www.washingtonpost.com/blogs/post-politics/wp/2013/08/01/manchin-lobbying-white-house-on-totally-unreasonable-coal-standards/>.

<sup>18</sup> Ezra Klein, *Good Riddance to Rottenest Congress in History*, BLOOMBERG (Jan. 2, 2013), available at <http://www.bloomberg.com/news/2013-01-02/good-riddance-to-rottenest-congress-in-history.html>. Congress has tracked a number of “productivity” statistics by Congress since the 80th Congress (1947-1948); see U.S. Senate, *Résumé of Congressional Activity*, available at [http://www.senate.gov/pagelayout/reference/two\\_column\\_table/Resumes.htm](http://www.senate.gov/pagelayout/reference/two_column_table/Resumes.htm).

<sup>19</sup> Comm. on Energy and Commerce Democrats, U.S. H.R., *The Anti-Environment Record of the 112th House of Representatives* (Nov. 14, 2012), available at <http://democrats.energycommerce.house.gov/index.php?q=legislative-database-anti-environment&legislation=All&topic=All&statute=All&agency=Department+of+Energy>.

<sup>20</sup> *Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 239, 66496 (Dec. 15, 2009), available at <http://www.gpo.gov/fdsys/pkg/FR-2009-12-15/pdf/E9-29537.pdf>.

<sup>21</sup> Nat’l Highway Traffic Safety Admin., *CAFE – Fuel Economy*, available at <http://www.nhtsa.gov/fuel-economy>.

<sup>22</sup> *Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews*, 77 Fed. Reg. 159, 49490 (Aug. 16, 2012), available at <http://www.gpo.gov/fdsys/pkg/FR-2012-08-16/pdf/2012-16806.pdf>.

<sup>23</sup> See, e.g., 10 C.F.R. §§ 429-430 (2013) (prescribing energy conservation standards for microwave ovens).

<sup>24</sup> President Barack Obama, *Remarks by the President in State of the Union Address* (Jan. 27, 2010), available at <http://www.whitehouse.gov/the-press-office/remarks-president-state-union-address>.

<sup>25</sup> See Bryan Walsh, *Politics: The State of the Union is All about Energy – Not Climate*, TIME (Jan. 5, 2011), available at <http://science.time.com/2011/01/25/politics-the-state-of-the-union-is-all-about-energy%E2%80%94not-climate/>.

<sup>26</sup> See U.S. EPA, *Settlement Agreement* (Dec. 2010), available at <http://epa.gov/carbonpollutionstandard/pdfs/boilerghgsettlement.pdf> (memorializing EPA’s agreement to propose GHG New Source Performance Standards (NSPS) for new and existing electric steam generating units by July 26, 2011, and a final rule for both sets of standards by May 26, 2012). *But see* U.S. EPA, *Modification to Settlement Agreement* (June 13, 2011), available at <http://epa.gov/carbonpollutionstandard/pdfs/20110613ghgsettlementmod.pdf> (delaying the proposed NSPS rules until September 30, 2011); see also Brad Plumer, *EPA Delays its Greenhouse-Gas Rules. Not a Big Deal – Or is It?*, WASHINGTON POST WONKBLOG (Sept. 15, 2011), available at [http://www.washingtonpost.com/blogs/wonkblog/post/epa-delays-its-greenhouse-gas-rules-thats-no-big-deal--or-is-it/2011/09/15/gIQAiuAKVK\\_blog.html](http://www.washingtonpost.com/blogs/wonkblog/post/epa-delays-its-greenhouse-gas-rules-thats-no-big-deal--or-is-it/2011/09/15/gIQAiuAKVK_blog.html).

<sup>27</sup> Letter from Cass R. Sunstein, Administrator, Office of Information and Regulatory Affairs, to Lisa Jackson, Administrator, EPA (Sept. 2, 2011), available at [http://www.whitehouse.gov/sites/default/files/ozone\\_national\\_ambient\\_air\\_quality\\_standards\\_letter.pdf](http://www.whitehouse.gov/sites/default/files/ozone_national_ambient_air_quality_standards_letter.pdf); see also John M. Broder, *Regulatory Nominee Vows to Speed up Energy Reviews*, N.Y. TIMES (June 12, 2013), available at [http://www.nytimes.com/2013/06/13/us/politics/environmental-rules-delayed-as-white-house-slows-reviews.html?ref=politics&\\_r=1&](http://www.nytimes.com/2013/06/13/us/politics/environmental-rules-delayed-as-white-house-slows-reviews.html?ref=politics&_r=1&); Lisa Heinzerling, *Who Will Run the EPA?*, 30 Yale J. on Reg. 39 (2013)

<sup>28</sup> Elizabeth Landau, *Debates Never Tackled Climate Change*, CNN (Oct. 23, 2012), available at <http://lightyears.blogs.cnn.com/2012/10/23/debates-never-tackled-climate-change/>.

<sup>29</sup> Nat’l Climate Assessment and Dev. Advisory Comm., *Introduction to Federal Advisory Committee Draft Climate Assessment*, 1 (Jan. 14, 2013), available at <http://ncadac.globalchange.gov/>.

<sup>30</sup> *Id.* at 16.

<sup>31</sup> Intergovernmental Panel on Climate Change, *Climate Change 2013: The Physical Science Basis – Summary for Policymakers* (2013) at 15, 23.

<sup>32</sup> Frank Newport, *Americans' Worries about Global Warming up Slightly*, GALLUP POLITICS (Mar. 30, 2012), available at <http://www.gallup.com/poll/153653/Americans-Worries-Global-Warming-Slightly.aspx?ref=more>. Gallup first asked Americans to rate their concern about global warming in 1989. At that point, sixty-three percent of Americans expressed concern. Concern has fluctuated over the years, falling to a low of fifty percent in 1998, fifty-one percent in 2004, and rising to sixty-six percent in 2008.

<sup>33</sup> National Climatic Data Center, *NCDC Announces Warmest Year on Record for Contiguous U.S.* (Jan. 8, 2013), available at <http://www.ncdc.noaa.gov/news/ncdc-announces-warmest-year-record-contiguous-us>.

<sup>34</sup> USDA, *U.S. Drought 2012: Farm and Food Impacts*, available at <http://www.ers.usda.gov/topics/in-the-news/us-drought-2012-farm-and-food-impacts.aspx>.

<sup>35</sup> Nat'l Climatic Data Ctr., NOAA, *State of the Climate: Drought: Annual 2012*, available at <http://www.ncdc.noaa.gov/sotc/drought/> (last visited Jan. 17, 2013).

<sup>36</sup> Climate Prediction Center, *U.S. Seasonal Drought Outlook* (Aug. 15, 2013), available at [http://www.cpc.ncep.noaa.gov/products/expert\\_assessment/sdo\\_summary.html](http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.html).

<sup>37</sup> Tim Sharp, *Superstorm Sandy: Facts about the Frankenstorm*, LIVESCIENCE (Nov. 27, 2012), available at <http://www.livescience.com/24380-hurricane-sandy-status-data.html>.

<sup>38</sup> Josh Keller, *Mapping Hurricane Sandy's Deadly Toll*, N.Y. TIMES (Nov. 17, 2012), available at <http://www.nytimes.com/interactive/2012/11/17/nyregion/hurricane-sandy-map.html>.

<sup>39</sup> Editorial, *Hurricane Sandy's Rising Costs*, N.Y. TIMES (Nov. 27, 2012), available at <http://www.nytimes.com/2012/11/28/opinion/hurricane-sandys-rising-costs.html>.

<sup>40</sup> Michael R. Bloomberg, *A Vote for a President to Lead on Climate Change*, BLOOMBERG (Nov. 1, 2012), available at <http://www.bloomberg.com/news/2012-11-01/a-vote-for-a-president-to-lead-on-climate-change.html> (noting that “President Obama has taken major steps to reduce our carbon consumption” and “sees climate change as an urgent problem that threatens our planet”).

<sup>41</sup> President Barack Obama, *Inaugural Address by President Barack Obama* (Jan. 21, 2013), available at <http://www.whitehouse.gov/the-press-office/2013/01/21/inaugural-address-president-barack-obama>; see also Interview by David Gregory with President Barack Obama in Washington, D.C. (Dec. 30, 2012), available at [http://www.msnbc.msn.com/id/50314590/ns/meet\\_the\\_press-transcripts/t/december-president-barack-obama-tom-brokaw-jon-meacham-doris-kearns-goodwin-david-brooks-chuck-todd/#.UP6deh00WSo](http://www.msnbc.msn.com/id/50314590/ns/meet_the_press-transcripts/t/december-president-barack-obama-tom-brokaw-jon-meacham-doris-kearns-goodwin-david-brooks-chuck-todd/#.UP6deh00WSo) (pledging to address energy and environmental concerns in his second term).

<sup>42</sup> *U.S. Elections Maps: 2012 Senate Races*, POLITICO, available at <http://www.politico.com/2012-election/map/#/Senate/2012/>.

<sup>43</sup> *U.S. Elections Maps: 2012 House Races*, POLITICO, available at <http://www.politico.com/2012-election/map/#/House/2012/>.

<sup>44</sup> For instance, in a televised debate for the Massachusetts Senate seat, Democratic candidate Elizabeth Warren warned that voting for Republican Senator Scott Brown would bring the Senate one seat closer to “the Republicans tak[ing] over control of the Senate, Jim Inhofe would become the person who would be in charge of the committee that oversees the Environmental Protection Agency. He’s a man that has called global warming ‘a hoax.’” *Massachusetts Senate Debate* (WBZ-TV Boston television broadcast Sept. 20, 2012), available at <http://www.c-spanvideo.org/program/308202-1>. See also Chris Murphy’s House website, posted while he was running for a Senate seat in Connecticut (stating that “I support a national standard to drive development of renewable power technologies like wind, solar, fuel cells and alternative fuels – a policy Connecticut and dozens of other states have already passed on their own. I’ve also fought hard for landmark climate change legislation that will drive private sector investment in the clean energy systems of the future”), available at [www.chrismurphy.com/issues/entry/energy/](http://www.chrismurphy.com/issues/entry/energy/); Dan Farber, *Energy and Environment in the Wisconsin Senate Race*, LEGAL PLANET: THE ENVIRONMENT AND LAND POLICY BLOG (Sept. 25, 2012) (quoting

then Representative Tammy Baldwin's campaign website as stating, "I support mandatory, market-based, cap-and-trade legislation to address climate change"); Michael Coleman, *US Senate Race: Clear Differences on Coal*, ALBUQUERQUE JOURNAL (Oct. 28, 2012) (quoting then Representative Martin Heinrich in debates with his Republican opponent that "I just don't think coal is the energy of the future. These jobs are important to the people working in them. I get that. But in terms of where we should be making policy investment to change our energy portfolio over time, I think we should be investing in . . . a cleaner energy future").

<sup>45</sup> Press Release, U.S. Sen. Bernie Sanders, *Boxer Propose Climate Change Bills* (Feb. 14, 2013), available at <http://www.sanders.senate.gov/newsroom/news/?id=2a869a44-1597-42a8-b625-1a88db3febbc>.

<sup>46</sup> President's Climate Action Plan, *supra* note 2.

<sup>47</sup> President Barack Obama, *Remarks by the President on Climate Change* (June 25, 2013), available at <http://www.whitehouse.gov/the-press-office/2013/06/25/remarks-president-climate-change>; see also Press Release, The White House, Office of the Press Secretary, *Presidential Memorandum—Power Sector Carbon Pollution Standards* (June 25, 2013), available at <http://www.whitehouse.gov/the-press-office/2013/06/25/presidential-memorandum-power-sector-carbon-pollution-standards>.

<sup>48</sup> Press Release, The White House, Office of the Press Secretary, *Presidential Memorandum—Power Sector Carbon Pollution Standards*, *supra* note 47.

<sup>49</sup> *Id.*

<sup>50</sup> Erica Martinson, *EPA Sends Climate Rule to White House*, POLITICO (July 1, 2013), available at <http://www.politico.com/story/2013/07/epa-climate-rules-white-house-93612.html?hp=f1>.

<sup>51</sup> The President's Climate Action Plan (June 2013), available at <http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>.

<sup>52</sup> See Jim Malewitz, *States Seeking Flexibility in Obama Climate Plan*, STATELINE (July 12, 2013), available at <http://www.pewstates.org/projects/stateline/headlines/states-seek-flexibility-in-obama-climate-plan-85899489841>; see also Molly K. Hooper, *Boehner: Obama Climate Proposal 'Absolutely Crazy'*, THE HILL (June 20, 2013), available at <http://thehill.com/blogs/e2-wire/e2-wire/306831-boehner-obama-climate-change-proposal-absolutely-crazy>.

<sup>53</sup> See Hooper, *supra* note 52.

<sup>54</sup> As this book goes to press, numerous petitions for certiorari are pending in the Supreme Court seeking review of the D.C. Circuit's decision upholding the EPA's endangerment finding for greenhouse gases, and its first set of greenhouse gas regulations promulgated under the Clean Air Act's mobile source and prevention of significant deterioration programs. See *Coal. for Responsible Regulation v. EPA*, 684 F.3d 102 (D.C. Cir. 2012). Should the Court grant review of the endangerment finding in particular, the underpinnings for EPA's GHG program could be at risk.

<sup>55</sup> Center for Climate and Energy Solutions, *Renewable Energy Standards*, available at <http://www.c2es.org/us-states-regions/policy-maps/renewable-energy-standards>.

<sup>56</sup> Database of State Incentives for Renewables and Efficiency, U.S. Department of Energy, *Summary Maps*, available at <http://www.dsireusa.org/summarymaps/index.cfm?ee=0&RE=0>.

<sup>57</sup> Regional Greenhouse Gas Initiative, available at <http://www.rggi.org>. There were ten member states; however, New Jersey left the program in May 2011. E.g., Lisa Fleisher & Cassandra Sweet, *New Jersey to Exit Carbon-Reduction Program*, WALL ST. J. (May 26, 2011), available at <http://online.wsj.com/article/SB10001424052702304520804576347560078618994.html>. All told, twenty-three states have signed onto regional initiatives to design or implement regional pollution trading programs. Katherine N. Probst & Sarah Jo Szambelan, Resources for the Future Discussion Paper, *The Role of the States in a Federal Climate Program* (2009), available at <http://www.rff.org/RFF/Documents/RFF-DP-09-46.pdf>.

<sup>58</sup> California Air Resources Board, *Cap-and-Trade Program*, available at <http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm>.

<sup>59</sup> See, e.g., Press Release, Munich RE, *North America Most Affected by Increases in Weather-Related Natural Catastrophes* (Oct. 17, 2012), available at [http://www.munichre.com/en/media\\_relations/press\\_releases/2012/2012\\_10\\_17\\_press\\_release.aspx](http://www.munichre.com/en/media_relations/press_releases/2012/2012_10_17_press_release.aspx) (asserting that “[t]he view that weather extremes are becoming more frequent and intense in various regions due to global warming is in keeping with current scientific findings, as set out in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) as well as in the special report on weather extremes and disasters (SREX)”); *Climate Change: Insurers Confirm Growing Risks, Costs*, INSURANCE NETWORKING NEWS (Mar. 2, 2012), available at <http://www.insurancenetworking.com/news/insurance-climate-change-risk-ceres-30007-1.html> (describing a press conference held by Senators Whitehouse (D-RI) and Sanders (I-VT) and representatives from The Reinsurance Association of America, Swiss Re, and Willis Re).

<sup>60</sup> *Global 500*, CNN MONEY (July 25, 2011), available at <http://money.cnn.com/magazines/fortune/global500/2011/snapshots/2255.html>.

<sup>61</sup> Eric Roston, *Clean Energy Helps Wal-Mart Reach Elusive Sustainability Goal*, BLOOMBERG (Mar. 4, 2013), available at <http://www.bloomberg.com/news/print/2013-03-04/clean-energy-growth-helps-wal-mart-hit-a-sustainability-goal-early.html>.

<sup>62</sup> *Id.*

<sup>63</sup> Walmart Corp., *Greenhouse Gas Emissions*, available at <http://corporate.walmart.com/global-responsibility/environment-sustainability/greenhouse-gas-emissions>; see also Danielle Kurtzleben, *Walmart Struggles to Overcome Environmental Criticism*, U.S. NEWS AND WORLD REP. (Apr. 20, 2012), available at <http://www.usnews.com/news/articles/2012/04/20/walmart-struggles-to-overcome-environmental-criticism>.

<sup>64</sup> Caring for Climate, *List of Signatories*, available at <http://caringforclimate.org/about/list-of-signatories/>.

<sup>65</sup> Executive Order 13514, 74 Fed. Reg. 194, 52117 (Oct. 8, 2009), available at [http://www.whitehouse.gov/assets/documents/2009fedleader\\_eo\\_rel.pdf](http://www.whitehouse.gov/assets/documents/2009fedleader_eo_rel.pdf). This Executive Order built on an earlier sustainability Executive Order, signed by President George W. Bush on January 18, 2007. See Executive Order 13422, 72 Fed. Reg. 14, 2763 (Jan. 23, 2007), available at <http://www.gpo.gov/fdsys/pkg/FR-2007-01-23/pdf/07-293.pdf>.

<sup>66</sup> *Memorandum for Heads of Federal Departments and Agencies*, 77 Fed. Reg. 48, 14473 (Mar. 12, 2012), available at <http://www.gpo.gov/fdsys/pkg/FR-2012-03-12/html/2012-5812.htm>. The guidance went into effect on March 12, 2012. *Id.*

<sup>67</sup> See, e.g., U.S. Army Energy Program, *Net Zero is a Force Multiplier*, available at <http://army-energy.hqda.pentagon.mil/netzero/> (describing the Army’s goal of piloting five installations to be net zero energy, five installations to be net zero waste, five installations to be net zero water, and one to be all three by 2020, with an eye toward having twenty-five net zero installations by 2030); U.S. Navy: Energy, Environment and Climate Change, *Energy*, available at <http://greenfleet.dodlive.mil/energy/> (outlining the Navy’s goals of producing at least fifty percent of all of its shore-based energy needs from renewables by 2020, and reducing petroleum use in the commercial fleet by fifty percent).

<sup>68</sup> See, e.g., U.S. EPA, *Settlement Agreement*, available at <http://epa.gov/carbonpollutionstandard/settlement.html> (stating that the EPA has agreed to set GHG NSPS for petroleum refineries).

<sup>69</sup> See, e.g., *Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews*, 77 Fed. Reg. 159, 49490 (Aug. 16, 2012), available at <http://www.gpo.gov/fdsys/pkg/FR-2012-08-16/pdf/2012-16806.pdf> (limiting volatile organic compound emissions but, in the process, requiring capture of methane).

<sup>70</sup> U.S. EPA Office of Water, EPA-820-F-11-002, *Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities* (Mar. 2011), available at [http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/factsheet\\_proposed.pdf](http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/factsheet_proposed.pdf).

<sup>71</sup> *Hazardous and Solid Waste Management System: Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, 75 Fed. Reg. 118, 35127 (June 21, 2010), available at <http://www.gpo.gov/fdsys/pkg/FR-2010-06-21/pdf/2010-12286.pdf>.

<sup>72</sup> Under Order No. 1000, each public utility transmission provider must establish procedures to identify transmission needs driven by public policy requirements and evaluate proposed solutions to those transmission needs. See *Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities*, 76 Fed. Reg. 49,842, 49,845 (Aug. 11, 2011).

<sup>73</sup> See Order No. 2003, *Standardization of Generator Interconnection Agreements and Procedures*, 68 Fed. Reg. 49,846 (Aug. 19, 2003) (codified at 18 C.F.R. pt. 35) (requiring changes to pro forma large generator interconnection agreements to accommodate variable energy resources).

<sup>74</sup> See Notice of Intent Not to Act against the California Public Utilities Commission, 134 FERC ¶ 61,271 (Mar. 31, 2011) (declining to enforce PURPA requirements against the California Public Utilities Commission).

<sup>75</sup> For example, in 2011, FERC issued Order No. 745, *Demand Response Compensation in Organized Wholesale Energy Markets*, 76 Fed. Reg. 16,658 (Mar. 24, 2011) (codified at 18 C.F.R. pt. 35), which established a new approach to compensating so-called “demand response resources”—strategies that seek to balance out the strain on the electric system by giving customers incentives to reduce energy consumption when wholesale energy prices are high. The Order seeks to remove barriers to fuller participation of such resources in wholesale markets, as alternatives to additional generation, by requiring ISOs and RTOs to compensate such resources at the market price for energy (known as the locational marginal price or “LMP”) when certain conditions are met. The Order is highly controversial and has led to objections that it overcompensates demand response because such resources are paid, essentially, twice (once for not consuming the unit of energy, and once for selling it into the wholesale market). For an analysis, see Richard Pierce, *A Primer on Demand Response and a Critique of Order 745*, 3 Geo. Wash. J. of Energy & Envtl. L. 102 (2012).

<sup>76</sup> Jon Wellinghoff was Chairman of the Federal Energy Regulatory Commission during President Obama’s first term and was a well-known advocate of renewable energy prior to his appointment. See <http://www.ferc.gov/about/com-mem/wellinghoff.asp>.

<sup>77</sup> Lisa Lerer, *Senators Look Past Barbara Boxer’s Climate Bill*, POLITICO (Nov. 6, 2009), available at <http://www.politico.com/news/stories/1109/29223.html>.

<sup>78</sup> Valerie Volcovici, *G20 Countries Agree to Phase Down Potent Greenhouse Gas*, Reuters (Sept. 6, 2013), available at <http://www.reuters.com/article/2013/09/06/us-g20-climate-idUSBRE9850WU20130906>.

<sup>79</sup> See Press Release, *U.S. Senator Tom Carper, Carper, Inhofe, Boxer & Kerry Introduce Black Carbon Bill* (Apr. 22, 2009), available at <http://www.carper.senate.gov/press/record.cfm?id=311799>; Press Release, U.S. Senate Committee on Environment and Public Works, *Bipartisan Clean Diesel Bill Reauthorization Unanimously Passed by the Senate* (Dec. 16, 2010), available at [http://www.epw.senate.gov/public/index.cfm?FuseAction=PressRoom.PressReleases&ContentRecord\\_id=f48793d2-802a-23ad-4058-4901b66e02fc](http://www.epw.senate.gov/public/index.cfm?FuseAction=PressRoom.PressReleases&ContentRecord_id=f48793d2-802a-23ad-4058-4901b66e02fc).

<sup>80</sup> Press Release, The White House, Office of the Press Secretary, *U.S.-China Clean Energy Announcements* (Nov. 17, 2009), available at <http://www.whitehouse.gov/the-press-office/us-china-clean-energy-announcements>.

<sup>81</sup> U.S. Department of State, *U.S.-China Ten Year Framework for Cooperation on Energy and Environment*, available at <http://www.state.gov/e/oes/eqt/tenyearframework/>. U.S. agencies involved in implementing the Ten Year Framework include the Departments of State, Energy, Treasury, Commerce, Interior, Transportation, and Agriculture, and EPA, the Trade Development Agency, and the U.S. Agency for International Development. Participating Chinese agencies include the National Development and Reform Commission, the State Forestry Administration, the National Energy Administration, and the Ministries of Finance, Environmental Protection, Science and Technology and Foreign Affairs. The lead

agencies for each country implement the Ten Year Framework, including a number of “action plans.” The “EcoPartnership” program creates partnerships at the subnational level between public and private sector bodies to pursue joint research or information exchange. *Id.*

<sup>82</sup> Press Release, The White House, Office of the Press Secretary, *United States and China Agree to Work Together on Phase Down of HFCs* (June 8, 2013), available at <http://www.whitehouse.gov/the-press-office/2013/06/08/united-states-and-china-agree-work-together-phase-down-hfcs>.

<sup>83</sup> U.S. EPA, *2013 Strategic and Economic Dialogue*, available at <http://www.epa.gov/international/regions/Asia/china/chinased.html>.

<sup>84</sup> See *U.S.-China Ten Year Framework for Cooperation on Energy and Environment*, *supra* note 80.

<sup>85</sup> Press Release, U.S. Department of State, Office of the Spokesperson, *U.S.-India Joint Factsheet: Sustainable Growth, Energy & Climate Change* (June 24, 2013), available at <http://www.state.gov/r/pa/prs/ps/2013/06/211017.htm>.

<sup>86</sup> Rob Bradley, *et al.*, World Resources Institute, *Slicing the Pie: Sector-Based Approaches to International Climate Agreements 1-5* (Dec. 2007), available at <http://pdf.wri.org/slicing-the-pie.pdf>.

<sup>87</sup> Thomas Beaumont, *Republicans Vulnerable Who Voted to Avert ‘Fiscal Cliff,’ Raise Taxes*, DENVER POST (Jan. 6, 2013), available at [http://www.denverpost.com/nationworld/ci\\_22318566/republicans-vulnerable-who-voted-avert-fiscal-cliff-raise](http://www.denverpost.com/nationworld/ci_22318566/republicans-vulnerable-who-voted-avert-fiscal-cliff-raise). Many point to Grover Nordquist’s “Federal Taxpayer Protection Pledge” as a major reason for the Republican Party’s long-standing resistance to any tax increases. Drafted in 1986, the purported “lifetime” pledge calls on signers to “oppose any and all efforts to increase the marginal income tax rates” and “oppose any net reduction or elimination of deductions or credits, unless matched dollar for dollar by further reducing tax rates.” The 112th Congress, which voted to avert the “fiscal cliff,” included 238 Representatives and forty-one Senators who had signed the pledge. The 113th Congress saw a small drop in these numbers; as of January 21, 2013, 219 Representatives and thirty-nine Senators were committed to the pledge. Americans for Tax Reform, *What is the Taxpayer Protection Pledge?*, available at <http://www.atr.org/taxpayer-protection-pledge>.

<sup>88</sup> See, e.g., Raju Chebium, Governors’ Wind Energy Coalition, *Wind Energy Has Small Slice of Energy Pie But Big Lobbying Push for Tax Credit* (Dec. 7, 2012), available at <http://www.governorswindenergycoalition.org/?p=4112>.

<sup>89</sup> See, e.g., Alec MacGillis, *On Sandy Relief, GOP is Stiffing its Own*, NEW REPUBLIC: THE PLANK (Jan. 2, 2013), available at <http://www.newrepublic.com/blog/plank/111560/sandy-relief-gop-stiffing-its-own#>; see also S. 7, 113th Cong. (2013).

<sup>90</sup> The term “carbon tax” is used to broadly describe a per-unit fee for emissions of carbon dioxide or other GHG pollutants, or for the sale, manufacture, production, import, or use of fossil fuels which lead to those emissions. See generally Jonathan L. Ramseur, *et al.*, Cong. Research Serv., R42731, *Carbon Tax: Deficit Reduction and Other Considerations* (2012), available at <http://www.fas.org/sgp/crs/misc/R42731.pdf>.

<sup>91</sup> See *id.*

<sup>92</sup> Bob Inglis & Arthur B. Laffer, Op-Ed., *An Emissions Plan Conservatives Could Warm To*, N.Y. TIMES (Dec. 27, 2008), available at <http://www.nytimes.com/2008/12/28/opinion/28inglis.html> (proposing to pair a carbon tax with a reduction in payroll or income taxes).

<sup>93</sup> Gregory Mankiw, *One Answer to Global Warming: A New Tax*, N.Y. TIMES (Sept. 16, 2007), available at <http://www.nytimes.com/2007/09/16/business/16view.html>; Evan Lehmann, *Who’s Afraid of a Carbon Tax? Not Romney’s Economic Advisors*, CLIMATEWIRE (Sept. 18, 2012), available at <http://www.eenews.net/stories/1059970080>.

<sup>94</sup> Kevin A. Hassett, *et al.*, American Enterprise Institute, *Climate Change: Caps vs. Taxes* (June 1, 2007), available at <http://www.aei.org/article/energy-and-the-environment/climate-change-caps-vs->

taxes/ (asserting “there is a broad consensus in favor of a carbon tax everywhere except on Capitol Hill, where the ‘T word’ is anathema”).

<sup>95</sup> See, e.g., Bipartisan Policy Center, Debt Reduction Task Force, *Restoring America’s Future* (Nov. 2010), available at <http://bipartisanpolicy.org/sites/default/files/BPC%20FINAL%20REPORT%20FOR%20PRINTER%202%2028%2011.pdf>. ; Video: Conference on The Economics of Carbon Taxes, co-sponsored by the American Enterprise Institute, Brookings Institution, International Monetary Fund, and Resources for the Future (Nov. 13, 2012), available at <http://www.aei.org/events/2012/11/13/understanding-the-economics-of-carbon-taxes/>. Although “[a] carbon tax was favored by many, perhaps most, of the members,” the Debt Reduction Task Force opted instead for a broad consumption tax. Alice M. Rivlin, The Domenici-Rivlin Tax Reform Proposal, Remarks at the Annual Meeting of the American Economic Association, at 5 (Jan. 7, 2012); see also Richard W. Caperton, Center for American Progress, *A Progressive Carbon Tax Will Fight Climate Change and Stimulate the Economy* (Dec. 6, 2012), available at <http://www.americanprogress.org/wp-content/uploads/2012/12/CAPERTONCarbonTax.pdf>.

<sup>96</sup> The Congressional Budget Office considered a carbon proposal equivalent to a twenty dollar fee per metric ton of carbon dioxide in 2012, increasing by 5.6% each year. Cong. Budget Office, *Reducing the Deficit: Spending and Revenue Options 205-06* (Mar. 2011), available at <http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/120xx/doc12085/03-10-reducingthedeficit.pdf>.

<sup>97</sup> See, e.g., Center for Climate and Energy Solutions, *111th Congress Climate Change Legislation*, available at <http://www.c2es.org/federal/congress/111/climate-change-legislative-proposals#2>.

<sup>98</sup> See, e.g., H.R. 594, 111th Cong. (2009) (proposing a ten dollars per ton fee on carbon dioxide, increasing each year by ten dollars until climate objectives were met); H.R. 1337, 111th Cong. (2009) (proposing a tax of fifteen dollars per ton, increasing by ten dollars each year); H.R. 2380, 111th Cong. (2009) (proposing a fifteen dollars per ton tax, increasing incrementally).

<sup>99</sup> In fact, the failed carbon trading proposal introduced by Senators Kerry, Graham, and Lieberman in 2009-2010 included a carbon fee on transportation fuels. See S. 1733, 111th Cong. § 729 (2009) (describing that oil refineries would not participate in the general carbon credit market, but would pay EPA directly the auction price for a certain set-aside of allowances).

<sup>100</sup> See Darren Goode, *Low-key Carbon Tax Talks Fuel Conservative Outcry*, POLITICO (July 15, 2012), available at <http://www.politico.com/news/stories/0712/78522.html>.

<sup>101</sup> Mark Drajem, *Carbon Fee from Obama Seen Viable with Backing from Exxon*, BLOOMBERG BUSINESSWEEK (Nov. 16, 2012), available at <http://www.businessweek.com/news/2012-11-15/carbon-fee-from-obama-seen-viable-with-backing-from-exxon>.

<sup>102</sup> See, e.g., Editorial, *A Sweltering Planet’s Agenda*, WASH. POST (Jan. 12, 2013), available at [http://articles.washingtonpost.com/2013-01-12/opinions/36312600\\_1\\_carbon-tax-ton-of-carbon-dioxide-climate-policy](http://articles.washingtonpost.com/2013-01-12/opinions/36312600_1_carbon-tax-ton-of-carbon-dioxide-climate-policy) (endorsing the concept of a carbon tax); Elizabeth Kolbert, Comment, *Paying for It*, THE NEW YORKER (Dec. 10, 2012), available at [http://www.newyorker.com/talk/comment/2012/12/10/121210taco\\_talk\\_kolbert](http://www.newyorker.com/talk/comment/2012/12/10/121210taco_talk_kolbert); Seth Borenstein, *Global Warming Talk Heats Up As Carbon Tax Revisited*, USA TODAY (Nov. 14, 2012), available at <http://www.usatoday.com/story/weather/2012/11/14/global-warming-climate-change-carbon-tax/1704787/>.

<sup>103</sup> E.g., George P. Shultz & Gary S. Becker, Op-Ed., *Why We Support a Revenue-Neutral Carbon Tax*, WALL ST. J. (Apr. 7, 2013), available at <http://online.wsj.com/article/SB10001424127887323611604578396401965799658.html>.

<sup>104</sup> See H.R. Con. Res. 142, 112th Cong. (2012) (expressing the opposition of Congress to Federal efforts to establish a carbon tax on fuels for electricity and transportation); S. Con. Res. 61, 112th Cong. (2012) (expressing the sense of Congress that a carbon tax is not in the economic interest of the U.S.). Neither resolution was reported out of committee. Senator Vitter authored S. Con. Res. 61 and voted for

the Biden-McConnell agreement on December 31, 2012. Alexander Bolton, *Senate Easily Approves Biden-McConnell ‘Fiscal Cliff’ Agreement Early Tuesday*, THE HILL (Jan. 1, 2013), available at <http://thehill.com/homenews/senate/275069-senate-approves-fiscal-cliff-deal>.

<sup>105</sup> See Paul Bledsoe, *Carbon Tax Could be Part of Eventual Tax Reform Package*, THE HILL CONGRESS BLOG (Nov. 26, 2012), available at <http://thehill.com/blogs/congress-blog/economy-a-budget/269343-carbon-tax-could-be-part-of-eventual-tax-reform-package> (arguing that the President needs to focus on the economy and that “Congress will have to take the critical first steps” of proposing a carbon tax); Kevin Hall, *Carbon Tax: The Idea That No Leader Proposes But That Won’t Die*, MCCLATCHY (Nov. 19, 2012), available at <http://www.mcclatchydc.com/2012/11/19/175068/carbon-tax-the-idea-no-leader.html#.Uf9UN5LVBsk>.

<sup>106</sup> These are by no means the only considerations when crafting a carbon tax. For an excellent study of carbon tax options, please consult Gilbert E. Metcalf and David Weisbach, *The Design of a Carbon Tax*, 33 Harv. Env’tl. L. Rev. 499 (2009).

<sup>107</sup> See, e.g., H.R. 594, *supra* note 97; H.R. 3242, 112th Cong. (2011); H.R. 6338, 112th Cong. (2012).

<sup>108</sup> Mark Muro & Jonathan Rothwell, Brookings Institution, *Cut to Invest: Institute a Modest Carbon Tax to Reduce Carbon Emissions, Finance Clean Energy Technology Development, Cut Taxes, and Reduce the Deficit* (Nov. 2012), available at <http://www.brookings.edu/~media/research/files/papers/2012/11/13%20federalism/13%20carbon%20tax.pdf>.

<sup>109</sup> See H.R. 3243, 112th Cong. (2011) (establishing a trust fund for paying dividends to taxpayers).

<sup>110</sup> See Inglis & Laffer, *supra* note 91; see also H.R. 2380, 111th Cong. (2009) (paying for a reduction in Social Security taxes by taxing combustible fossil fuels).

<sup>111</sup> Cf. H.R. 1337, 111th Cong. (2009) (establishing a trust fund to develop clean energy technologies, assist affected industries, and offset payroll taxes).

<sup>112</sup> Cong. Budget Office, Issue Brief, *Federal Financial Support for the Development and Production of Fuels and Energy Technologies* 1-2 (Mar. 2012) [hereinafter “CBO, Issue Brief”], available at [http://www.cbo.gov/sites/default/files/cbofiles/attachments/03-06-FuelsandEnergy\\_Brief.pdf](http://www.cbo.gov/sites/default/files/cbofiles/attachments/03-06-FuelsandEnergy_Brief.pdf).

<sup>113</sup> H.R. 1, 111th Cong. (2009); see also John M. Broder, *After Federal Jolt, Clean Energy Seeks New Spark*, N.Y. TIMES (Oct. 23, 2012), available at <http://www.nytimes.com/2012/10/24/business/energy-environment/future-of-american-aid-to-clean-energy.html?pagewanted=all>.

<sup>114</sup> CBO, Issue Brief, *supra* note 111, at 8-9.

<sup>115</sup> See, e.g., Stefan Thiel, *The Dark Side of Green*, NEWSWEEK, reprinted in THE DAILY BEAST (Oct. 23, 2009), available at <http://www.thedailybeast.com/newsweek/2009/10/23/the-dark-side-of-green.html>.

<sup>116</sup> See, e.g., Secretary Steven Chu, Secretary Chu’s Remarks at the City Club of Cleveland – As Prepared for Delivery (Jan. 18, 2012), available at <http://energy.gov/articles/secretary-chus-remarks-city-club-cleveland-prepared-delivery>; Institute of Electrical and Electronics Engineers, *A Brief History of the U.S. Federal Government and Innovation (Part III): World War II and Beyond* (Aug. 2011), available at <http://www.todaysengineer.org/2011/Aug/history.asp>.

<sup>117</sup> National Research Council, *et al.*, *Energy Research at DOE: Was it Worth It?* (National Academy Press 2001).

<sup>118</sup> See, e.g., Todd Woody, *China Leads in Clean Energy Investments*, N.Y. TIMES GREEN BLOG (Mar. 29, 2010), available at <http://green.blogs.nytimes.com/2010/03/29/china-leads-in-renewable-investments/> (noting that China’s direct investments in wind, solar, and other renewable energy projects grew by fifty percent in 2009 to \$34.6 billion); U.N. Env’t. Programme, *Global Renewable Energy Investment Powers to Record \$257 Billion* (July 11, 2012), available at

<http://www.unep.org/newscentre/default.aspx?DocumentID=2688&ArticleID=9163> (reporting that global renewable energy investment reached a record \$257 billion in 2011, led by China with \$52 billion).

<sup>119</sup> Statement by John Doerr, Partner, Kleiner Perkins Caufield & Byers: Hearing before the Senate Comm. on Env't & Public Works, 111th Cong., at 3 (July 16, 2009), available at [http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore\\_id=475d0524-1b1d-4a26-9e7f-b3f5eb9b9dc7](http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=475d0524-1b1d-4a26-9e7f-b3f5eb9b9dc7).

<sup>120</sup> President Barack Obama, *Weekly Address: Clean Energy Will Help Us Out-Compete and Out-Innovate the Rest of the World* (May 7, 2011), available at <http://www.whitehouse.gov/the-press-office/2011/05/07/weekly-address-clean-energy-will-help-us-out-compete-and-out-innovate-re>.

<sup>121</sup> Nick Juliano, Governors' Biofuels Coalition, *Wyden Predicts Success of Small Bills as Report Shows Industry Growth*, (Feb. 4, 2013), available at <http://www.governorsbiofuelscoalition.org/?p=5025> (citing the "Sustainable Energy in America 2013 Factbook" compiled by Bloomberg New Energy Finance).

<sup>122</sup> U.S. H.R. Natural Resources Comm. Democrats, *The Economic Challenge: Jobs and Clean Tech Growth*, available at <http://democrats.naturalresources.house.gov/issue/clean-energy-jobs>.

<sup>123</sup> See, e.g., *Frontline Commanders Requesting Renewable Power Options*, DEFENSE INDUSTRY DAILY (Jan. 24, 2012), available at [http://www.defenseindustrydaily.com/commanders-in-iraq-urgently-request-renewable-power-options-02548/?utm\\_campaign=newsletter&utm\\_source=did&utm\\_medium=textlink](http://www.defenseindustrydaily.com/commanders-in-iraq-urgently-request-renewable-power-options-02548/?utm_campaign=newsletter&utm_source=did&utm_medium=textlink).

<sup>124</sup> See, e.g., Press Release, Dupont, *Dupont Expects Continue Revenue Growth in Global Photovoltaic Market: Accelerating R&D Pipeline and Expanding Production Capacity to Fuel Growth* (Mar. 17, 2009), available at [http://www2.dupont.com/Photovoltaics/en\\_US/news\\_events/article20090317.html](http://www2.dupont.com/Photovoltaics/en_US/news_events/article20090317.html); Rachel Layne, *GE to Build New York Battery Plant, Create 350 Jobs*, BLOOMBERG (May 12, 2009), available at <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aEgOj7FsBux8>. See also Beck Allman, *Google Investments in Renewable Energy Top \$1 Billion*, INDEPENDENT VOTER NETWORK (Jan. 19, 2013), available at <http://ivn.us/2013/01/19/google-investments-in-renewable-energy-top-1-billion/>.

<sup>125</sup> U.S. Dep't of Energy, *Wind Powering America*, (2012), available at [http://www.windpoweringamerica.gov/wind\\_installed\\_capacity.asp](http://www.windpoweringamerica.gov/wind_installed_capacity.asp). In 2011, Iowa generated nearly twenty percent of its total electricity from wind, which was surpassed only by coal as a source for electricity generation in the state. U.S. Energy Information Admin., *Iowa: State Profile and Energy Estimates*, available at <http://www.eia.gov/state/?sid=IA&CFID=11736579&CFTOKEN=936780365f92c7a6-2729CB8A-25B3-1C83-54D55F898BBF7372&jsessionid=8430ec12401549ae353a6d6833036a4f3241>. Coal plants can run twenty-four hours a day unless they are offline for maintenance or a malfunction, whereas wind turbines only generate energy when the wind is blowing. As a result, Iowa still generates a good deal more electricity from coal than wind. See *id.*

<sup>126</sup> *Wind Powering America*, *supra* note 124.

<sup>127</sup> Press Release, Sen. Chuck Grassley, *Bipartisan Support for Extending the Production Tax Credit for Wind Energy* (Nov. 13, 2012), available at [http://www.grassley.senate.gov/news/Article.cfm?customel\\_dataPageID\\_1502=43038](http://www.grassley.senate.gov/news/Article.cfm?customel_dataPageID_1502=43038).

<sup>128</sup> Press Release, N.J. Dep't of Env'tl. Protection, *Christie Administration Advances Commitment to Renewable Energy Development; New Jersey Surpasses Milestone of 10,000 Solar Installations* (June 25, 2011), available at [http://www.nj.gov/dep/newsrel/2011/11\\_0088.htm](http://www.nj.gov/dep/newsrel/2011/11_0088.htm).

<sup>129</sup> E.g., Ashe Schow, *President Obama's Taxpayer-Backed Green Energy Failures*, HERITAGE FOUNDATION: THE FOUNDRY (Oct. 18, 2012), available at <http://blog.heritage.org/2012/10/18/president-obamas-taxpayer-backed-green-energy-failures/> (arguing that "[t]he government's picking winners and losers in the energy market has cost taxpayers billions of dollars," and that the federal beneficiaries that haven't failed are the companies "that would've found the financial support in the private market").

<sup>130</sup> See Angel Gonzalez & Keith Johnson, *Spain's Solar-Power Collapse Dims Subsidy Model*, WALL ST. J. (Sept. 8, 2009), <http://online.wsj.com/article/SB125193815050081615.html>.

<sup>131</sup> See Neela Banerjee, *Darrell Issa to Probe Government Loan Programs after Solyndra Collapse*, L.A. TIMES (Sept. 20, 2011), available at <http://articles.latimes.com/2011/sep/20/news/la-pn-issa-solyndra-probe-20110920>.

<sup>132</sup> U.S. Dep't of Treasury, *1603 Program: Payments for Specified Energy Property in Lieu of Tax Credits* (Mar. 4, 2013), available at <http://www.treasury.gov/initiatives/recovery/Documents/Message%20on%20Sequestration%201603%20Program.pdf>.

<sup>133</sup> S. 734, 112th Cong. (2011) (authorizing appropriations to the Department of Energy for the research, development, demonstration, and commercial applications of vehicles that run on alternative fuels).

<sup>134</sup> S. 629, 112th Cong. (2011) (establishing competitive grants for increased hydropower production).

<sup>135</sup> Hannah Northey, *Governors' Wind Energy Coalition, Senate Subpanel Approves Energy, Water Spending Bill* (Apr. 25, 2012), available at <http://www.governorswindenergycoalition.org/?p=2052>.

<sup>136</sup> See, e.g., K Kaufmann, *Wind Energy Tax Credit Extension Part of 'Cliff' Deal*, USA TODAY (Jan. 2, 2013), available at <http://www.usatoday.com/story/news/nation/2013/01/02/fiscal-cliff-wind-energy-extension/1804447/> (noting that, "one year may not be enough for developers to plan for new projects").

<sup>137</sup> Cong. Budget Office, Issue Brief, *supra* note 111, at 5.

<sup>138</sup> Kaufmann, *supra* note 135.

<sup>139</sup> Amy Harder, *Despite Obama's Call, Senate Blocks Oil-Subsidies Bill*, NAT'L JOURNAL (Apr. 27, 2012), available at <http://www.nationaljournal.com/energy-report/despite-obama-s-call-senate-blocks-oil-subsidies-bill-20120329> (noting that fifty-one Senators voted to roll back the subsidies, but that the measure required sixty votes to overcome a filibuster).

<sup>140</sup> Cong. Budget Office, *Testimony on Federal Financial Support for Fuels and Energy Technologies* (Mar. 13, 2013), available at <http://www.cbo.gov/publication/43993>.

<sup>141</sup> E.g., S. 629, 112th Cong. (2011); H.R. 267, 113th Cong. (2013) (allowing FERC to grant permitting exemptions to small hydropower projects).

<sup>142</sup> E.g., S. 3275, 112th Cong. (2012) (authorizing Master Limited Partnerships to be organized for investment in clean energy technologies).

<sup>143</sup> These standards are also called "alternative energy standards" and "clean energy standards" when such standards would give credit to some forms of fossil-fuel energy, for instance coal burned in supercritical (relatively high efficiency) power plants or using carbon capture and sequestration, and nuclear energy. See Center for Climate and Energy Solutions, *Clean Energy Standards: State and Federal Policy Options and Implications* (Nov. 2011), available at <http://www.c2es.org/docUploads/Clean-Energy-Standards-State-and-Federal-Policy-Options-and-Implications.pdf>.

<sup>144</sup> The Iowa Policy Project, *Shining Bright: Growing Solar Jobs in Iowa 4* (Mar. 2011), available at <http://votesolar.org/wp-content/uploads/2011/03/Iowa-SolarJobs-Report.pdf> (stating that in 1983, Iowa set a renewable standard, requiring its utilities to purchase 105 MW of renewable electricity).

<sup>145</sup> Database of State Incentives for Renewables & Efficiency, U.S. Department of Energy, *Financial Incentives for Renewable Energy*, available at <http://www.dsireusa.org/summarytables/finre.cfm>.

<sup>146</sup> H.R. 2454, 111th Cong. § 101 (2009).

<sup>147</sup> S. 80, 111th Cong. (2010).

<sup>148</sup> *Id.* § 610(b).

<sup>149</sup> *Id.* § 610(a).

<sup>150</sup> *Id.* § 610(c)(2)(H).

<sup>151</sup> Fact Sheet, The White House, Office of the Press Secretary, *President Obama's Plan to Win the Future* (Jan. 2011), available at <http://www.whitehouse.gov/the-press-office/2011/01/25/fact-sheet-state-union-president-obamas-plan-win-future>.

<sup>152</sup> Ben Geman, *Bingaman, Murkowski Seek Input on Obama's 'Clean' Energy Plan*, E2 WIRE: THE HILL'S ENERGY & ENV'T BLOG (Mar. 21, 2011), available at <http://thehill.com/blogs/e2-wire/e2-wire/151055-bingaman-murkowski-seek-input-on-obamas-clean-energy-plan>.

<sup>153</sup> S. 2146, 112th Cong. § 601(f) (2012).

<sup>154</sup> *Id.* § 610(c)(2).

<sup>155</sup> U.S. EIA, *Analysis of the Clean Energy Standard Act of 2012*, at 4 (May 2012), available at <http://www.eia.gov/analysis/requests/bces12/pdf/cesbing.pdf>.

<sup>156</sup> *Id.* at 2.

<sup>157</sup> See, e.g., American Council for an Energy-Efficient Economy, *America's Abundant, Untapped Energy Efficiency Resource*, available at <http://aceee.org/files/pdf/fact-sheet/Basic%20EE%20Fact%20Sheet.pdf>.

<sup>158</sup> See Database of State Incentives for Renewables & Efficiency, U.S. Department of Energy, *Energy Efficiency Resource Standards*, available at [http://www.dsireusa.org/documents/summarymaps/EERS\\_map.pdf](http://www.dsireusa.org/documents/summarymaps/EERS_map.pdf).

<sup>159</sup> The White House website has touted the general concept of a CES that would result in renewable sources providing eighty percent of U.S. electricity by 2035 since early 2011. See The White House, *Develop and Secure America's Energy Resources*, available at <http://www.whitehouse.gov/energy/securing-american-energy>.

<sup>160</sup> Joseph E. Aldy, et al., Letter, *Willingness to Pay and Political Support for a U.S. National Clean Energy Standard*, *Nature Climate Change* 2, 596-99 (2012) (describing poll of 1,010 people contacted between April 23 and May 12, 2012).

<sup>161</sup> See, e.g., *Amer. Tradition Inst. v. Colorado*, 876 F. Supp. 2d 1222 (D. Colo. 2012) (alleging that the Colorado RES violates the Commerce Clause of the U.S. Constitution); Jim Snyder, *Clean-Energy Requirements Targeted by ALEC, Norquist*, BLOOMBERG (Apr. 23, 2012), available at <http://www.bloomberg.com/news/2012-04-24/clean-energy-requirements-targeted-by-alec-norquist.html>.

<sup>162</sup> See, e.g., *Carbon Markets: Climate Bill Worries Officials in RGGI States*, CLIMATEWIRE (Apr. 12, 2010) (reporting on a March 6, 2010 letter sent by a number of Senators to Senators Kerry, Graham, and Lieberman asking for RGGI to be protected from preemption by climate legislation).

<sup>163</sup> E.g., Jesse Jenkins & Devon Swezey, The Breakthrough Institute, *Time to Bury Cap and Trade and Plan Anew* (July 22, 2010), available at [http://thebreakthrough.org/archive/time\\_to\\_bury\\_cap\\_and\\_trade\\_and](http://thebreakthrough.org/archive/time_to_bury_cap_and_trade_and) (stating that "the United States Senate is not going to enact any form of cap and trade. Not this year. And probably not any time in the foreseeable future"); see also John M. Broder & Clifford Krauss, *Advocates of Climate Bill Scale Down Their Goals*, N.Y. TIMES (Jan. 26, 2012), available at [http://www.nytimes.com/2010/01/27/science/earth/27climate.html?\\_r=0](http://www.nytimes.com/2010/01/27/science/earth/27climate.html?_r=0).

<sup>164</sup> Richard Conniff, *The Political History of Cap and Trade*, SMITHSONIAN (Aug. 2009), available at <http://www.smithsonianmag.com/science-nature/Presence-of-Mind-Blue-Sky-Thinking.html>.

<sup>165</sup> See, e.g., Nicolas Loris, The Heritage Foundation, *The Costs of Cap and Trade* (Sept. 14, 2010), available at <http://www.heritage.org/research/commentary/2010/09/the-costs-of-cap-and-trade>; Robert Shapiro, Carbon Tax Ctr., *Carbon Taxes vs. Cap-and-Trade*, <http://www.carbontax.org/issues/carbon-taxes-vs-cap-and-trade/> (describing that one way a carbon tax is preferable is its price predictability).

<sup>166</sup> Bryan Walsh, *Greens Celebrate Cap-and-Trade Victory – Cautiously*, TIME (May 22, 2009), available at <http://www.time.com/time/health/article/0,8599,1900408,00.html> (noting that several

environmental organizations have a “nagging worry” that free allowances and offset projects may have weakened the House-passed climate bill).

<sup>167</sup> Joel Kirkland, *Senators Call for Financial Reform Before Cap and Trade*, N.Y. TIMES (Nov. 5, 2009), available at <http://www.nytimes.com/cwire/2009/11/05/05climatewire-senators-call-for-financial-reform-before-ca-93661.html?pagewanted=all> (noting that Senators Lincoln (D-AR), Murkowski (R-AK), Cantwell (D-WA), and Dorgan (D-ND) were concerned about the potential for market manipulation in a carbon trading scheme).

<sup>168</sup> E.g., Adele Morris, *et al.*, *Time for a Price Collar on Carbon*, POLITICO (July 24, 2009), available at <http://www.politico.com/news/stories/0709/25346.html>.

<sup>169</sup> Env'tl. Defense Fund, *How Cap and Trade Works*, available at <http://www.edf.org/climate/how-cap-and-trade-works>.

<sup>170</sup> Robert Stavins, *Cap-and-Trade, Carbon Taxes, and My Neighbor's Lovely Lawn*, HUFFINGTON POST (Oct. 22, 2010), available at [http://www.huffingtonpost.com/robert-stavins/cap-and-trade-carbon-taxes\\_b\\_2003791.html](http://www.huffingtonpost.com/robert-stavins/cap-and-trade-carbon-taxes_b_2003791.html).

<sup>171</sup> A 2010 political ad showed Senator Joe Manchin (D-W. Va.) firing a rifle at a copy of cap-and-trade legislation. Ben Geman, *Sen. Manchin: Ad Shooting Cap-and-Trade Bill Showed 'Responsible' Gun Use*, E2 WIRE: THE HILL'S ENERGY & ENV'T BLOG (Dec. 18, 2012), available at <http://thehill.com/blogs/e2-wire/e2-wire/273405-sen-manchin-ad-shooting-cap-and-trade-bill-showed-responsible-gun-use>.

<sup>172</sup> Felicity Barringer, *Cap and Trade, the California Way*, N.Y. TIMES GREEN BLOG (Oct. 31, 2010), available at <http://green.blogs.nytimes.com/2010/10/31/cap-and-trade-the-california-way/>; Wyatt Buchanan & Kelly Zito, *Climate Law Suspension Defeated*, SFGATE (Nov. 3, 2010), available at <http://www.sfgate.com/sports/article/Climate-law-suspension-defeated-3167650.php>.

<sup>173</sup> Lynn Doan, *California Governor Clears Way for Carbon Market Link to Quebec*, BLOOMBERG (Apr. 8, 2013).

<sup>174</sup> Jared Kaltwasser, *As N.J. Leaves RGGI, Study Says Program Added \$1.6 B to Region's Economy*, NJBIZ (Nov. 15, 2011), available at [http://www.njbiz.com/article/20111115/NJBIZ01/111119893/As-NJ-leaves-RGGI-study-says-program-added-\\$16B-to-region-s-economy](http://www.njbiz.com/article/20111115/NJBIZ01/111119893/As-NJ-leaves-RGGI-study-says-program-added-$16B-to-region-s-economy).

<sup>175</sup> Reg'l Greenhouse Gas Initiative, *Old Auction Notices*, available at [http://www.rggi.org/market/co2\\_auctions/information/old\\_auction\\_notices](http://www.rggi.org/market/co2_auctions/information/old_auction_notices).

<sup>176</sup> Paul J. Hibbard, *et al.*, The Analysis Group, *The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States* 22-25 (Nov. 15, 2011), available at [http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic\\_Impact\\_RGGI\\_Report.pdf](http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic_Impact_RGGI_Report.pdf).

<sup>177</sup> S. 2995, 111th Cong. (2010). Cosponsors of the Clean Air Act Amendments of 2010 included Senators Alexander (R-TN), Brown (R-MA), Cardin (D-MD), Collins (R-ME), Dodd (D-CT), Feinstein (D-CA), Gillibrand (D-NY), Graham (R-SC), Gregg (R-NH), Kaufman (D-DE), Klobuchar (D-MN), Lieberman (I-CT), Schumer (D-NY), Shaheen (R-NH), and Snowe (R-ME).

<sup>178</sup> See Darren Samuelsohn, *Tom Carper's Power Plant Bill Dies*, POLITICO (Sept. 20, 2010), available at <http://www.politico.com/news/stories/0910/42414.html>.

<sup>179</sup> *EME Homer City Generation, L.P. v. EPA*, 696 F.3d 7 (D.C. Circ. 2012), cert. granted, *Am. Lung Ass'n v. EME Homer City Generation, L.P.*, 81 U.S.L.W. 3702 (U.S. June 24, 2013) (No. 12-1182).

<sup>180</sup> *National Emission Standards for Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units*, 77 Fed. Reg. 32, 9304 (Feb. 16, 2012), available at <http://www.gpo.gov/fdsys/pkg/FR-2012-02-16/pdf/2012-806.pdf>.

<sup>181</sup> Maria Cantwell & Susan Collins, Op-Ed., *A Cap-and-Dividend Way to a Cleaner Nation and More Jobs*, WASH. POST (June 18, 2010), available at <http://www.washingtonpost.com/wp-dyn/content/article/2010/06/17/AR2010061704564.html>.

<sup>182</sup> 42 U.S.C. § 7545.

<sup>183</sup> Energy Policy Act of 2005, Pub. L. No. 109-58, § 1501, 119 Stat. 594, 1067 (adding subsection 211(o) to the Clean Air Act, 42 U.S.C. § 7545 (o)).

<sup>184</sup> Energy Independence and Security Act, Pub. L. 110-140, §§ 201-202, 121 Stat. 1492, 1519-21 (amending subsection 211(o) to the Clean Air Act, 42 U.S.C. § 7545 (o)).

<sup>185</sup> 42 U.S.C. § 7545 (o)(2)(B)(i)(I).

<sup>186</sup> *Id.* § 7545 (o)(3)(B).

<sup>187</sup> *Id.* § 7545 (o)(7)(D).

<sup>188</sup> *Id.* § 7545 (o)(7)(E)(ii).

<sup>189</sup> *Id.*

<sup>190</sup> *Id.* § 7545 (o)(7)(A).

<sup>191</sup> *Id.* § 7545 (o)(4).

<sup>192</sup> Zack Colman, *Lawmakers Push EPA to Waive Corn Ethanol Requirement*, E2 WIRE: THE HILL'S ENERGY & ENV'T BLOG (Aug. 2, 2012), available at <http://thehill.com/blogs/e2-wire/e2-wire/241847-lawmakers-push-for-epa-to-end-corn-ethanol-requirement> (describing a letter sent by 156 Members of Congress to Administrator Jackson, asking for a waiver).

<sup>193</sup> Holly Jessen, *Industry Pleased with RFS Waiver Request Denial*, ETHANOL PRODUCER MAGAZINE (Nov. 16, 2012), available at <http://www.ethanolproducer.com/articles/9309/industry-pleased-with-rfs-waiver-request-denial>.

<sup>194</sup> *Am. Petrol. Inst. v. Envtl. Prot. Agency*, 706 F.3d 474 (D.C. Cir. 2013).

<sup>195</sup> 2014 Standards for the Renewable Fuel Standard Program, Proposed Rule (prepublication rule signed Nov. 14, 2013), available at <http://www.epa.gov/otaq/fuels/renewablefuels/documents/rfs-2014-standards-nprm-11-15-13.pdf>; Matthew L. Ward, *For First Time, EPA Proposes Reducing Ethanol Requirements for Gas Mix*, NEW YORK TIMES (Nov. 14, 2013).

<sup>196</sup> Ben Geman, *EPA Grapples with Climate Effects of Palm Oil in Fuel*, E2 WIRE: THE HILL'S ENERGY & ENV'T BLOG (Oct. 24, 2012), available at <http://thehill.com/blogs/e2-wire/e2-wire/263867-epa-grapples-with-climate-effects-of-palm-oil>.

<sup>197</sup> Michael Taylor, *et al.*, *Insight: Top Palm Oil Producer Indonesia Wants to be More Refined*, REUTERS (July 16, 2012), available at <http://www.reuters.com/article/2012/07/15/indonesia-palm-idUSL3E8HA00E20120715>.

<sup>198</sup> Joe Leitmann, *Engaging with the World's Third Largest Greenhouse Gas Emitter*, WORLDBANK BLOGS (Mar. 6, 2008), available at <http://blogs.worldbank.org/eastasiapacific/engaging-with-the-worlds-third-largest-greenhouse-gas-emitter>. *But see* Fiona Harvey, *Palm Oil Giant Vows to Spare Most Valuable Indonesian Rainforest*, THE GUARDIAN (Feb. 9, 2011), available at <http://www.theguardian.com/environment/2011/feb/09/pal-oil-giant-most-valuable-indonesian-rainforest>.

<sup>199</sup> *See, e.g., Supplemental Determination for Renewable Fuels Produced under the Final RFS2 Program from Grain Sorghum*, 74 Fed. Reg. 74592 (Dec. 17, 2012) (determining that grain sorghum ethanol, when produced in a refinery powered by natural gas, is a “renewable fuel,” but when produced in a refinery powered by specified biogas, is an “advanced fuel”).

<sup>200</sup> Tina Caparella, *Biodiesel Industry Takes Steps to Stop RIN Fraud*, RENDER (Apr. 2012), available at <http://www.rendermagazine.com/articles/2012-issues/april-2012/biofuels-bulletin/> (describing that on October 3, 2011, Rodney Hailey, owner of Clean Green Fuels, LLC, was charged with wire fraud, money laundering, and violating the Clean Air Act, for selling thirty-two million RIN without producing a gallon of biodiesel; and that on February 2, 2012, EPA issued a Notice of Violation to Absolute Fuels, LLC, alleging that the company had sold forty-eight million RIN without producing biodiesel); *see also* Justin E. Felt & Rakesh Radhakrishnan, *What's Wrong with RIN Markets?*,

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RENEWABLE ENERGY WORLD (June 26, 2012), *available at*

<http://www.renewableenergyworld.com/rea/news/article/2012/06/whats-wrong-with-rin-markets>.

<sup>201</sup> Caparella, *supra* note 197.

<sup>202</sup> Nick Snow, *House Bill Aims to Combat RIN Fraud in RFS Biodiesel Program*, OIL AND GAS J. (Sept. 20, 2012), *available at* <http://www.ogj.com/articles/2012/09/house-bill-aims-to-combat-rin-fraud-in-rfs-biodiesel-program.html> (reporting on bipartisan House bill, Stop RIN Fraud Act of 2012, which would require EPA to certify RINs).

<sup>203</sup> *RFS Renewable Identification Number (RIN) Quality Assurance Program*, 78 Fed. Reg. 35, 12158 (Feb. 21, 2013), *available at* <http://www.gpo.gov/fdsys/pkg/FR-2013-02-21/pdf/2013-03206.pdf>.

<sup>204</sup> *See, e.g.*, Mark Drajem, *BP Not in Step with Industry on Renewable Fuel Regulations*, *Wash. Post* (June 23, 2013), *available at* [http://articles.washingtonpost.com/2013-06-23/politics/40152160\\_1\\_rfs-renewable-fuel-standard-refiners](http://articles.washingtonpost.com/2013-06-23/politics/40152160_1_rfs-renewable-fuel-standard-refiners).

<sup>205</sup> *See, e.g.*, Susanne Retka Schill, *Researchers: National LCFS Would Address RFS Weaknesses*, ETHANOL PRODUCER MAG. (July 19, 2012), *available at*

<http://ethanolproducer.com/articles/8958/researchers-national-lcfs-would-address-rfs-weaknesses>; National Low Carbon Fuel Standard Project, *National Low Carbon Fuel Standard Research Team Responds to CEA Critique of National LCFS Report* (Nov. 5, 2012), *available at* <http://nationallcfsproject.ucdavis.edu/NLCFS-Response-to-CEA-Critique.pdf>.

<sup>206</sup> *See, e.g.*, Dana Hull, *Chevron and its Allies Take Aim at California's Low Carbon Fuel Standard*, SAN JOSE MERCURY NEWS (Jan. 31, 2013), *available at* [http://www.mercurynews.com/ci\\_22496041/chevron-and-its-allies-take-aim-at-californias?IADID=Search-www.mercurynews.com-www.mercurynews.com](http://www.mercurynews.com/ci_22496041/chevron-and-its-allies-take-aim-at-californias?IADID=Search-www.mercurynews.com-www.mercurynews.com).

<sup>207</sup> *Rocky Mountain Farmers Union v. Corey*, No. 12-15131 (9th Cir. Sept. 18, 2013).

<sup>208</sup> *Rocky Mountain Farmers Union*, No. 12-15131, slip. op. at 12-13.

<sup>209</sup> *Pike v. Bruce Church, Inc.*, 397 U.S. 137 (1970).

<sup>210</sup> Thibault Worth, *California Dreaming? Selling Congress on Low Carbon Fuel*, KQED BLOG (July 19, 2012), *available at* <http://blogs.kqed.org/climatewatch/2012/07/19/selling-congress-on-low-carbon-fuel/>.

<sup>211</sup> Ian Burton, International Institute for Environment and Development, *Beyond Borders: The Need for Strategic Global Adaptation* (Dec. 2008), *available at* <http://pubs.iied.org/pdfs/17046IIED.pdf> (noting that adaptation “[t]ook a back seat” to mitigation on the international front until the United Nations conference in Bali in 2007, because it was assumed that “the impacts of climate change would arise slowly over time and could be dealt with piecemeal, as they emerged”).

<sup>212</sup> *See, e.g.*, Christina Larson, *The Adaptation Generation*, THE NEW REPUBLIC: THE VINE (Jan. 5, 2009), *available at* <http://www.newrepublic.com/blog/the-vine/the-adaptation-generation> (noting that, “[u]ntil recently, discussing the notion of ‘adaptation’ to global warming was anathema to most mainstream environmentalists” and quoting Al Gore’s concern, as articulated in his 1992 book, *Earth in the Balance*, that adaptation conversations might reinforce the “terrible moral consequences...of delay”).

<sup>213</sup> Serious discussions around adaptation began earlier in international circles—the U.N. launched its Adaptation Fund in 2007. *See* U.N. Framework Convention on Climate Change, *Adaptation Fund*, *available at*

[http://unfccc.int/cooperation\\_and\\_support/financial\\_mechanism/adaptation\\_fund/items/3659.ph](http://unfccc.int/cooperation_and_support/financial_mechanism/adaptation_fund/items/3659.ph).

<sup>214</sup> H.R. 2454, 111th Cong. § 251 (2009); *see, e.g.*, S. 1733, 111th Cong. § 211 (2009) (directing EPA to fund a research program to help water utilities adapt to climate change); S. 1733, 111th Cong. § 324 (2009) (establishing an international climate change adaptation and global security program); S. 1733, 111th Cong. § 351-56 (2009) (assisting health professionals in adapting to climate change). *But see* Alejandro Camacho, *On Adaptation, Kerry-Lieberman Climate Bill Largely Similar to ACES, but Drops Several Provisions and Provides Less Money*, CENTER FOR PROGRESSIVE REFORM BLOG (May 14, 2010),

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available at <http://www.progressivereform.org/CPRBlog.cfm?idBlog=94E5459C-97E7-DDCE-87B470670A5F3030>.

<sup>215</sup> Center for Climate and Energy Solutions, *Congressional Bills Addressing Climate Change Adaptation, 111th Congress*, available at [http://www.c2es.org/docUploads/Federal\\_Bills\\_Addressing\\_Adaptation\\_080210.pdf](http://www.c2es.org/docUploads/Federal_Bills_Addressing_Adaptation_080210.pdf).

<sup>216</sup> Between July and November 2009, the Senate Environment and Public Works (EPW) Committee held ten hearings on climate change legislation featuring ninety-five witnesses. Of these witnesses, thirty made some mention of adaptation, although most references were brief. At least four witnesses who spent a significant portion of their testimony discussing adaptation were opposed to any climate mitigation legislation. None of the EPW Committee's hearings addressed adaptation squarely—witnesses mentioned it on their own initiative. See, e.g., Statement of Ken Salazar, Secretary, Department of the Interior: Hearing on Energy and Climate Legislation, U.S. Senate Committee on Environment and Public Works, 111th Cong. (July 7, 2009), available at [http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore\\_id=8b371746-bf8c-4d97-b2c3-dc295aa10c24](http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=8b371746-bf8c-4d97-b2c3-dc295aa10c24); Testimony of The Honorable Douglas H. Palmer, Mayor of Trenton & Past President of the U.S. Conference of Mayors before the U.S. Senate Environment and Public Works, 111th Cong. (July 21, 2009), available at [http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore\\_id=da801180-11f8-4aab-8d96-25213507b387](http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=da801180-11f8-4aab-8d96-25213507b387).

<sup>217</sup> MANAGING THE RISKS OF EXTREME EVENTS AND DISASTERS TO ADVANCE CLIMATE CHANGE ADAPTATION 9 (Christopher B. Field, *et al.* eds., Cambridge University Press 2012), available at [http://ipcc-wg2.gov/SREX/images/uploads/SREX-All\\_FINAL.pdf](http://ipcc-wg2.gov/SREX/images/uploads/SREX-All_FINAL.pdf) (noting *inter alia* that it is “likely that anthropogenic influences have led to warming of extreme daily minimum and maximum temperatures at the global scale” and that “there has been an anthropogenic influence on increasing extreme coastal high water due to an increase in mean sea level,” two factors that may contribute to more frequent extreme weather events); see also *Facing the Consequences*, *ECONOMIST* (Nov. 25, 2010), available at <http://www.economist.com/node/17572735>.

<sup>218</sup> Munich RE, Knowledge Series, *Severe Weather in North America: Perils, Risks, Insurance 2* (Oct. 2012), available at [http://www.munichreamerica.com/pdf/ks\\_severe\\_weather\\_na\\_exec\\_summary.pdf](http://www.munichreamerica.com/pdf/ks_severe_weather_na_exec_summary.pdf).

<sup>219</sup> FEMA, *Disaster Declarations by Year*, available at <http://www.fema.gov/disasters/grid/year> (last visited Aug. 5, 2013). There were 286 major declarations, affecting forty-seven states, the District of Columbia, and Puerto Rico. There were also sixty-one more serious “emergency” declarations stemming from natural disasters over the same time period, affecting twenty-eight states, the District of Columbia, and Puerto Rico. *Id.*

<sup>220</sup> U.S. EPA, *Future Climate Change*, available at <http://www.epa.gov/climatechange/science/future.html>.

<sup>221</sup> Press Release, International Energy Agency, *The World is Locking Itself into an Unsustainable Energy Future Which Would Have Far-Reaching Consequences, IEA Warns in Latest World Energy Outlook* (Nov. 9, 2011), available at <http://www.iea.org/newsroomandevents/pressreleases/2011/november/name,20318,en.html> (summarizing a finding in the 2011 World Energy Outlook report that eighty percent of energy-related carbon dioxide emissions permitted to 2035 – that is, the amount that can be emitted before the world exceeds the two degree Celsius rise in global average surface temperatures – are already locked in by existing capital stock, and that in a business as usual scenario, the world will hit that limit by 2017).

<sup>222</sup> See, e.g., Roger Pielke, Jr., Breakthrough Institute, *Al Gore Comes Around on Adaptation* (Sept. 15, 2008), available at [http://thebreakthrough.org/archive/al\\_gore\\_comes\\_around\\_on\\_adapta](http://thebreakthrough.org/archive/al_gore_comes_around_on_adapta) (quoting Al Gore from a recent article in *The Economist* that he no longer believed “adaptation subtract[s] from our efforts on prevention”).

<sup>223</sup> See, e.g., The Resource Innovation Group Working Paper Series 2011-01, *Can Climate Change Preparedness Efforts Spur Greater Interest in Emission Reductions?* 3 (2011), available at <http://www.theresourceinnovationgroup.org/storage/TRIG%20Preparation-Mitigation%20FINAL%20LR%206-13-2011.pdf> (finding that poll respondents who participated in a Climate Futures Forum or other adaptation-relation workshop reported higher concern for local climate impacts than non-participants—58.7 percent to 49.9 percent—and that nearly seventy percent of participants believed learning about climate adaptation led them to an increased interest in mitigation).

<sup>224</sup> See, e.g., Lisa Friedman, *Companies Begin to See Necessity and Profits in Adapting to Climate Change*, CLIMATEWIRE (July 11, 2012), available at <http://www.eenews.net/public/climatewire/2012/07/11/1>.

<sup>225</sup> Georgetown Climate Center, *State and Local Adaptation Plans*, available at <http://www.georgetownclimate.org/adaptation/state-and-local-plans?page=1>. The Georgetown Climate Center acts as a clearinghouse for state and local climate adaptation policies. See *id.*

<sup>226</sup> While Congress requires states to complete those plans before receiving certain federal wildlife management funds, the plans are not required to address climate adaptation. See *id.*

<sup>227</sup> State of California, *Adaptation Planning Guide*, available at [http://resources.ca.gov/climate\\_adaptation/local\\_government/adaptation\\_policy\\_guide.html](http://resources.ca.gov/climate_adaptation/local_government/adaptation_policy_guide.html).

<sup>228</sup> Pam Rubinoff, Rhode Island Sea Grant Presentation, *Building Blocks for Climate Change: Tools for Assessment and Planning* (Oct. 8, 2011), available at [http://seagrant.gso.uri.edu/z\\_downloads/coast/clim\\_chg\\_BI\\_Oct8\\_2011.pdf](http://seagrant.gso.uri.edu/z_downloads/coast/clim_chg_BI_Oct8_2011.pdf).

<sup>229</sup> See, e.g., Douglas Codiga, *et al.*, University of Hawai'i Sea Grant College Program, Center for Island Climate Adaptation and Policy, *Climate Change and Regulatory Takings in Coastal Hawai'i* (2011), available at [http://seagrant.soest.hawaii.edu/sites/seagrant.soest.hawaii.edu/files/publications/web\\_climatechangeregulatorytakingshi.pdf](http://seagrant.soest.hawaii.edu/sites/seagrant.soest.hawaii.edu/files/publications/web_climatechangeregulatorytakingshi.pdf) (describing the likely interplay between “regulatory takings” law under the federal and Hawaii constitution, and such climate change adaptation measures as shoreline setbacks, shoreline hardening, and flood control and mitigation).

<sup>230</sup> The first version of the legislation, H.B. 819, passed by both houses, would have required North Carolina to base predictions of future sea level rise on a steady, linear rate of increase, despite evidence of a much faster rise. One month later, the House voted to revise the bill. Jane Lee, *Update: Revised North Carolina Sea Level Rise Bill Goes to the Governor*, SCIENCE INSIDER (July 3, 2012), available at <http://news.sciencemag.org/climate/2012/07/update-revised-north-carolina-sea-level-rise-bill-goes-governor>.

<sup>231</sup> Center for Climate and Energy Solutions, *Climate Change Adaptation: What Federal Agencies are Doing* 5 (Feb. 2012), available at <http://www.c2es.org/docUploads/federal-agencies-adaptation.pdf>.

<sup>232</sup> S. 1881, 112th Cong. (2011).

<sup>233</sup> See, e.g., U.S. Gov't Accountability Office, GAO-13-242, *Climate Change: Future Federal Adaptation Efforts Could Better Support Local Infrastructure Decision Makers* (Apr. 12, 2013), available at <http://www.gao.gov/assets/660/653741.pdf>; U.S. Gov't Accountability Office, GAO-13-253, *Climate Change: Various Adaptation Efforts are under Way at Key Natural Resource Management Agencies* (May 31, 2013), available at <http://www.gao.gov/assets/660/654991.pdf>.

<sup>234</sup> President's Climate Action Plan, *supra* note 2.

<sup>235</sup> See, e.g., John Muller & Taylor Behrendt, *Sandy Spurs Talk of Sea Barrier for New York*, ABC NEWS (Nov. 2, 2012), available at <http://abcnews.go.com/blogs/headlines/2012/11/sandy-spurs-talk-of-sea-barrier-for-new-york/>.

<sup>236</sup> H.R. 4348, 112th Cong. (2012).

<sup>237</sup> S. 601, 113th Cong. (2013).

<sup>238</sup> U.S. Gov't Accountability Office, GAO-07-285, Report to the U.S. Senate Committee on Homeland Security and Governmental Affairs, *Climate Change: Financial Risks to Federal and Private*

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*Insurers in Coming Decades are Potentially Significant* 5 (March 2007), available at <http://www.gao.gov/new.items/d07285.pdf>.

<sup>239</sup> Changes to the National Flood Insurance Program were rolled into the highway reauthorization bill as agreed to in conference, H.R. 4348, and included: reforming the premium rate structure to exclude severe repetitive loss properties and property that has incurred flood-related damage where the insurance payment equaled or exceeded the fair market value of such property; authorizing the program to increase premium to accurately reflect the current risk of flood; and establishing a Technical Mapping Advisory Council to recommend new mapping standards for Flood Insurance Rate Maps. GOP.gov: The Website for the House Republican Majority, *Conference Report to Accompany H.R. 4348 – Surface Transportation Extension Act of 2012*, ), available at <http://www.gop.gov/bill/112/2/hr4348> (last visited Aug. 5, 2013).

<sup>240</sup> U.S. Fish & Wildlife Service, *Coastal Barrier Resources Act*, available at <http://www.fws.gov/CBRA/> (describing the program).

<sup>241</sup> Secretary of State John Kerry, Remarks at the U.S.-China Strategic and Economic Dialogue Joint Opening Session (July 10, 2013), available at <http://www.state.gov/secretary/remarks/2013/07/211773.htm>.

<sup>242</sup> See U.S. Energy Information Administration, *Electric Power Industry – U.S. Electricity Imports from and Electricity Exports to Canada and Mexico, 2001-2011*, available at [http://www.eia.gov/electricity/annual/html/epa\\_02\\_13.html](http://www.eia.gov/electricity/annual/html/epa_02_13.html). Net imports from these countries represent a very small percentage of overall electricity consumption in the U.S., [http://www.eia.gov/electricity/annual/html/epa\\_02\\_13.html](http://www.eia.gov/electricity/annual/html/epa_02_13.html); in 2010, for instance, net imports from Mexico represented .02% of U.S. electricity consumption, while net imports from Canada represented .65%.

<sup>243</sup> International Energy Agency, *World Energy Outlook 2012: Executive Summary 2* (2012), available at <http://www.iea.org/publications/freepublications/publication/English.pdf> (noting that “[n]o country is an energy ‘island’”).

<sup>244</sup> See National Energy Policy Development Group, *Reliable, Affordable, and Environmentally Sound Energy for America’s Future* (May 2001), available at <http://www.wtrg.com/EnergyReport/National-Energy-Policy.pdf>.

<sup>245</sup> Organizing for Action, *All of the Above*, available at <http://www.barackobama.com/energy-info/>.

<sup>246</sup> See, e.g., Brad Plumer, *As Fracking Booms, the EPA Treads Cautiously*, WASH. POST WONKBLOG (Apr. 18, 2012), available at [http://www.washingtonpost.com/blogs/wonkblog/post/as-fracking-booms-the-epa-treads-cautiously/2012/04/18/gIQAxCvLRT\\_blog.html](http://www.washingtonpost.com/blogs/wonkblog/post/as-fracking-booms-the-epa-treads-cautiously/2012/04/18/gIQAxCvLRT_blog.html) (describing that EPA decided to give industry extra time in the final Clean Air Act rule for oil and gas wells); EPA, *Region 8 Draft Report: Pavillion Groundwater Investigation* (Dec. 8, 2011), available at <http://www2.epa.gov/region8/pavillion> (noting that on June 20, 2013, EPA announced it was turning over investigation of possible drinking water contamination from oil and gas activity to the state of Wyoming).

<sup>247</sup> See *Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands*, 78 Fed. Reg. 101, 31636 (May 24, 2013), available at <http://www.gpo.gov/fdsys/pkg/FR-2013-05-24/pdf/2013-12154.pdf>.

<sup>248</sup> U.S. Energy Information Administration, *How Dependent Are We on Foreign Oil?* (May 10, 2013), available at [http://www.eia.gov/energy\\_in\\_brief/article/foreign\\_oil\\_dependence.cfm](http://www.eia.gov/energy_in_brief/article/foreign_oil_dependence.cfm); see also Kasia Klimasinska, *U.S. Oil Imports to Seen [sic] Hitting 20-Year Low 42% of Use*, BLOOMBERG BUSINESSWEEK (Aug. 23, 2012), available at <http://www.businessweek.com/news/2012-08-23/u-dot-s-dot-oil-imports-to-seen-hitting-20-year-low-42-percent-of-use>.

<sup>249</sup> International Energy Agency, *supra* note 238, at 1.

<sup>250</sup> Matthew Philips, *Why Natural Gas Will Stay Cheap in 2013*, BLOOMBERG BUSINESSWEEK (Jan. 10, 2013), available at <http://www.businessweek.com/articles/2013-01-10/why-natural-gas-will-stay-cheap-in-2013>.

<sup>251</sup> As of mid-2013, the Department of Energy provisionally approved three such applications. See U.S. Department of Energy, *Summary of LNG Export Applications*, available at [http://energy.gov/sites/prod/files/2013/08/f2/Summary\\_of\\_Export\\_Applications.pdf](http://energy.gov/sites/prod/files/2013/08/f2/Summary_of_Export_Applications.pdf); see also Press Release, U.S. Department of Energy, *Energy Department Authorizes Third Proposed Facility to Export Liquefied Natural Gas* (Aug. 7, 2013), available at <http://energy.gov/articles/energy-department-authorizes-third-proposed-facility-export-liquefied-natural-gas-1>.

<sup>252</sup> U.S. Energy Information Administration, *Monthly Coal- and Natural Gas-Fired Generation Equal for First Time in April 2012* (July 6, 2012), available at <http://www.eia.gov/todayinenergy/detail.cfm?id=6990>. Coal has since retaken the lead, at least for the time being. See U.S. Energy Information Administration, *Year-to-Date Natural Gas Use for Electric Power Generation is Down from 2012* (Apr. 11, 2013), available at <http://www.eia.gov/todayinenergy/detail.cfm?id=10771>.

<sup>253</sup> U.S. Energy Information Administration, *U.S. Coal Exports Set Monthly Record* (June 19, 2013), available at <http://www.eia.gov/todayinenergy/detail.cfm?id=11751>.

<sup>254</sup> See Elizabeth Sheargold & Smita Walavalkar, Columbia Law School: Center for Climate Change Law, *NEPA and Downstream Greenhouse Gas Emissions of U.S. Coal Exports* (Aug. 2013), available at <http://web.law.columbia.edu/sites/default/files/microsites/climate-change/files/Publications/Fellows/NEPA%20and%20Review%20of%20Coal%20Exports.pdf>.

<sup>255</sup> Nathanael Massey, *Critics of Northwestern Coal Exports Question Narrow Scope of Government Review*, CLIMATEWIRE (Jan. 22, 2013).

<sup>256</sup> Blake Clayton, Council on Foreign Relations, Policy Innovation Memorandum No. 34, *The Case for Allowing U.S. Crude Oil Exports* (July 2013), available at <http://www.cfr.org/oil/case-allowing-us-crude-oil-exports/p31005>.

<sup>257</sup> See, e.g., Ryan Olson, *Legalize Crude Oil Exports*, HERITAGE FOUNDATION: THE FOUNDRY (Nov. 23, 2012), available at <http://blog.heritage.org/2012/11/23/legalize-crude-oil-exports/>.

<sup>258</sup> Institute for Energy Research, *EIA Releases New Energy Forecast: Fossil Fuels Still Reign in 2035* (Dec. 30, 2010), available at <http://www.instituteforenergyresearch.org/2010/12/30/eia-releases-new-energy-forecast-fossil-fuels-still-reign-in-2035/>.

<sup>259</sup> If one of the agencies entitled to consultation objects to the State Department's recommendation, the agency may request that the decision be elevated to the President. Exec. Order No. 23,337, 3 C.F.R. 13337 (Apr. 30, 2004); see also Elana Schor, *Keystone XL: DOE Stayed Silent on State's Latest Pipeline Review*, E&E PUBLISHING (Aug. 23, 2013), available at <http://www.eenews.net/stories/1059986407>.

<sup>260</sup> See, e.g., Natural Resources Defense Council, *Say No to Tar Sands Pipeline* (Feb. 28, 2011), available at <http://www.nrdc.org/land/tarsandspipeline.asp>.

<sup>261</sup> See, e.g., Mark Green, The Energy Collective, *Keystone XL: In the National Interest* (Apr. 23, 2013), available at <http://theenergycollective.com/mark-green/215751/keystone-xl-national-interest>.

<sup>262</sup> See Global Carbon Project, *Global Carbon Budget*, available at <http://www.globalcarbonproject.org/carbonbudget/index.htm>.

<sup>263</sup> Amy Myers Jaffe & Ronald Soligo, The James A. Baker III Institute for Public Policy, Rice University, *The International Oil Companies* 3 (Nov. 2007), available at [http://www.bakerinstitute.org/publications/NOC\\_IOCs\\_Jaffe-Soligo.pdf](http://www.bakerinstitute.org/publications/NOC_IOCs_Jaffe-Soligo.pdf).

<sup>264</sup> See, e.g., David Hodgkinson, et al., *'The Hour When the Ship Comes in': A Convention for Persons Displaced by Climate Change*, 36 Monash U. L. Rev. 69 (2010).

<sup>265</sup> See, e.g., Jane McAdams, CLIMATE CHANGE, FORCED MIGRATION, AND INTERNATIONAL LAW (Oxford Univ. Press 2012).

<sup>266</sup> Michael B. Gerrard and Gregory W. Wannier, eds., THREATENED ISLAND NATIONS: LEGAL IMPLICATIONS OF RISING SEAS AND A CHANGING CLIMATE (Cambridge 2013).

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<sup>267</sup> Laurence C. Smith, Scott R. Stephenson, *New Trans-Arctic Shipping Routes Navigable by Midcentury*, Proceedings of the National Academy of Sciences, Vol. 110 no. 13, E1191-95.

<sup>268</sup> D.L. Gautier, *Assessment of Undiscovered Oil and Gas in the Arctic*, SCIENCE 324 (2009): 1175-1179.

<sup>269</sup> Catherine Cheney, *Arctic Commercial Fishing Deal Would Set a Precedent*, WORLD POLITICS REVIEW (April 24, 2013), available at <http://www.worldpoliticsreview.com/trend-lines/12891/arctic-commercial-fishing-deal-would-set-a-precedent>.

<sup>270</sup> Andrew Restuccia, *Council Sets 2015 Goal for Climate Pact*, POLITICO (May 16, 2013), available at <http://www.politico.com/story/2013/05/council-sets-2015-goal-for-climate-pact-91431.html>.