THE CLIMATE POLICY LANDSCAPE

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On June 25, 2013, President Obama "gave the speech climate advocates have been clamoring for."[1] It announced the broad outlines of a "new national climate plan"[2]; a White House document issued the same day provided details.[3] President Obama's Climate Action Plan ("Action Plan") sets three broad goals: reducing domestic greenhouse gas emissions, increasing the nation's resilience to climate change, and securing international cooperation. This article focuses on the first goal: a reduction in United States emissions of greenhouse gases.

I. GREENHOUSE GASES AND THE CLIMATE ACTION PLAN

Greenhouse gases warm the earth by trapping part of its outgoing thermal radiation and re-emitting it back to the surface. Carbon dioxide ("CO_2") is the most important greenhouse gas,[4] and fossil fuels are CO_2's most important source.[5] Their

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1. Fuzz Hogan, *Can Obama Change Our Climate Future in the Present (Geo)Political Climate?*, IN THE TANK: THE NEW AMERICA BLOG (June 25, 2013, 8:26 PM), http://www.inthetank.newamerica.net/blog/2013/06/can-obama-change-our-climate-future-present-geopolitical-climate.

2. President Barack Obama, Remarks at Georgetown University (June 25, 2013), *available at* http://www.youtube.com/watch?v=OE-fiyMA_6o.

3. EXEC. OFFICE OF THE PRESIDENT, THE PRESIDENT'S CLIMATE ACTION PLAN, (June 2013) [hereinafter ACTION PLAN], *available at* http://www.nytimes.com/interactive/2013/06/25/us/obama-climate-action-plan.html.

4. Andrew A. Lacis et al., *Atmospheric CO_2: Principal Control Knob Governing Earth's Temperature*, 330 SCIENCE 356, 356 (2010). The global warming potential of water vapor is comparable to that of CO_2, but water vapor is a feedback rather than a driver of temperature change." *Id.* at 356–57. The amount of water vapor in the atmosphere rises with a temperature increase and falls with a temperature decrease. *See id.* at 356. Without the warming resulting from CO_2 and other greenhouse gases, all atmospheric water vapor would be deposited as ice on the surface of a "snowball earth." *See id.* at 357–58.

5. U.S. ENVTL. PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990–2011, tbl.ES-2 at ES-5 (2013), *available at* http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf. Globally, land use

importance is reflected in the Action Plan, which proposes to reduce greenhouse gas emissions primarily by reducing domestic consumption of fossil fuels.[6]

Potentially, the Action Plan's most important element is the regulation of greenhouse gas emissions from power plants and other stationary sources. A proposed rule to regulate emissions from new plants was issued only three months after President Obama's speech.[7] A proposed rule for the much more consequential task of regulating emissions from existing plants is promised by mid-2014.[8]

The plan also includes actions by the federal government in its proprietary role, buying things and managing its properties. For instance, the plan would require the government to obtain twenty percent of its electricity from renewable sources.[9] And the plan provides for money: loan guarantees for advanced fossil fuel projects and loans for energy efficiency.[10] The Action Plan is expected to allow the United States to meet its pledge to reduce its emissions to seventeen percent below the 2005 level by 2020.[11] But

changes such as deforestation are a major source of emissions, but for the United States they are a net carbon sink; that is, they absorb more CO_2 than they emit. *Id.* at ES-6.

6. *See* ACTION PLAN, *supra* note 3.

7. *See* Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 1429 (proposed Sept. 20, 2013) (to be codified at 40 C.F.R. pt. 60), *available at* http://www.epa.gov/sites/production/files/2013-09/documents/20130920proposal.pdf [hereinafter Standards of Perfromance].

8. *See* Power Sector Carbon Pollution Standards, 78 Fed. Reg. 39,535, 39,536 (June 25, 2013), *available at* http://www.gpo.gov/fdsys/pkg/FR-2013-07-01/html/2013-15941.htm.

9. Memorandum from President Barack Obama on Energy Management to the Heads of Executive Departments and Agencies (Dec. 5, 2013), *available at* http://www.whitehouse.gov/the-press-office/2013/12/05/presidential-memorandum-federal-leadership-energy-management (implementing the twenty percent electricity pledge).

10. *See* ACTION PLAN, *supra* note 3, at 7, 9.

11. U.S. DEP'T OF STATE, FIRST BIENNIAL REPORT OF THE UNITED STATES OF AMERICA ch. 4, at 1 (2014), *available at* http://www.state.gov/documents/organization/219039.pdf. Without the Action Plan, 2020 gross greenhouse gas emissions are projected to be 5.3% below 2005 levels. *Id.* ch. 5, at 2. The 17% pledge was made at the 2009 Copenhagen Conference of Parties held under the United Nations Framework Convention on Climate Change. COPENHAGEN ACCORD, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE app. 1 (2009), *available at* http://unfccc.int/meetings/copenhagen_dec_2009/items/5264.php. The annual meetings under the Framework Convention provide the principal forum for efforts to negotiate a successor to the Kyoto Protocol, a subsidiary document under the Framework Convention that sets out its signatories' 2008–2012 emission-reduction obligations. The United States did not ratify Kyoto, but it did ratify the Framework Convention itself and therefore is able to participate in the meetings. The

it will not alter the basic landscape of domestic climate policy and therefore will not escape the limits that are inherent in that political landscape.

This is not a criticism of the plan. The current landscape is not of President Obama's making, nor does it lie within his power to change. Change would require a political transformation. Absent such a transformation, the most that can be done is to push closer to the limits the political landscape imposes. That is what the Action Plan proposes to do.

II. THE FAILURE OF FEDERAL LEGISLATION

The landscape's defining feature is the absence of federal legislation dealing broadly with climate change. Serious efforts to enact such legislation began in 2003 with the introduction of the Climate Stewardship Act by Senators Lieberman and McCain.[12] The high-water mark for climate-related bills was reached almost exactly four years before President Obama's speech, when the House passed Waxman-Markey, a bill that would have established an economy-wide cap-and-trade regime.[13] The bill failed in the Senate the following year,[14] and no legislation dealing broadly with climate has passed either chamber since then.

Nor is any likely to pass for the foreseeable future. The near success of Waxman-Markey depended on a Democratic commitment to action and large Democratic majorities in both chambers. In the end, that was not enough. Enactment of broad legislation would require either continued Democratic control of the White House combined with even stronger Democratic control of the Congress or an ideological transformation of the Republican Party. Neither event appears imminent.

texts of the Framework Convention and the Kyoto protocol are available at http://www.unfccc.int/essential_background/convention/items/6036.php and http://www.unfccc.int/essential_background/kyoto_protocol/items/6034.php.

12. Climate Stewardship Act of 2003, S. 139, 108th Cong. (2003). Modified versions of the bill were reintroduced in 2005 and 2007 as Climate Stewardship and Innovation Act of 2005, S. 1151, 109th Cong. (2005) and Climate Stewardship and Innovation Act of 2007, S. 280, 110th Cong. (2007).

13. American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009).

14. *See* Bryan Walsh, *Why the Climate Bill Died*, TIME.COM (July 26, 2010), http://www.science.time.com/2010/07/26/why-the-climate-bill-died.

In the Congress, the focus has shifted from ends to means—from the goal of reducing emissions to enumerated measures for achieving a reduction. The shift is best represented by proposals to establish a national renewable energy or clean energy portfolio standard.

A renewable portfolio standard requires that a portion of a jurisdiction's electricity be supplied by designated renewable energy technologies.[15] A clean energy standard broadens the mandate to include certain other "clean" sources, which may include nuclear power, fossil fuels with carbon capture and sequestration, natural gas, and conservation. Renewable portfolio standards and clean energy standards are referred to here collectively as portfolio standards.

Portfolio standards have their origin in the renewable portfolio standards enacted by states beginning with Iowa in 1983.[16] Today, twenty-nine states plus the District of Columbia have mandatory standards and an additional eight states have voluntary goals.[17] Several bills to establish a federal portfolio standard were submitted prior to Waxman-Markey,[18] and one or more bills have been before Congress almost continuously since its defeat. At the time of this writing, at least three bills have been introduced in the Senate or House of Representatives.[19]

The portfolio standard proposals are the most ambitious climate-related legislation to receive serious congressional attention since Waxman-Markey, but compared to a broad cap-

15. The standards generally do not require electricity suppliers actually to generate or purchase electricity from a qualifying energy source but to hold tradable certificates representing the required amount of electricity from those sources (renewable energy certificates or "REC"s). A REC is created when one megawatt-hour of electricity is generated by a qualifying renewable energy source. RYAN WISER ET AL., RENEWABLES PORTFOLIO STANDARDS: A FACTUAL INTRODUCTION TO EXPERIENCE FROM THE UNITED STATES 4 (2007), *available at* http://www.emp.lbl.gov/publications/renewables-portfolio-standards-factual-introduction-experience-united-states. Only three of the twenty-nine states with mandatory renewable portfolio standards do not utilize tradable renewable energy credits: Hawaii, Iowa and New York. DSIRE: DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, http://www.dsireusa.org (last visited Mar. 7, 2014).

16. WISER ET AL., *supra* note 15 at 2 fig.1.

17. DSIRE: DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, http://www.dsireusa.org (last visited Mar. 7, 2014) (summarizing state standards).

18. WISER ET AL., *supra* note 15, at 14.

19. Renewable Electricity Standard Act of 2013, H.R. 3654, 113th Cong. (2013); American Renewable Energy and Efficiency Act, S. 1627, 113th Cong. (2013); Renewable Electricity Standard Act of 2013, S. 1595, 113th Cong. (2013).

and-trade regime, they have two weaknesses: they are narrower and less accurate. These weaknesses are not the result of bad legislative drafting; they reflect the limitations of the portfolio standard tool.

Their comparative narrowness exists at two levels. They apply only to the electricity sector, and within that sector, the only actions they promote are the ones listed in the law. In contrast, the only inescapable limit on the reach of a cap-and-trade regime is the practical ability to monitor emissions: you cannot cap what you cannot measure. This generally excludes the agriculture and forestry sectors,[20] but little else.[21] And rather than seeking to identify actions that reduce emissions, a cap-and-trade regime creates a financial incentive for emitters to find the cheapest way to reduce them.[22] Not surprisingly, emitters are able to identify alternatives not dreamt of by legislative draftsmen.[23]

The accuracy problem is created by the fact that actions qualifying for the standard do not have the same impact on

20. Even those sectors can be partly brought under the regime through the use of carbon offsets. Although a systematic monitoring of these sectors' emissions is not practical, it is possible to determine whether a particular agricultural or forestry project reduces emissions from the business-as-usual level. Under both the Regional Greenhouse Gas Initiative ("RGGI") and the California cap-and-trade regime, certain categories of such reductions create offset credits that can be used as additional allowances for emissions in the sectors covered by the cap. For an overview of carbon offsets for the RGGI, see *CO_2 Offsets*, REGIONAL GREENHOUSE GAS INITIATIVE, http://www.rggi.org/market/offsets (last visited Mar. 5, 2014). For the California regime, see *Compliance Offset Program*, AIR RES. BD., CAL. ENVTL. PROT. AGENCY, http://www.arb.ca.gov/cc/capandtrade/offsets/offsets.htm (last visited Mar. 5, 2014).

21. The limits discussed in the text are ones that are inherent in the cap-and-trade (or carbon tax) tool. Other emissions may be excluded for policy reasons. The Kyoto Protocol did not apply a cap to the emissions of developing countries, and the direct application of the RGGI is limited to the electricity sector, although carbon offsets can be created in other sectors. *See CO_2 Offsets*, REGIONAL GREENHOUSE GAS INITIATIVE, http://www.rggi.org/market/offsets (last visited Mar. 5, 2014).

22. This incentive is created by the price of emissions allowances in the secondary market. Because allowances are tradable, a company that reduces its emissions can sell more allowances or buy fewer allowances in that market. In both cases, the incentive for the reduction is created by the secondary market price and, in general, is not directly affected by whether the allowances were initially distributed for free or through an auction. *See* TODD SCHATZKI & ROBERT N. STAVINS, ANALYSIS GROUP, USING THE VALUE OF ALLOWANCES FROM CALIFORNIA'S GHG CAP-AND-TRADE SYSTEM 1 (2012), *available at* http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Value_Allowances_California_GHG_Cap_Trade_System.pdf.

23. *See* Margaret R. Taylor, *Innovation Under Cap-and-Trade Programs*, 109 PROC. NAT'L ACAD. SCIS. 4804 (2012) *available at* http://www.pnas.org/content/109/13/4804.full.pdf.

emissions. Generally all qualifying actions reduce emissions, but in different amounts.

The differences have two sources. One is the qualifying energy sources themselves. This is clearest for clean energy standards that include natural gas as a qualifying energy source. In providing a gigajoule of energy, natural gas emits about forty percent less CO_2 than coal, and its advantage is increased by the fact that an efficient natural gas generator also requires about forty percent less energy[24] than a coal-fired unit. Nevertheless, natural gas is a fossil fuel, and its combustion does produce CO_2—less than coal, but more than wind or solar. From the standpoint of reducing CO_2 emissions, a megawatt-hour of electricity generated by natural gas therefore is less valuable than one generated by wind or solar.

This first accuracy problem can be reduced by weighting the qualifying energy sources. The clean energy standard proposed by President Obama in his January 2011 State of the Union address[25] is illustrative. It would include electricity generated by combined cycle natural gas units, but each of their megawatt-hours would count as only 0.5 megawatt-hours towards the standard.[26]

However, neither weighting nor any other legislative device can eliminate the second accuracy problem. This problem stems from differences in the emissions of the energy the clean source displaces. Wind is included as a qualifying energy source by all portfolio standards, and its life-cycle CO_2 emissions are close to zero.[27] However, the act of generating electricity with wind does

24. A combined cycle natural gas unit can achieve a thermal efficiency of around 60% by making double use of the fuel's energy. Its combustion produces a hot expanding gas that spins one turbine, and its remaining thermal energy after exiting that turbine raises steam to spin a second turbine. By comparison, coal generating units and simple natural gas combustion turbines use the energy in their respective fuels only once and achieve thermal efficiencies in the 30% to 35% range.

25. President Barack Obama, Address before a Joint Session of Congress on the State of the Union, 2011 DAILY COMP. PRES. DOC. 47 (Jan. 25, 2011), *available at* http://www.gpo.gov/fdsys/pkg/DCPD-201100047/html/DCPD-201100047.htm.

26. BIPARTISAN POL'Y CTR., THE ADMINISTRATION'S CLEAN ENERGY STANDARD PROPOSAL: AN INITIAL ANALYSIS 3, 6 (2011), *available at* http://www.bipartisanpolicy.org/library/report/administration's-clean-energy-standard-proposal-initialanalysis.

27. For electricity generation, life cycle emissions include not only the emissions directly produced by generating the electricity—zero in the case of wind—but also those produced by building and installing the generator. For wind, a recent survey of the literature by National Renewable Energy Laboratory found emissions equal to about ten

not itself reduce emissions: a wind turbine does not sweep CO_2 molecules out of the air. What reduces emissions is wind's displacement of some other energy source. The reduction in emissions therefore depends not on the wind but on the amount of CO_2 the displaced generation would have emitted.

Suppose that one hundred megawatt-hours of wind-generated electricity are added to a system, and displace the same amount of generation from an existing unit. Consider three alternatives for the existing unit.

- A 30% efficient[28] coal plant. To generate the electricity, the plant would have used 1200 gigajoules ("GJ") of coal, and each gigajoule would have emitted ninety-three kilograms of CO_2. Displaced emissions therefore would be 93 x 1200 = 111,600 kilograms or 111.6 metric tons.
- A 30% efficient natural gas combustion turbine. Because efficiency is the same, the plant also would have used 1200 GJ of fuel, but natural gas emits only fifty-three kilograms of CO_2 per GJ. The displaced emissions therefore would be smaller: 63.6 metric tons.[29]
- A 50% efficient combined cycle natural gas unit. The unit's higher efficiency means that only 720 GJ of

grams of CO_2 per kilowatt-hour, based on an assumed capacity factor and operating life. NAT'L RENEWABLE ENERGY LAB., WIND LCA HARMONIZATION (2013), *available at* http://www.nrel.gov/ana;ysis/sustain_lca_results.html. For comparison, coal emissions equal about 1000 grams of CO_2 per kilowatt-hour. *Id.*

28. Efficiency here refers to the relationship between the energy in the generated electricity and the energy in the fuel used to generate the electricity. A megawatt-hour is equal to 3.6 billion Joules or 3.6 gigajoules ("GJ"). Generating a megawatt-hour with a 30% efficient generator therefore requires 3.6/.30 = 12.0 GJ of input energy.

29. This calculation considers only the CO_2 emissions that result directly from burning the fuel to generate the electricity. A broader analysis would also consider the leakage of natural gas into the atmosphere in the process of producing it and transporting it to the point of use. Methane ("CH_4") is the principal component of natural gas and is itself a powerful greenhouse gas. Leakage therefore increases the life-cycle greenhouse gas emissions associated with the use of natural gas. However, the magnitude of the increase depends on the percentage of leakage, and that percentage is the subject of current debate. *See* Conway Irwin, *EDF Experts on Fracking-Methane Study: 5 Key Takeaways* (Oct. 1, 2013, 1:30 PM), http://www.breakingenergy.com/2013/10/01/edf-experts-on-fracking-methane-study-key-takeaways; *see also* Michael Wines, *Emissions of Methane in U.S. Exceed Estimates, Study Finds*, N.Y. TIMES, Nov. 25, 2013, http://www.nytimes.com/2013/11/26/us/emissions-of-methane-in-us-exceed-estimates-study-finds.html.

natural gas would be needed, and displaced emissions would be 38.2 metric tons.

The reduction in emissions is nearly three times as large in the first case as in the third. However, the reward under a portfolio standard would be the same. The reason is that portfolio standards reward means rather than ends. They do not reward emission reductions; they reward actions that are expected to result in emission reductions. And that expectation is almost always correct: adding one hundred megawatt-hours of wind will almost certainly reduce emissions. As the above examples illustrate, however, the magnitude of the reduction can vary widely.

Notwithstanding these shortcomings, a national portfolio standard would be an important step towards decreasing domestic CO_2 emissions. The most serious practical shortcoming of a national standard is not that it is inferior to cap-and-trade but that it would require federal legislation. Bills have been submitted, and President Obama included a portfolio standard in his January 2011 State of the Union address.[30] But no standard has been approved by either chamber since 2005, and the near-term prospects for congressional approval probably are only slightly better for a portfolio standard than for cap-and-trade.

This does not mean that climate-relevant legislation is impossible. Legislation that advances modest climate goals might succeed if the link to climate was only implicit and the legislation offered politically attractive non-climate benefits. The leading example—and, indeed, the only one as of the time of this writing—is the extension of the Production Tax Credit ("PTC") for wind and other renewables from the end of 2012 to the end of 2013.[31] Generating electricity with wind reduces CO_2 emissions.

30. American Clean Energy Leadership Act of 2009, S. 1462, 111th Cong. (2009); President Barack Obama, Address before a Joint Session of Congress on the State of the Union, 2011 DAILY COMP. PRES. DOC. 47 (Jan. 25, 2011), *available at* http://www.gpo.gov/fdsys/pkg/DCPD-201100047/html/DCPD-201100047.htm.

31. American Taxpayer Relief Act of 2012, Pub. L. No. 112–240, § 407, 126 Stat. 2313, 2340 (2012). The nominal one-year extension of the PTC was effectively closer to two years. Under the legislation governing before the extension, a wind farm had to have begun operating by the end of 2012 in order to qualify for the tax credit; under the extension, it only is necessary that construction have begun by the end of 2013. *See Renewable Electricity Production Tax Credit (PTC)*, U.S. DEP'T OF ENERGY, http://www.energy.gov/savings/renewable-electricity-production-tax-credit-ptc (last visited Mar. 19, 2014).

The extension, however, contained no reference to CO_2 or climate. Moreover, the wind farms supported by the tax credit also produce lease payments for the owners of the land on which the turbines sit, jobs for the people who build and service them, and revenues for the places where the landowners and workers shop.

But wind is a special case. Hydroelectric power aside, it is by far the most important renewable for generating electricity. In 2012, wind accounted for over three percent of the national electricity supply; by comparison, only a tenth that much came from solar photovoltaic panels.[32] The wind industry's size makes it a significant lobbying force, and its political importance probably is increased by its concentration in states whose senators and representatives would be unlikely to support legislation on the basis of climate concerns alone. However, even those advantages have so far not been enough to gain a further extension of the PTC.

III. THE LIMITS OF STATE-LEVEL ACTION: POLITICS AND ECONOMICS

One alternative to federal legislation is action by the states. States had already taken the lead in responding to climate change when Waxman-Markey was introduced, and state action has continued since its defeat. The list of state measures promoting renewable energy and energy conservation was long then and is longer today. It includes tax benefits, net metering, and renewable portfolio standards.[33] The broadest response—the state counterpart to Waxman-Markey—has been the creation of two cap-and-trade regimes. The RGGI, now covering the electricity sectors of nine northeastern states,[34] began operation in 2009. The

32. *What is U.S. Electricity Generation by Energy Source?*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3 (last updated May 9, 2013).

33. DSIRE: DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, http://www.dsireusa.org (last visited Mar. 7, 2014) (listing state measures).

34. The RGGI was formed by ten states but Governor Christie withdrew New Jersey in 2011. The nine remaining states, from north to south, are Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Delaware, and Maryland. For an overview of the RGGI see *Welcome*, REGIONAL GREENHOUSE GAS INITIATIVE, http://www.rggi.org (last visited Mar. 5, 2014).

broader and more ambitious California regime became effective at the beginning of 2013.[35]

However, the political polarization that has produced legislative paralysis at the national level has affected the states as well. Its effect for the states has been not paralysis but a division of the country into red states and blue, with a scattering of purple in between. The indifference or hostility of some federal legislators to climate issues reflects the views of the voters who elected them.[36] Not surprisingly, state governors and legislators elected by those same voters have shown little inclination to address the climate issue.

For state legislatures as well as Congress, economics can sometimes trump ideology. One of the ironies of current energy policy is that the best onshore wind resources are found in a band of Great Plains red states running from the Dakotas to Texas. Some of these states have enacted legislation promoting the exploitation of their wind. Deep-red Texas is the poster child for the coexistence of official climate skepticism with state-promoted exploitation of local wind resources.[37]

Texas has important natural advantages. Its wind resources are large and, compared to the Great Plains states to its north, relatively close to major load centers. More importantly, the resources are not separated from the load centers by state boundaries.[38] It probably also has helped that environmental

35. California's cap-and-trade regulations went into effect at the beginning of 2012, but the program's obligations only became effective at the beginning of 2013. CTR. FOR CLIMATE AND ENERGY SOLUTIONS, CALIFORNIA CAP-AND-TRADE PROGRAM SUMMARY 3 (2013), *available at* http://www.c2es.org/docUploads/calif-cap-trade-01-13.pdf.

36. As on many issues, the precise results of surveys depend on the phrasing of the question, but the general pattern is consistent: climate skepticism is greater among Republicans than among Democrats and is greater among the most conservative Republicans than among Republicans as a whole. *See* PEW RESEARCH CTR., GOP DEEPLY DIVIDED OVER CLIMATE CHANGE 1–2 (2013), *available at* http://www.people-press.org/files/legacy-pdf/11-1-13%20Global%20Warming%20Release.pdf.

37. *See* KATE GALBRAITH & ASHER PRICE, THE GREAT TEXAS WIND RUSH: HOW GEORGE BUSH, ANN RICHARDS, AND A BUNCH OF TINKERERS HELPED THE OIL AND GAS STATE WIN THE RACE FOR WIND POWER ch. 1 (2013).

38. Construction of an interstate natural gas pipeline requires a Federal Energy Regulatory Commission ("FERC") certificate that carries with it the power of eminent domain. *See* 15 U.S.C. § 717f(h). But approval for the construction of interstate electricity transmission lines is generally left to the states. It therefore is necessary to secure approvals from each state through which the line passes, and those states may include ones that receive no direct benefit from the line. *See* Elena Verkilov, *If It's Broke, Fix It:*

concerns are generally less of an obstacle for new projects in Texas than in the blue states that might be considered renewable energy's natural home.[39]

But the state's wind industry would have grown less rapidly if those advantages had not been combined with effective support from its government. Probably the most important—and most costly—support was the creation of Competitive Renewable Energy Zones and the approval of thousands of miles of transmission lines to connect wind resources in those zones to Texas load centers.[40] The cost of the lines, now estimated at $6.82 billion, will be recovered from the state's electricity customers.[41]

However, the actions of even windy red states do not extend to dealing broadly and explicitly with climate. All of the ten states now participating in cap-and-trade voted for Obama in 2008 and 2012.[42] None voted for President Bush in 2004, and only New Hampshire voted for him in 2000.[43] One can imagine the extension of cap-and-trade to additional blue states, but its extension to red states appears as unlikely as the enactment of broad federal legislation.

Federal Regulation of Electrical Transmission Lines, 2013 U. ILL. L. REV. 695, 705–06, 718–23 (2013).

39. GALBRAITH & PRICE, *supra* note 37.

40. *See Program Overview*, PUB. UTIL. COMM'N TEX: CREZ TRANSMISSION PROGRAM INFO. CTR., http://www.texascrezprojects.com/overview.aspx (last visited Mar. 20, 2014).

41. RS&H, CREZ PROGRESS REPORT NO. 12 (JULY UPDATE) 6 (2013), *available at* http://www.texascrezprojects.com/page2960926.aspx; Kate Galbraith, *Cost of Texas Wind Transmission Lines Nears $7 Billion,* TEX. TRIBUNE (Aug. 24, 2011), http://www.texastribune.org/2011/08/24/cost-texas-wind-transmission-lines-nears-7-billion.

42. The ten states include the nine RGGI member states and California. Roddy Scheer & Doug Moss, *Does Cap-and-Trade Work?*, RIDGEFIELD PRESS (Mar. 19. 2014), http://www.theridgefieldpress.com/27292/does-cap-and-trade-work; *Welcome*, REGIONAL GREENHOUSE GAS INITIATIVE, http://www.rggi.org (last visited Mar. 5, 2014) (listing the nine RGGI member states). For the 2008 and 2012 elections vote distributions, see *2012 Electoral Vote Distribution*, FED. ELECTION COMM'N, http://www.fec.gov/pubrec/fe2012/2012presmaps.pdf (last visited Mar. 7, 2014) (showing the ten cap-and-trade states that voted for Obama in 2012); *2008 Electoral Vote Distribution*, FED. ELECTION COMM'N, http://www.fec.gov/pubrec/fe2008/2008presmaps.pdf (last visited Mar. 7, 2014) (showing the ten cap-and-trade states that voted for Obama in 2008).

43. *2004 Electoral Vote Distribution*, FED. ELECTION COMM'N, http://www.fec.gov/pubrec/fe2004/presmaps.pdf (last visited Mar. 7, 2014) (showing the ten cap-and-trade states that did not vote for Bush in 2004); *2000 Electoral Vote Distribution*, FED. ELECTION COMM'N, http://www.fec.gov/pubrec/fe2000/elecvotemap.htm (last visited Mar. 7, 2014) (showing nine of the ten cap-and-trade states, with New Hampshire as the outlier, that did not vote for Bush in 2000).

Action by the states also is subject to another and more fundamental limitation: the economics of climate change. Those economics pose a major obstacle to aggressive action even by a state inclined to environmental action.

The impact of CO_2 emissions is global and is unaffected by their geographical source. Within a year, emissions from Birmingham and Beijing are spread indistinguishably throughout the atmosphere. A corollary is that the benefit of any reduction in those emissions also is spread globally. A jurisdiction's benefit from actions to reduce emissions therefore does not depend on how much it contributed to the actions, or indeed on whether it contributed at all. It depends on the jurisdiction's share of the harm the emissions would have caused.

The arithmetic implicit in this proposition begins with the social cost of carbon ("SCC"): the present value of the global harm caused by an additional metric ton of CO_2 emissions. Because most of that harm will occur decades and centuries in the future, the SCC is heavily influenced by the discount rate used to translate future harm into current value. Table 1 shows the SCC for 2015 and 2025 calculated by a federal interagency working group using discount rates of 2.5% to 5.0%.[44]

Table 1
Social Cost of Carbon in 2015 and 2025
($2007)

Discount rate	2.5%	3.0%	5.0%
2015	$57	$37	$11
2025	$69	$47	$14

44. INTERAGENCY WORKING GRP. ON SOC. COST OF CARBON, U.S. GOV'T, TECHNICAL SUPPORT DOCUMENT: TECHNICAL UPDATE OF THE SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12866, at 3 (Nov. 2013 revision), *available at* http://www.whitehouse.gov/sites/default/filesomb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impact-analysis.pdf [hereinafter TECHNICAL UPDATE OF THE SOCIAL COST OF CARBON].

The costs shown in the table are for the entire world. In 2010 the interagency working group had estimated that the United States would bear seven percent to ten percent of the global total.[45] The share of any state would be smaller. Some sense of how much smaller can be gained by assuming it is proportional to the size of a state's economy. On that assumption, individual states' share of the global social cost of carbon would range from less than two percent for California down to about 0.02% for Vermont.[46] Using the 2015 global SCC for a three percent discount rate, these percentages imply that the cost of an additional ton of emissions for even the largest state is only around a dollar and for some states it is only about a penny.[47]

These costs are also the benefit an individual state would receive from a one ton emission reduction. From the narrow perspective of state self-interest, it is this benefit to which the cost of any state action must be compared. Even for blue states, the obvious question is not why they do not do more. Rather, the question is why they do anything at all. The answer no doubt varies with the state and with the action involved. However, a likely underlying reason is that for the most part the cost of state climate measures has so far been comparatively modest.

A comprehensive assessment of the cost of state measures is beyond the scope of this article, and probably beyond the scope of rational human activity: the standard data base[48] lists more than a hundred renewable energy and conservation measures for California alone.[49] The following discussion is limited to two measures: renewable portfolio standards and cap-and-trade.[50]

45. INTERAGENCY WORKING GRP. ON SOC. COST OF CARBON, U.S. GOV'T, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12866, at 11 (2010), *available at* http://www.epa.gov/oms/climate/regulations/scc-tsd.pdf [hereinafter SOCIAL COST OF CARBON].

46. States' individual shares have been calculated by multiplying the share of the United States in the impact of CO_2 emissions by each state's share of the national GDP from BUREAU OF ECON. ANALYSIS, U.S. DEP'T OF COMM., WIDESPREAD ECONOMIC GROWTH IN 2012 (2013), *available at* http://www.bea.gov/newsreleases/regional/gdp_state/2013/pdf/gsp0613.pdf.

47. The working group's estimates have been criticized as too low. *See* Laurie T. Johnson & Chris Hope, *The Social Cost of Carbon in U.S. Regulatory Impact Analyses: An Introduction and Critique*, 2 J. ENVTL. STUD. & SCI. 205, 215 (2012).

48. DSIRE: DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, http://www.dsireusa.org (last visited Mar. 20, 2014).

49. However, the California figure includes numerous measures that are applicable only to a single city or county or a single utility. *California: Incentives/Polices for Renewables*

A. Renewable Portfolio Standards

A renewable portfolio standard generally requires that a state's electricity suppliers hold RECs representing the required amount of electricity generated by qualifying renewables.[51] The cost of buying RECs is included in the supplier's cost of service and recovered through the price at which it sells electricity.[52] The cost of a renewable portfolio standard thus is borne by the customers of the state's electricity suppliers.

At least two factors limit this cost.[53] One is that the price of RECs usually is not very high. It varies with the level of the standard and the cost of the cheapest qualifying renewable. According to the most recent publicly available survey, REC prices were several cents per kilowatt-hour in some New England states but elsewhere ranged from around a penny down to less than a tenth of a cent.[54]

The second factor is that the percentage of a state's electricity supply that must be supplied by qualifying renewables

& Efficiency, DSIRE: DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, http://www.dsireusa.org/incentives/index.cfm?state=CA&re=1&ee=1&spv=0&st=0&srp=1 (last visited Mar. 20, 2014).

50. A third widely used measure, net metering, has become politically contentious. However, since net-metered electricity only makes up a tiny share of the total electricity supply, the issue's aggregate cost significance lies in the future. *See* William Pentland, *Electric Power Politics: Net-Metering Gets Nasty*, FORBES (May 30, 2013, 4:11 PM), http://www.forbes.com/sites/williampentland/2013/05/30/electric-power-politics-net-metering-gets-nasty.

51. *See supra* note 15.

52. *See* U.S. DEP'T OF ENERGY, GUIDE TO PURCHASING GREEN POWER 10 (2004), *available at* http://www.energy.gov/sites/prod/files/2013/10/f4/purchase_green_power.pdf. If the supplier is not regulated, the cost is simply one more operating cost that must be recovered from its customers if it is to stay in business.

53. A potential third factor is rate suppression. The wholesale price of electricity varies with demand. It is higher on a hot August afternoon when nearly all generating units are needed than late on a mild April night, when only the most efficient generating plants are running. The addition of renewables like wind and solar reduces demand for conventional generation and therefore reduces—"suppresses"—the wholesale price of electricity. However, the lower price may not be high enough to sustain the conventional generation capacity needed for a reliable electricity supply and it may have to be supplemented by other payments to conventional generators, which would also be reflected in the price to electricity consumers. *See* RICHARD W. CAPERTON, CTR. FOR AM. PROGRESS, WIND POWER HELPS TO LOWER ELECTRICITY PRICES 2–3, 5 (2012), *available at* http://www.americanprogress.org/wpcontent/uploads/2012/10/CapertonPTCpower2.pdf.

54. *Renewable Energy Certificates (RECs)*, GREEN POWER NETWORK, U.S. DEP'T OF ENERGY, http://www.apps3.eere.energy.gov/greenpower/markets/certificates.shtml?page=5&printCs (last updated Oct. 2, 2013).

dilutes the impact of REC prices on consumers. The percentage usually starts very low and then gradually increases. It may eventually reach twenty percent or more, but in most states it still is significantly below that end point. The consumer impact of even a REC price of several cents per kilowatt-hour therefore is likely to be less than a penny, and the impact in states with lower REC prices would have to be measured in hundredths of a cent.

Of course, even a few hundredths of a cent applied to the electricity consumption of a large state may produce a cost measured in millions of dollars. However, the question of why states continue to support and even expand renewable portfolio standards is a political one. A small increase in utility bills may create little political pressure, and on the other side, local renewable resources and local industries linked to those resources often benefit from the standard. To date, this balance has been enough to fend off efforts to repeal or significantly weaken the standards.[55]

B. Cap-and-Trade

Most of RGGI's allowances have been distributed by auction[56] and this will increasingly be true in California as well.[57] As cap-and-trade critics have pointed out, such auctions are effectively taxes on CO_2 emissions.[58] A corollary of this insight is that their proceeds, like those from any tax, support government programs that have been approved through the normal political process.

55. *See, e.g.*, Suzanne Goldberg & Ed Pilkington, *ALEC Calls for Penalties on "Free Rider" Solar-panel Owners,* GRIST (Dec. 6, 2013, 8:05 AM), http://www.grist.org/climate-energy/alec-calls-for-penalties-on-free-rider-solar-panel-users (one example of a group's effort to weaken energy regulations).

56. For 2013, ninety-four percent of the available allowances were offered at auction. *2013 Allowance Allocation*, REGIONAL GREENHOUSE GAS INITIATIVE, http:/www.rggi.org/market/co2_auctions/results/58-co2-auctions-tracking-a-offsets (last visited Mar. 20, 2014).

57. The only allowances not distributed by auction are the ones allocated directly to certain industries that are unable to recoup costs associated with compliance or face out-of-state competition. This distribution will decline over time. *See* DALLAS BURTRAW ET AL., RES. FOR THE FUTURE, CALIFORNIA'S NEW GOLD: A PRIMER ON THE USE OF ALLOWANCE VALUE CREATED UNDER THE CO_2 CAP-AND-TRADE PROGRAM 8 (2012), *available at* http://www.rff.org/documents/RFF-DP-12-23.pdf.

58. *See, e.g.*, Cara Horowitz, *California Cap and Trade Survives Industry Tax Challenge*, LEGAL PLANET (Nov. 14, 2013), http://www.legal-planet.org/2013/11/14/california-cap-and-trade-survives-industry-tax-challenge.

Without cap-and-trade, the programs would have to either find a new tax source or be eliminated. The first alternative holds little political appeal, and in the blue states that now participate in cap-and-trade, those programs have strong political support.

The above discussion does not mean that cost is politically irrelevant. The fact that generally modest emission reductions have proved to be politically sustainable does not mean that much larger reductions could be sustained. California is the test case. Its per capita electricity consumption already is below the national average,[59] and it has a legislatively mandated goal of reducing its emissions to the state's 1990 level by 2020.[60] Because of population growth, this would mean per capita emissions would have to be well below the 1990 level.[61]

It is an ambitious goal, but there is little doubt that California will achieve it. Now attention is turning to the issue of a post-2020 goal. California is likely the best possible setting for achieving large emission reductions. It is liberal and has a history of aggressive environmental regulation. It also has an administrative body—the California Air Resources Board ("CARB")—with an unusual measure of autonomy in shaping that regulation.[62]

However, much larger reductions carry two political risks. One stems from the fact that, at least in the near term, California apparently would be going it alone. This raises concern about the competitiveness of California firms and about the state's own ability to retain and attract companies.

The second is more fundamental. It is the impact of larger reductions on California consumers. Some emission reductions can be achieved through what are called no-regrets actions: actions that are economically justified even if climate benefits are ignored. The state requiring more efficient lighting might fall under this heading. As reductions become larger, however, climate benefits must provide an increasing part of the justification.

59. GREGORY FREEMAN ET AL., L.A. CNTY. ECON. DEV. CORP., THE AB 32 CHALLENGE: REDUCING CALIFORNIA'S GREENHOUSE GAS EMISSIONS 19 (2008), *available at* http://www.laedc.org/reports/TheAB32Challenge.pdf.

60. CAL. HEALTH & SAFETY CODE § 38550 (Deering 2007).

61. FREEMAN ET AL., *supra* note 59, at 16–17.

62. *See generally ARB Formal Rulemaking Activity*, AIR RES. BD., CAL. ENVTL. PROT. AGENCY, http://www.arb.ca.gov/regact/regact.htm (last reviewed Dec. 13, 2013).

Reductions that cannot be fully justified by non-climate concerns are an investment, and like any investment, they involve a reduction in current consumption in return for a future benefit. Stated in those general terms, reducing emissions is no different than saving for retirement. Behind the generality, however, there is an important distinction. People who save for retirement generally expect to receive the future benefit. Because of global warming's long-term and global nature, however, most of the benefit of today's emission reductions will be received by people who are not yet born and who will live in other countries.

This issue is not unique to California; it is an intrinsic part of the climate policy debate.[63] It potentially becomes more acute at the state level because of the wide gulf between the reductions achievable by a single state and the reductions needed to have a measurable impact on future climate change. Even for charitably-minded citizens, it may seem they are being asked to sacrifice much for little result.

IV. FEDERAL ACTION WITHOUT LEGISLATION

We come to the remaining alternative: federal administrative action under existing laws. Legislative deadlock is not a serious problem because no legislative action is needed. In the Climate Action Plan, the only element requiring congressional approval is the inclusion of $7.9 billion in clean energy funding in the Fiscal Year 2014 budget.[64]

Federal action is not immune to the logic of climate change economics, but that logic's force is weaker at the national level. To begin with there is the matter of size: the benefit to the United States from a reduction in emissions is greater than the benefit to any individual state, and the impact of potential national-scale emission reductions also is greater. But the more significant difference is that responsibility for international negotiations rests on the national government.

The difference is not absolute. California and Quebec have linked their respective cap-and-trade regimes effective January 1,

63. *See* David A. Weisbach & Cass R. Sunstein, *Climate Change and Discounting the Future: A Guide for the Perplexed* 34–35 (AEI Ctr. for Regulatory & Mkt. Studies, Working Paper No. 08-19, 2008), *available at* http://www.ssrn.com/abstract=1223448.

64. ACTION PLAN, *supra* note 3, at 7.

2014.[65] However, agreements setting the framework for broad reductions in emissions are, by the constitutional allocation of powers and by practical necessity, the responsibility of the national government.

This also is true of implicit agreements—the international climate counterpart to the antitrust concept of conscious parallelism.[66] The Kyoto Protocol created nominally binding commitments for the developed countries that signed it.[67] Its most likely replacement is sometimes referred to as "pledge and review"—a combination of voluntary national pledges with an international framework for evaluating and monitoring them.[68]

Formally, each nation's pledge would be made independently of the pledges of other countries. In the context of an international negotiation, however, they are linked: the willingness of one country to commit to large reductions is affected by other countries' commitments. United States emission reductions therefore are leveraged: they increase the likelihood of reductions by other countries.

The other side of that coin is that the failure of the United States to commit to significant reductions potentially would jeopardize efforts to negotiate a successor to Kyoto. For the consequences of such a failure, the social cost of carbon shown in Table 1 is not an adequate guide. It is an estimate of the economic impact per ton for relatively small changes in total emissions—the

65. Lucas Bifera, *California Marks First Anniversary of Cap-and-Trade,* THE ENERGY COLLECTIVE (Nov. 14, 2013), http://www.theenergycollective.com/lucas-bifera/304301/california-marks-first-anniversary-cap-and-trade. California also has a non-binding agreement with the province of British Columbia as well as the states of Washington and Oregon to develop a regional climate plan anchored by a multi-jurisdiction greenhouse gas trading, as well as an agreement with the Chinese national environmental agency to help China develop municipal emissions trading programs. *Id.*

66. In conscious parallelism, there is no explicit agreement among competitors, but they follow each other's lead in raising or lowering prices. This type of behavior is effective only where the number of competing firms is small. Similarly, although more than one hundred nations participate in international climate negotiations, China, the United States and the European Union account for more than half of global emissions. *See, e.g.*, Donald F. Turner, *The Definition of Agreement Under the Sherman Act: Conscious Parallelism and Refusals To Deal*, 75 HARV. L. REV. 655, 657–58 (1962) (providing an explanation of conscious parallelism).

67. Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 11, 1997, 37 I.L.M. 22 (1998).

68. *See The Global Climate Change Regime*, COUNCIL ON FOREIGN RELATIONS, http://www.cfr.org/climate-change/global-climate-change-regime/p21831 (last updated June 19, 2013).

kind of changes that are likely to be at issue in a federal regulatory rulemaking[69] or in the actions of a single state. It is not intended to measure the impact of the difference between what may be effectively two different future worlds.

V. THE LIMITS OF REGULATION WITHOUT LEGISLATION

Federal regulation without legislation is, however, subject to its own limitations. It is more vulnerable to political or judicial reversal. And the fragmented authority conferred by existing laws both limits the reductions that can be achieved and increases their cost.

Two factors increase the vulnerability of administrative action under existing law. The first stems from the very reason for resort to administrative action: legislative deadlock. Lying behind that deadlock are widely divergent views on the climate issue and on the appropriateness of government action to deal with it. This divergence increases the likelihood that actions will be reversed if there is a shift of political power.

The second reason stems from the link between the problem of vulnerability and the problem of fragmented authority. Fragmentation can be reduced by broad interpretations of existing statutory provisions,[70] but such interpretations increase the risk of judicial reversal. The scope for strictly legal disagreement is greater, and the likely role of values and policy preferences—and therefore of politics—is enhanced. The effect of these two factors is well illustrated by the shifting fortunes of efforts to regulate greenhouse gas emissions under the Clean Air Act ("CAA").[71]

69. TECHNICAL UPDATE OF THE SOCIAL COST OF CARBON, *supra* note 44, at 2.

70. *See, e.g.*, DANIEL A. LASHOF ET AL., NAT'L RES. DEF. COUNCIL, CLOSING THE POWER PLANT CARBON POLLUTION LOOPHOLE: SMART WAYS THE CLEAN AIR ACT CAN CLEAN UP AMERICA'S BIGGEST CLIMATE POLLUTERS (2013) (describing the National Resources Defense Council's proposal for EPA regulation of existing power plants), *available at* http://www.nrdc.org/air/pollution-standards/files/pollution-standards-report.pdf.

71. *Compare* Jason Scott Johnston, *Climate Change Confusion and the Supreme Court: The Misguided Regulation of Greenhouse Gas Emissions Under the Clean Air Act*, 84 NOTRE DAME L. REV. 1, 10–12 (2008) (discussing the results of broad statutory interpretation of the CAA), *with* Teal Jordan White, *Clean Air Act Mayhem: The EPA's Tailoring Rule Stitches Greenhouse Gas Emissions Into the Wrong Regulatory Fitting*, 18 TEX. WESLEYAN L. REV. 407, 428, 432–33 (2011) (discussing Congress' intent regarding the Environmental Protection Agency's power to regulate greenhouse gases under the CAA).

The basic elements of the scientific case for anthropogenic global warming were in place by the early 1980s: CO_2 is a greenhouse gas, its atmospheric concentration is increasing, and global temperatures are rising.[72] But there appears to have been no consideration of the implications of this science in federal administrative proceedings for nearly two decades.

There were two potential regulatory issues to be considered. One was whether the social cost of carbon should be included in cost-benefit analyses. In a proceeding to establish new CAFÉ standards, the National Highway and Transportation Safety Administration under President George W. Bush declined to do so on the ground that the cost of emissions was "too uncertain to support their explicit valuation and inclusion among the savings in environmental externalities from reducing gasoline production and use."[73]

In November 2007 the Ninth Circuit reversed, holding that uncertainty did not justify assigning a zero value to the cost of greenhouse gas emissions.[74] One year later Senator Obama defeated Senator McCain for the presidency, and an interagency working group began preparing guidelines for the inclusion of the social cost of capital in cost-benefit analyses. A technical support document for initial guidelines was issued in 2010.[75]

By itself, the inclusion of the social cost of carbon in cost-benefit calculations was unlikely to produce a large reduction in greenhouse gas emissions. Much more important was the second issue: whether greenhouse gases are pollutants within the meaning of the CAA and therefore subject to regulation by the Environmental Protection Agency ("EPA").

The public path to that issue's current resolution began during President Clinton's second term. An April 1998 memorandum from the EPA's general counsel to its administrator

72. In 1859, an English scientist, Joseph Tyndall, found that CO_2 absorbs the radiation from warm bodies, but the other two pieces were not put firmly in place until the second half of the twentieth century. SPENCER R. WEART, THE DISCOVERY OF GLOBAL WARMING 3–6 (Harvard Univ. Press rev. and expanded ed. 2008). In 1960, based on sustained monitoring, David Keeling showed that the atmospheric concentration of CO_2 was steadily rising, and groups in the United States and Great Britain assembled records of global average temperatures for the first time around 1980. *Id.* at 34–37, 116–18.

73. Ctr. for Biological Diversity v. Nat'l Highway Transp. & Safety Admin., 538 F.3d 1172, 1192 (9th Cir. 2008).

74. *Id.* at 1200.

75. SOCIAL COST OF CARBON, *supra* note 45.

stated that CO_2 is an "air pollutant" within the meaning of Section 302(g) of the CAA and therefore subject to regulation under that act.[76] No EPA action followed, probably because CAA-based regulation would not lend itself to the kind of regional or national cap-and-trade favored by the Clinton administration.[77]

The following year a group of environmental and renewable energy organizations filed a rulemaking petition asking the EPA to regulate motor vehicle greenhouse gas emissions under Section 202(a)(1) of the CAA.[78] The EPA took no official action on the petition for more than a year. During that time Governor Bush defeated Vice President Gore. Following the election, and eight days before the Bush inauguration, the EPA issued a request for comments on the petition.[79]

The Clinton EPA could request comments, but the Bush EPA would receive and evaluate them. In September 2003 the EPA denied the petition on the grounds that it lacked legal authority to issue the requested regulations and that, even if it did have the authority, it could decline to exercise it due to the uncertainty of the science and the ineffectiveness of a regulation limited to domestic vehicle emissions.[80]

A coalition of states and environmental groups appealed the denial to the D.C. Court of Appeals. Two members of the panel that heard the case had been appointed by Republican presidents and voted to uphold the denial.[81] The third panel member, appointed by President Clinton, dissented.[82]

The Supreme Court granted certiorari. It could be expected that the Court's four liberal justices would vote to reverse the Court of Appeals and its four most conservative Justices would vote to affirm it. The outcome therefore was likely to depend on the vote of Justice Kennedy.

76. Memorandum from Jonathan Z. Cannon, General Counsel, EPA, to Carol M. Brown, Administrator, EPA, at 2 (Apr. 10, 1998) (on file with author).

77. *See id.* at 2, 5.

78. Control of Emissions From New and In-use Highway Vehicles and Engines, 66 Fed. Reg. 7486 (Jan. 23, 2001).

79. *See id.* The request itself is dated January 12, 2001. *Id.* at 7487.

80. Control of Emissions From New and In-use Highway Vehicles and Engines, 68 Fed. Reg. 52,922–33 (Sept. 8, 2003).

81. Massachusetts v. EPA, 415 F.3d 50 (D.C. Cir. 2005).

82. *Id.* at 51.

In this case, Justice Kennedy joined the liberals, giving reversal a 5-4 majority.[83] The majority found that motor vehicle greenhouse gas emissions are an "air pollutant" and therefore subject to EPA regulation if the agency judges they "may reasonably be anticipated to endanger public health or welfare."[84] If the emissions fall under the agency's jurisdiction, it is required to regulate them; it cannot decline to do so merely because it believes that regulation would be unwise.[85]

The majority recognized that the EPA has broad discretion in determining the form of regulation,[86] and on remand, the agency might have responded with a light regulatory touch. Instead, it ran out the clock for the remaining months of President Bush's second term, leaving the response to an agency that would be shaped by the winner of the 2008 presidential election.

The implications of a victory by Senator McCain were unclear: in 2003, and again in 2005 and 2007, he had co-sponsored bills that would have established a cap-and-trade regime,[87] but since then he had at least become less vocal in support of broad federal action. There was, on the other hand, no doubt about the implications of an Obama victory: he had addressed the climate change issue as early as 2006, [88] and the issue figured prominently in the 2008 Democratic Party platform.[89]

Vehicle emissions were the EPA's first important target. At the end of 2009 it published the two findings required for

83. Massachusetts v. EPA, 549 U.S. 497 (2007).

84. *Id.* at 528 (quoting 42 U.S.C. § 7521(a)(1)).

85. *Id.* at 532–33.

86. *Id.* at 533.

87. *See supra* note 12 and accompanying text.

88. Barack Obama, Senator, Speech on Energy Independence and the Safety of Our Planet (Apr. 3, 2006), *available at* http://www.obamaspeeches.com/060-Energy-Independence-and-the-Safety-of-Our-Planet-Obama-Speech.htm.

89. The Democratic Party platform devoted a separate section to climate change, in addition to referring to it in connection with other issues such as energy security. *See* John Woolley & Gerhard Peters, *2008 Democratic Party Platform*, THE AM. PRESIDENCY PROJECT (Aug. 25, 2008), http://www.presidency.ucsb.edu/ws/?pid=78283. A week later the Republican Party platform also referred to climate change, but less prominently and with a caution "against the doomsday climate change scenarios peddled by the aficionados of centralized command-and-control government." John Woolley & Gerhard Peters, *2008 Republican Party Platform*, THE AM. PRESIDENCY PROJECT (Sept. 1, 2008), http://www.presidency.ucsb.edu/ws/?pid=78545.

regulating the emissions: that they contribute to air pollution, and that the pollution may reasonably be anticipated to endanger public health and welfare.[90] Based on those findings, the following year the EPA joined with the National Highway Traffic Safety Administration in issuing regulations that not only established new and more demanding fuel economy standards—CAFÉ standards—but also limited tailpipe emissions of CO_2.[91]

The EPA then turned to power plants. In September 2013 it proposed regulation of CO_2 emissions from new stationary sources including power plants.[92] Regulations for existing stationary sources are promised by mid-2014.[93]

Beyond 2014, however, looms another presidential election and the risk of an EPA less inclined to act vigorously—or perhaps to act at all—to reduce greenhouse gas emissions. And running continuously for at least the next several years is the risk of judicial reversal. These risks are the unavoidable consequences of legislative paralysis—or, rather, they are the consequences that could be avoided only by adding administrative inaction to Congressional inaction.

VI. ACHIEVABLE REDUCTIONS AND THEIR COST

The Climate Action Plan may survive judicial challenges; the White House may continue to be occupied by administrations supportive of its goals. Two problems would remain: the limited reductions that can be achieved, and the cost of those reductions. Both stem from the fragmented nature of a climate policy based on existing laws.

The standard of comparison is a broad cap-and-trade regime. Such a regime can achieve larger reductions because it can obtain them from a larger share of the economy. Agriculture and forestry are the only sectors that are beyond its direct reach, and even in those sectors reductions can be promoted by carbon

90. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009) (to be codified at 40 C.F.R. ch. 1).

91. Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule, 75 Fed. Reg. 25,324 (May 7, 2010) (to be codified at 40 C.F.R. pts. 531, 533, 536, 537, 538) [hereinafter Light-Duty Greenhouse Gas Emission Standards].

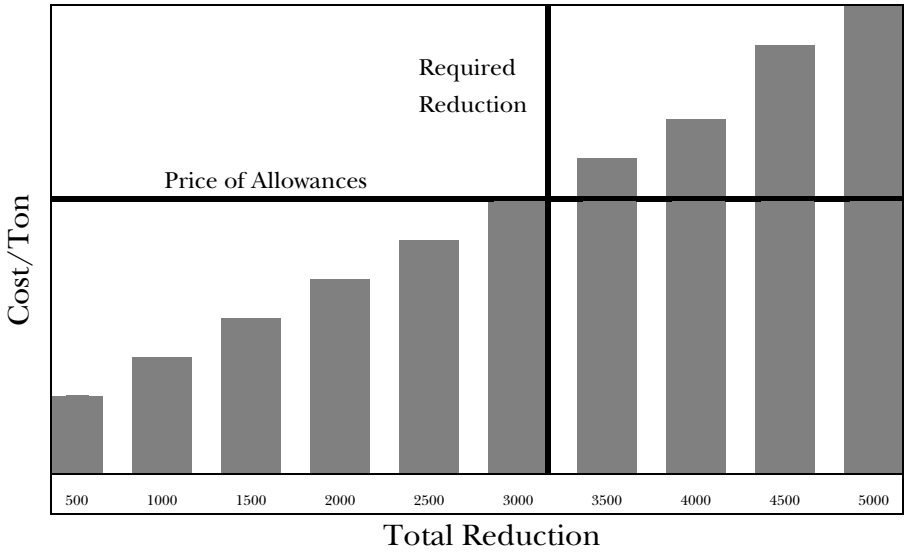
92. *See supra* note 7.

93. *See supra* note 8 and accompanying text.

offsets.[94] California's cap-and-trade regime is projected eventually to cover eighty-five percent of the state's emissions.[95] Even the most expansive—and riskiest—interpretation of existing law cannot reach so far.

Reductions are cheaper under a cap-and-trade regime because the regime creates an incentive to select the least expensive alternatives for achieving them. If we could identify those alternatives, we could arrange them like the bars in Figure 1. For simplicity, the figure assumes that each alternative could reduce emissions by five hundred million tons. It also assumes a reduction of three billion tons is required in order to comply with a cap; this requirement is represented by the vertical line in the graph. (As discussed below, the horizontal line represents the price of emission allowances in the secondary market.

Figure 1. Reducing Emissions under Cap-and-Trade



To minimize the cost of compliance, reductions must be made using the alternatives to the left of the vertical line. This involves two tasks: identifying those alternatives, and using them to reduce emissions. Cap-and-trade leaves both tasks to the

94. *See supra* note 20 and accompanying text.

95. CÉCILE GOUBET, CDC CLIMATE RES., THE FUTURE CALIFORNIAN CARBON MARKET REVEALED (2011), *available at* http://www.cdcclimat.com/IMG//pdf/11-12_climate_brief_9__the_future_californian_carbon_market_revealed.pdf.

companies responsible for the emissions. Each company is free to assess its costs and to decide what to do. However, the costs it must weigh in making that decision include the price of emission allowances in the secondary market. If the price is higher than the cost of reducing emissions, it has an incentive to reduce them in order to avoid buying allowances—or in order to sell allowances it already holds. If the price is lower than the cost, it has an incentive to buy rather than reduce.

The reductions that are made—and the ones that are not made—are thus determined by the price of allowances in the secondary market. That price, like the price in any market, depends on supply and demand. The supply consists of the alternatives for reducing emissions represented by the bars in Figure 1. The demand is the need for reductions represented by the figure's vertical line.

As in any market, the point where supply matches demand establishes the price, represented in the figure by the horizontal line. At that price, alternatives to the left of the vertical line are made because their cost is lower than the price; to the right of the line, cost exceeds price and reductions are not made.

The real world is less perfect. Companies may misestimate the cost of reducing emissions or their projection of future allowance prices may prove to be wrong. But a cap-and-trade regime does two things: it leaves the task of identifying the lowest-cost alternatives to the parties that are in the best position to perform it, and it creates an incentive for those parties to act on that identification. And it does these things in a consistent way for all of the economic sectors covered by the cap-and-trade regime. The price of allowances, and therefore the incentive, is the same for an oil refinery as for an electricity generator, and the same for a steel maker as for a producer of cement.

This cost-minimization incentive is independent of the magnitude of the required emission reduction. In Figure 1, the alternatives used would have been different if the required reduction had been two million tons or four million—or if they had equaled the reductions achievable by the Climate Action Plan. In each case, however, the market price of allowances would have created an incentive to achieve the reduction at the lowest possible cost.

The Climate Action Plan does not, and could not, do this. Some elements of the plan are directed at means rather than

ends. For example, federal agencies have been directed to acquire twenty percent of their electricity from renewable sources.[96] This mandate will almost certainly reduce emissions, but the amount of the reduction will depend on the generation the renewables displace. Only by chance will the reduction be achieved at the lowest possible cost.

Regulation under the CAA does not suffer from this problem. Because greenhouse gases now are classified as air pollutants,[97] the EPA can regulate them directly. By the structure and requirements of the statute, however, each category of emission source is a world in itself. The analysis that led to the regulation of vehicle tailpipe emissions differed from the analysis that supported the regulation of emissions from new stationary sources, and both differed from the analysis underlying the regulation of microwave ovens.[98] The light-duty vehicle and microwave rules both referred to the social cost of carbon, but both found that the regulation's benefits exceeded its costs without consideration of climate benefits.[99] The new source rule had no need to refer to the social cost of carbon because EPA found that the regulation would not have a significant impact.

A more aggressive regulation of greenhouse gases would go beyond what can be justified by non-climate benefits. The social cost of carbon then would place an upper limit on the compliance costs that could be justified. Even then, however, it would not by itself unify the weighing of costs and benefits below that limit. Cap-and-trade does not minimize the cost of emission reductions by equalizing the reductions made by each activity or even by equalizing the average cost per ton that each activity bears. It does so by equalizing the *marginal* cost of reductions—the cost of the last ton of reduction for each activity. To match this without legislation would require creation of a nationwide cap-and-trade system under the CAA. It also would require the system's survival

96. *See supra* note 9 and accompanying text.

97. *See* Standards of Performance, *supra* note 7, at 17–18.

98. *See* Energy Conservation Program: Energy Conservation Standards for Standby Mode and Off Mode for Microwave Ovens, 78 Fed. Reg. 36,316, 36,318 (June 17, 2013) (to be codified at 10 C.F.R. pts. 429, 430) ; Light-Duty Vehicle Greenhouse Gas Emission Standards, *supra* note 91, at 25,342–48; Standards of Performance, *supra* note 7, at 343–44.

99. *See* Energy Conservation Program: Energy Conservation Standards for Standby Mode and Off Mode for Microwave Ovens, 78 Fed. Reg. at 36,318; Light-Duty Vehicle Greenhouse Gas Emission Standards, *supra* note 91, at 25,342–48.

against judicial challenge and shifting political control. In comparison, the political transformation required for broad national climate legislation may seem a realistic hope.

VII. CONCLUSION

An effective response to global warming must be governmental and national. It must be governmental because the market by itself takes no account of the greenhouse gas emissions that are the cause of the warming. The cost of those emissions is an externality—a cost that is not borne by the companies and individuals responsible for the emissions and therefore unlikely to be considered in their actions. As cap-and-trade illustrates, markets can minimize the cost of the response, but only if the government puts its thumb on the scale.

The response must be national because the externality is global, and national governments are the only practical vehicles for negotiating broad international cooperation. States can play a role but that role is limited by ideology and the economics of climate change.

Today, however, this logic confronts the fact of legislative paralysis. A federal response still is possible, but only in the form of administrative actions based on existing laws. Such actions are both more vulnerable and less cost-effective than legislation like Waxman-Markey. But broad federal climate legislation—and, indeed, perhaps any federal climate legislation—is not on today's menu. The alternative to an imperfect administrative response is no response at all.