Getting Warmer: California and Massachusetts Spark a Global Warming Revolution

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I. INTRODUCTION

In 2007, the Intergovernmental Panel on Climate Change (IPCC) published its Fourth Assessment Report, finding that the "[w]arming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level."[1] The IPCC further found that "[o]bservational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases."[2] That our planet is warming to the detriment of all living species is now undisputed. Scientific data overwhelmingly support the notion that global greenhouse

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1. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT 1 (2007).

2. *Id.* (footnote omitted).

gas (GHG) emissions are a major cause of the earth's warming.[3] The IPCC's report ominously concluded that "[t]here is high agreement and much evidence that [even] with current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades."[4] Despite that forecast, the IPCC's message was not entirely bleak. Citing the wide array of available adaptation technologies and evidence of the substantial economic potential for the mitigation of global GHG emissions, the report concluded that adaptation and mitigation "can complement each other and together can significantly reduce the risks of climate change."[5]

California and Massachusetts have effected a paradigm shift in state-based approaches to GHG emissions by passing comprehensive global warming statutes that prescribe both adaptation and mitigation to reduce emissions substantially. Building from the United States Environmental Protection Agency's (EPA) success with emissions trading to reduce acid deposition and lessons from previous state-based emissions trading initiatives, California has fashioned a comprehensive cap-and-trade program that is the centerpiece of a broad statutory scheme designed to reduce the state's GHG emissions to 1990 levels by 2020.[6] Similarly, Massachusetts has promulgated detailed emissions reporting and certification measures that will help the state achieve a 2020 emissions level that is twenty-five percent below its 1990 level.[7] This Comment will explore each state's statute and describe some of the emissions reductions measures the states have already begun to develop and implement. Finally, the Comment will conclude by suggesting how other states and the federal government can model their own GHG emissions reductions efforts on the California and Massachusetts statutes.

II. BACKGROUND: COOPERATIVE FEDERALISM

While federal legislation is the primary driver for environmental regulation, creative state efforts have long spurred substantive change at

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3. *See, e.g.*, *id.* at 3.1.
4. *Id.* (emphasis omitted).
5. *Id.* at 5.3.
6. AIR RES. BD., CAL. ENVTL. PROT. AGENCY, PROPOSED REGULATION TO IMPLEMENT THE CALIFORNIA CAP-AND-TRADE PROGRAM pt. 1 (2010), *available at* http://www.arb.ca.gov/regact/2010/capandtrade10/capisor.pdf [hereinafter CAL. CAP-AND-TRADE PROGRAM].
7. *See Overview of the Global Warming Solutions Act (GWSA)*, MASS. DEP'T OF ENVTL. PROT., http://www.mass.gov/dep/air/climate/gwsa.htm (last visited Mar. 30, 2011).

the local and national level.[8] Currently, "cooperative federalism" is the predominant approach to federal-state interaction under the various federal environmental statutes.[9] This model encourages federal legislators to construct a "floor" upon which states may adopt more stringent regulatory schemes that reflect their individual environmental concerns and political climates.[10] Congress has repeatedly chosen to preempt only state laws that are weaker than their federal counterparts to preserve state autonomy and prevent a nationwide "race-to-the-bottom."[11]

The Clean Air Act (CAA) is the principal federal statute for regulating airborne pollutants. The CAA grants the states broad discretion to fashion unique emissions reduction measures that meet the EPA's National Ambient Air Quality Standards (NAAQS).[12] While the EPA develops national standards that "protect the public health," the CAA enables the states to adopt more stringent controls on stationary sources.[13] Further, recognizing California's historical leadership in curbing air pollution, the CAA enables California to petition the EPA for a waiver when it determines that more stringent tailpipe emissions controls are necessary to combat air pollution problems.[14] Once the EPA has granted a waiver, any other state is free to adopt standards that are no less stringent than to those adopted by California.[15]

III. THE CALIFORNIA GLOBAL WARMING SOLUTIONS ACT

California has long been a climate change pioneer. In 1988, years before definitive scientific research explained the link between GHG emissions and climate change, the state legislature passed a measure directing the California Energy Commission to study global warming impacts on the state and develop an inventory of GHG sources.[16] By 2000, a program was established to permit companies, cities, and government agencies to record their GHG emissions voluntarily for a

8. ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 115 (6th ed. 2009).

9. *Id.* at 116.

10. WILLIAM ANDREEN ET AL., CTR. FOR PROGRESSIVE REFORM, COOPERATIVE FEDERALISM AND CLIMATE CHANGE: WHY FEDERAL, STATE, AND LOCAL GOVERNMENTS MUST CONTINUE TO PARTNER (2008).

11. *Id.* at 6.

12. *Id.* at 8-9.

13. Clean Air Act §§ 109(b)(1), 209(b), 42 U.S.C. §§ 7409(b)(1), 7543(b) (2006).

14. ANDREEN ET AL., *supra* note 10, at 9.

15. *Id.* at 9-10.

16. Assem. B. 4420 (Cal. 1988).

potential program that would credit GHG emissions reductions.[17] In 2003, California joined with Washington and Oregon to create the West Coast Global Warming Initiative, demonstrating the state's commitment to region-wide climate change efforts.[18] Finally, Governor Schwarzenegger signed Executive Order S-3-05 in 2005, which called for the state to reduce GHG emissions to 1990 levels by 2020 and to reduce GHG emissions to eighty percent below 1990 levels by 2050.[19]

In 2006, Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006 (CGWSA).[20] The CGWSA, authored by Assembly Speaker Fabian Nuñez, was the first effort by a state legislature to counter the myriad threats posed by global warming through a single comprehensive statute.[21] Under California's existing law, responsibility for the control of GHG emissions was delegated to three distinct state agents: the State Air Resources Board (Board), the State Energy Resources Conservation and Development Commission, and the California Climate Action Registry.[22] Further, under California's pre-CGWSA scheme, the Secretary for Environmental Protection was required to coordinate emissions reductions of GHGs and climate change activity within the state.[23] The CGWSA substantially changed this arrangement by making the Board the primary vehicle for implementing and enforcing California's new global warming statute.[24]

Recognizing that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California," the California legislature enacted the CGWSA to abate GHG emissions by establishing demanding emissions limits and adopting rules to achieve the maximum technologically feasible and cost-effective GHG reductions.[25] Acknowledging the potential economic effect of unrestrained GHG emissions, the legislature found that "[g]lobal warming will have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry."[26] By investing

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17. CAL. AIR RES. BD., CLIMATE CHANGE SCOPING PLAN: A FRAMEWORK FOR CHANGE 1, 4 (2008).
18. *Id.*
19. *Id.*
20. *Assembly Bill 32: Global Warming Solutions Act*, CAL. AIR RES. BD., http://www.arb.ca.gov/cc/ab32/ab32.htm (last visited Mar. 30, 2011).
21. Legis. Digest to Assem. B. No. 32, 2010 Leg. Reg. Sess.
22. *Id.*
23. *Id.*
24. *See id.*
25. CAL. HEALTH & SAFETY CODE §§ 38501(a), 38550, 38560 (2010).
26. *Id.* § 38501(b).

in the development of "innovative and pioneering" technologies, the CGWSA works to protect and promote California's existing industries while spurring economic growth and job creation in a burgeoning new "green" economy.[27]

A. Reporting and Verification Mandate

The CGWSA's substantive provisions outline the Board's important new responsibilities. The first responsibility is a twofold requirement that the Board adopt regulations that require the reporting and verification of statewide GHG emissions while simultaneously monitoring and enforcing compliance with the emissions levels established by the statute.[28] The reporting requirement pragmatically targets those sources or categories of sources that contribute most to statewide emissions. Accordingly, the most severe emitters are the first to adhere to the statute's reporting mandate. The CGWSA takes an aggressive stance towards all emissions sources, as evidenced by section 38530(b)(2).[29] This provision demands that the Board "[a]ccount for greenhouse gas emissions from all electricity consumed in the state, including transmission and distribution line losses from electricity generated within the state or imported from outside the state."[30] Further, the statute requires that the Board periodically review and update its emissions reporting requirements while streamlining and unifying state, federal, and international emissions reporting efforts.[31]

Beyond mandating the regular reporting of GHG emissions, the CGWSA establishes an aggressive cap for California's emissions level to be achieved by 2020. The statute requires that the Board, "after one or more public workshops, with public notice . . . and . . . comment," determine California's 1990 statewide emissions level and then set an emissions limit for the year 2020 to match that figure.[32] The statute also delegates authority to the Board to make recommendations to the governor and legislature on how to continue to reduce GHG emissions beyond 2020.[33]

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27. *Id.* tit. 17, § 38501(e).
28. *Id.* tit. 17, § 38530(a).
29. *Id.* tit. 17, § 38530(b)(2).
30. *Id.*
31. *Id.* tit. 17, § 38530(c).
32. *Id.* tit. 17, § 38550.
33. *Id.* tit. 17, § 38551(c).

B. Discrete Early Actions

To achieve GHG emissions reductions, the CGWSA first charged the Board to publish a list of "discrete early action [DEA] greenhouse gas emission reduction measures" to help spur emissions reductions through basic techniques in advance of more comprehensive regulations.[34] The legislature then gave the Board a three-year window to adopt regulations that would help implement the DEAs. These regulations were required to achieve the "maximum technologically feasible and cost-effective reductions" from the sources or categories of sources identified by the Board as GHG emitters.[35] In September 2007, the Board approved a list of nine DEAs to be implemented on or before January 1, 2010.[36] The first DEA targeted nitrogen oxide and diesel particulate matter emissions from container vessels, passenger vessels, and refrigerated cargo vessels docked at California ports.[37] Accordingly, the Board promulgated regulations requiring ships harnessing synchronous power transfer processes when changing from vessel-based power to shore-based power to use a maximum of three hours of auxiliary diesel engine per berth visit.[38] Ships using the nonsynchronous power transfer process would be limited to five total hours per berth visit.[39] The Board predicts that this DEA will account for a reduction of .2 million metric tons of carbon dioxide equivalent by 2020.[40]

The Board also approved a long-term effort to reduce the presence of compounds with high global warming potential (GWP) in consumer products.[41] This measure represents a small part of a comprehensive "Consumer Products Program."[42] Targeting pressurized containers that utilize nitrous oxide (N_2O) and hydrofluorocarbon propellant products, the initiative produced a June 2008 amendment to the California Consumer Protection Regulation that prohibits the sale, supply, "or manufacture for use in California any Pressurized Gas Duster product that contains methylene chloride, perchloroethylene, or any chemical

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34. *Id.* § 38560.5(a).
35. *Id.*
36. CAL. AIR RES. BD., *supra* note 17, at 5.
37. CAL. CODE REGS. tit. 17, § 93118.3(a) (West 2011).
38. *Id.* tit. 17, § 93118.3(d)(1)(D)(1)(a).
39. *Id.* tit. 17, § 93118.3(d)(1)(D)(1)(b).
40. CAL. AIR RES. BD., SCOPING PLAN MEASURE IMPLEMENTATION TIMELINE (2010), *available at* http://www.arb.ca.gov/cc/scopingplan/sp_measures_implementation_timeline.pdf.
41. "'[GWP]' means the radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of carbon dioxide over a given period of time." CAL. CODE REGS. tit. 17, § 94850(a)(75).
42. *See id.* tit. 17, §§ 94500-94575.

compound that has a [GWP] value of 150 or greater."[43] The provision became effective on December 31, 2010. The Board anticipates that this single measure will eliminate .23 million metric tons of carbon dioxide equivalent by 2020.[44]

In December 2008, the Board adopted new regulations pursuant to a third DEA aimed at reducing greenhouse gas emissions by improving the fuel efficiency of heavy-duty tractors that pull fifty-three-foot or longer box-type trailers.[45] Recognizing that California's transportation sector is the leading source of GHG emissions in the state, with heavy-duty trucks accounting for approximately twenty percent of those emissions,[46] the Board approved a regulation that requires tractors over fifty-three feet in length to be U.S. EPA SmartWay Certified Tractors using tires that harness SmartWay Verified Technologies.[47] On December 17, 2010, the Board responded to public comment lamenting the adverse economic impact the regulation was having on California's economy by suggesting a number of amendments to help ease the regulation's economic burden while still encouraging long-term GHG reductions.[48] These amendments included exemptions from the aerodynamic and tire requirements for storage trailers and an extension of the compliance date for retrofitting 2010 and previous model year tractors and low rolling resistance tires until January 1, 2013.[49]

From January through June 2009, the Board approved regulations for the six remaining DEAs.[50] Perhaps the most significant was a new Low Carbon Fuel Standard designed to lower "greenhouse gas emissions by reducing the full fuel-cycle, carbon intensity of the transportation fuel pool used in California."[51] The regulation targets a swath of transportation fuels from standard reformulated gasoline to diesel fuel, fossil compressed or fossil liquefied natural gas, biogas, electricity, compressed or liquefied hydrogen, denatured fuel ethanol, neat biomass-based diesel, and a number of fuel blends.[52] Ultimately, the new Low Carbon Fuel Standard will effect a ten percent reduction in the average

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43. *Id.* tit. 17, § 94509(r)(1); *Greenhouse Gases in Consumer Products*, CAL. AIR RES. BD., http://www.arb.ca.gov/consprod/regact/ghgcp/ghgcp.htm (last visited Mar. 23, 2011).

44. CAL. AIR RES. BD., *supra* note 40, at 1.

45. CAL. CODE REGS. tit. 17, § 95300.

46. CAL. AIR RES. BD., RESOLUTION 10-46, at 2 (2010), *available at* http://www.arb.ca.gov/regact/2010/truckbus10/reso1046.pdf [hereinafter RESOLUTION 10-46].

47. CAL. CODE REGS. tit. 17, § 95303.

48. RESOLUTION 10-46, *supra* note 46, at 3.

49. *Id.* at 3-4.

50. CAL. AIR RES. BD., *supra* note 17, at 29.

51. CAL. CODE REGS. tit. 17, § 95480.

52. *Id.* tit. 17, § 95480.1.

carbon intensity of gasoline, diesel fuel, and their substitutes by 2020.[53] The Board projects this reduction will decrease California's overall GHG emissions by sixteen million metric tons of carbon dioxide equivalent by 2020.[54]

C. California Air Resources Board Climate Change Scoping Plan

Integral to the CGWSA is a provision that invests the Board with scoping authority for the implementation of the statute's broad emissions reduction mandate. The Climate Change Scoping Plan (CCSP) was commissioned to identify specific "emission reduction measures, alternative compliance mechanisms, market-based compliance mechanisms, and potential monetary and nonmonetary incentives for" emissions sources "to facilitate the achievement of the maximum feasible and cost-effective reductions of greenhouse gas emissions by 2020."[55] In developing the scoping plan, the CGWSA instructs the Board to comply with a number of key directives. First, the Board must consider GHG emissions programs in other states, localities, and nations, including the European Union.[56] Further, the Board must "evaluate the total potential costs and total potential economic and noneconomic benefits of the plan for reducing greenhouse gases to California's economy, environment, and public health."[57] The Board must also harness "the best available economic models, emission estimation techniques, and other scientific methods" to meet this requirement.[58] Finally, CGSWA directs the Board to consider the relative contribution of each source or source category and the potential for adverse effects on small businesses.[59] It also requires the Board to solicit public comment through a series of community workshops targeted at regions that experience the most significant exposure to emissions, including communities with minority and low-income populations.[60] Ultimately, the Board set a de minimis threshold of GHG emissions below which emission reduction requirements would not apply.[61]

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53. CAL. AIR RES. BD., *supra* note 17, at 46. "'Carbon intensity' means the amount of lifecycle greenhouse gas emissions, per unit of energy of fuel delivered, expressed in grams of carbon dioxide equivalent per megajoule (gCO2E/MJ)." CAL. CODE REGS. tit. 17, § 95481(a)(11).

54. CAL. AIR RES. BD., *supra* note 40, at 1.

55. CAL. HEALTH & SAFETY CODE § 38561(b) (2010).

56. *Id.* § 38561(c).

57. *Id.* § 38561(d).

58. *Id.*

59. *Id.* § 38561(e).

60. *See id.* § 38561(g).

61. CAL. AIR RES. BD., *supra* note 17, at 96-97.

In December 2008, the Board published the CCSP in accordance with the CGWSA. The CCSP explained that reducing California's GHG emissions to 1990 levels by 2020 would require an emissions reduction from about fourteen tons of carbon dioxide equivalent per person to about ten tons per person.[62] Embracing this challenge as a "magnificent opportunity to transform California's economy into one that runs on clean and sustainable technologies," the Board proceeded to detail its recommendations for achieving such a goal.[63] The measures suggested by the CCSP would be implemented through the Board's rulemaking capacity or the authority of other state agencies.

D. GHG Emissions Trading: Cap-and-Trade

The CCSP outlines a broad-based California cap-and-trade program that sets a firm limit on statewide emissions.[64] As the Board explains, "[a] cap-and-trade program sets the total amount of greenhouse gas emissions allowable for facilities under the cap and allows covered sources, including producers and consumers of energy, to determine the least expensive strategies to comply."[65] On October 28, 2010, the Board published a staff report explaining the specific provisions and objectives of the cap-and-trade program.[66]

In California's proposed program, a fixed cap will be placed on the overall GHG emissions produced by targeted sectors that account for roughly eighty-five percent of California's aggregate GHG emissions.[67] The state will then issue allowances equal to the cap.[68] Emissions sources that fall under the cap are required to turn in allowances equal to their emissions at the conclusion of each compliance period. The economic incentive for sources that aggressively reduce their emissions is clear; the program permits them to sell their surplus allowances to other firms that cannot achieve the same reductions, thus creating market demand for the most cost-effective reduction methods. The Board suggests that "[c]reating a market provides more flexibility than direct regulation can, and it also provides incentives that can spur local investment and the use of green technologies."[69] To encourage the

62. *Id.* at ES-1.
63. *Id.*
64. *Id.* at 30-38.
65. *Id.* at 30.
66. CAL. CAP-AND-TRADE PROGRAM, *supra* note 6.
67. *Id.* at I.
68. *Id.* at ES-2.
69. *Id.* at II-2.

maximum feasible emissions reductions in the program's infancy, the Board will distribute allowances to firms for free during the first year.[70]

The cap-and-trade program establishes a pragmatic phasing-in process that separates emissions sectors into two distinct compliance periods.[71] The first compliance period, which begins in 2012, targets electricity generators, including electricity imported from outside California, and large industrial sources with GHG emissions at or above 25,000 metric tons of carbon dioxide equivalent ($MTCO_2e$). The second compliance period commences in 2015 and expands the program to include fuel distributors to cover emissions associated with the combustion of gasoline, diesel, natural gas, and propane from sources with emissions below 25,000 $MTCO_2e$, including all commercial, residential and small business sources. The second compliance period further includes all fuels used for transportation.

The total GHG emissions cap for 2012 will be set at 165.8 million $MTCO_2e$.[72] Subsequently, the cap will decline between 2013 and 2015 to encourage emissions reductions. In 2015, the second compliance period will commence, adding fuel suppliers to the list of capped sources. The Board has set a preliminary 2015 cap at 394.5 million $MTCO_2e$. By 2020, the Board hopes to reduce the cap to 334.2 million $MTCO_2e$, a figure that will help California achieve the 2020 emissions limit set out in the CGWSA. The Board readily acknowledges that properly setting the emissions cap level is "critical to the environmental effectiveness of the cap-and-trade program."[73] The Board's limit must effectively balance myriad competing interests. Ideally, the Board's cap will prove sufficiently stringent to compel emissions reductions. However, an overly stringent cap will likely frustrate the business objectives of the regulated industry by creating unacceptably high allowance prices. Conversely, a high baseline cap will flood the market with cheap allowances and discourage businesses from implementing cost-saving technologies.

The Board undoubtedly drew from the experience of other state-based emissions trading programs when it formulated its current program. Since the early 1990s, the South Coast Air Quality Management District (SCAQMD), whose jurisdiction includes the heavily polluted Los Angeles Air Basin, has been implementing a host of

70. *Id.* at II-1.
71. *Id.* at II-2-3.
72. *Id.* at V-3.
73. *Id.* at II-3.

trading mechanisms to reduce non-GHG emissions.[74] As opposed to writing specific regulations for existing sources, SCAQMD relies largely on a gradually declining cap-and-trade program to achieve reductions. One element of SCAQMD's plan is the "Regional Clean Air Incentives Market (RECLAIM), which allocates an annually declining number of emissions credits to each covered source."[75] Under the RECLAIM program, sources are precluded from emitting more pollution than the credits that they own. Thus, emitters can match their emissions to their allocated credits, emit less than their allotted credits and sell their remaining credits, or purchase additional credits for emissions that exceed their initial allocation.[76]

SCAQMD set its initial baseline for the declining cap-and-trade program based on the highest annual level of source emissions for the five years preceding RECLAIM's start date.[77] This decision would prove fateful for RECLAIM's early reductions. By adopting such a high initial baseline, emitters found it more economical simply to purchase allowances than actually install pollution control measures. While many of RECLAIM's early failures can be attributed to the miscalculated initial baseline, some scholars suggest that the lack of a banking scheme was an additional impediment to the program's success. Dallas Burtraw suggests, "[h]ad banking been allowed, sources with low-cost abatement options would have had an incentive to adopt them early and retain the allowances for future periods, even in the case where allocations were higher than the current demand for emissions."[78] As the EPA explains, "banking provides direct incentives for continual reductions by giving credit for over compliance; these credits . . . allow manufacturers to put technology improvements in place when they are ready for market, rather than being forced to adhere to a strict regulatory schedule that may or may not conform to industry developments."[79]

Environmentalists instructed the Board that the European Union's Emission Trading Scheme (EU ETS) was a further example of a failed system plagued by inaccurate emissions reporting data and a subsequent

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74. PERCIVAL ET AL., *supra* note 8, at 604.
75. *Id.*
76. *Id.* at 604-05.
77. *Id.* at 606.
78. *Id.* (quoting Dallas Burtraw et al., *Economics of Pollution Trading for SO2 and NOx* 37 (Resources for the Future Discussion Paper 05-05, 2005).
79. *Id.* (quoting Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,412 (2008)).

"over-allocation" of emissions allowances.[80] During that program's trial phase, caps were set without a comprehensive data set from the regulated emitters. As a result, a program that intended to reduce GHG emissions by four percent actually produced a surplus of allowances that resulted in a price crash in August 2006.[81] As the Board noted, the lack of a banking program also hindered EU ETS's efficacy.

When considering the initial cap for the GHG cap-and-trade program, the Board's intention was to "set a cap trajectory that would provide for a gradual GHG emission reduction path toward the 2020 target."[82] Thus, the Board determined that for the first compliance period, also termed the "narrow-scope cap," the initial allowance would be equal to that sector's projected emissions level for the year of the plan's implementation.[83] In 2015, the total number of allowances will increase as fuel suppliers are phased into the program to cover GHG emissions from distributed fuel use. To account for these emissions, the Board began with the reduced narrow-scope cap level projected for 2015 and then added an incremental increase equal to the fuel suppliers' projected emissions for 2014. The fuel suppliers' cap is further calibrated to reflect reductions within that sector produced by other CCSP measures.

The Board's proposed cap-and-trade plan calls for a nonrestrictive banking program that allows participants to hold spare allowances and use them for compliance in a later period.[84] In addition to the banking scheme, the cap-and-trade program proposes an offset measure that would allow participants to meet eight percent of their compliance obligation through emissions reductions not covered by the formal cap-and-trade program.[85] As the Board notes, "[o]ffsets provide additional low-cost abatement options to the program participants, and can reduce the costs of the program for covered entities."[86] Finally, the Board has proposed flexible sanctions to help force compliance. Specifically, the Board's Executive Officer will have the authority to "suspend, revoke, or place transaction restrictions on the [h]olding [a]ccounts of violators."[87]

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80. AIR RES. BD., CAL. ENVTL. PROT. AGENCY, PROPOSED REGULATION TO IMPLEMENT THE CALIFORNIA CAP-AND-TRADE PROGRAM: SETTING THE PROGRAM EMISSIONS CAP pt. 1, app. E, at E-1, E-7 (2010), *available at* http://www.arb.ca.gov/regact/2010/capandtrade10/capv3appe.pdf [hereinafter SETTING THE PROGRAM EMISSIONS CAP].

81. *Id.* at E-7-8.

82. *Id.* at E-5

83. *Id.* at E-6.

84. CAL. CAP-AND-TRADE PROGRAM, *supra* note 6, at II-39-40.

85. *Id.* at III-1.

86. SETTING THE PROGRAM EMISSIONS CAP, *supra* note 80, at E-11.

87. CAL. CAP-AND-TRADE PROGRAM, *supra* note 6, at II-49.

E. Sector Specific Initiatives

Beyond the comprehensive cap-and-trade program, the CCSP proposes a number of long-term GHG reduction measures that include the implementation of California's Pavley Light-Duty vehicle greenhouse gas standards (Pavley).[88] First adopted in 2002, Pavley "directed [the Board] to adopt vehicle standards that lowered greenhouse gas emissions to the maximum extent technologically feasible, beginning with the 2009 model year."[89] Part of the Pavley program calls for the introduction of zero-emissions vehicles to help reach the state's 2020 and 2050 emissions requirements. To help develop clean energy vehicle technologies, the Board administers the Air Quality Improvement Program, which provides approximately $50 million per year for grants to fund clean vehicle and equipment projects.[90]

Further, the state will adopt more stringent building and appliance standards to increase energy efficiency.[91] To achieve a goal of reducing statewide annual energy demands by 32,000 gigawatt hours, the Board will promulgate regulations that target industrial, agricultural, commercial, and residential end-users. Pursuant to the California Long Term Energy Efficiency Strategic Plan, the Board proposes more stringent building codes and appliance efficiency standards, broader standards for new types of appliances and for water efficiency, and new financing strategies to encourage owners to retrofit existing buildings with renewable energy sources.

The CCSP also lays out an aggressive strategy to increase California's current twelve percent Renewables Portfolio Standard (RPS) to thirty-three percent by 2020.[92] California's RPS seeks to promote the state's reliance on renewable energy sources. Renewable sources include wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas. The CCSP predicts an expansion of California's transmission line infrastructure and grid improvements to accommodate the integration of stable and intermittent renewable sources. The CCSP also contemplates a feed-in tariff for all RPS-eligible small-scale renewable energy facilities up to twenty megawatts in size to facilitate their rapid integration into the energy grid.

Additionally, the CCSP describes a number of other creative measures to facilitate California's transition to cleaner energy sources.

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88. CAL. AIR RES. BD., *supra* note 17, at 38-41.
89. *Id.* at 39.
90. *Id.* at 40-49.
91. *Id.* at 41-44.
92. *Id.* at 44-46.

As part of Governor Schwarzenegger's Million Solar Roofs Program, California has established a goal to install 3000 megawatts of new solar capacity by 2017.[93] One of the most significant reduction measures is the "Green Building Strategy."[94] Under this initiative, new and existing commercial buildings and homes will eventually reach a Zero Net Energy (ZNE) target. Ultimately, the "Green Building Strategy" will produce a twenty-six million metric ton reduction in carbon dioxide equivalent by 2020.

One unique challenge addressed by the CCSP is the containment and reduction of high GWP gases used in air conditioning systems, fire suppression systems, refrigeration units, and during insulation foam production. Typically contained in old refrigerators and air conditioners, these gases are released either through leakage or during the disposal process and persist in the atmosphere for tens or even hundreds of years.[95] The Board contemplates a multifaceted approach to reducing emissions from high GWP gases beginning with four measures introduced during the DEA phase. Those measures reduce refrigerant emissions from motor vehicle air conditioning systems, impose sulfur hexafluoride (SF_6) limits in nonutility and nonsemiconductor applications, reduce perfluorocarbons in semiconductor manufacturing, and limit high GWP use in consumer products. Future regulations will further reduce GHG emissions from mobile sources by mandating low GWP refrigerants for new motor vehicle air conditioning systems, initiating air conditioner refrigerant leak tests during vehicle smog checks, and encouraging refrigerant recovery from decommissioned refrigerated shipping containers. Stationary sources will be subjected to a refrigerant tracking, reporting, and repair deposit program and new specifications for commercial and industrial refrigeration systems.

Ultimately, the CGWSA uniquely demonstrates the advantages of a cooperative federalism model. Under the current system, California is free to regulate areas within its exclusive jurisdiction, including electric utilities, land use controls, agriculture, and building codes.[96] Further, California's flexibility to regulate mobile sources will allow the state to meet an aggressive GHG emissions reduction target by 2020. Not surprisingly, Massachusetts would soon follow suit with its own global warming statute.

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93. *Id.* at 53.
94. *Id.* at 57-59.
95. *Id.* at 59-61.
96. *See* ANDREEN ET AL., *supra* note 10, at 10-11.

IV. MASSACHUSETTS GLOBAL WARMING SOLUTIONS ACT

A. Background and Substantive Provisions

On August 7, 2008, Governor Deval Patrick signed into law the Massachusetts Global Warming Solutions Act (MGWSA).[97] MGWSA "requires the Executive Office of Energy and Environmental Affairs (EOEEA), in consultation with other state agencies and the public, to set economy-wide . . . (GHG) emission reduction goals" for the state.[98] The MGWSA mandates that the state's 2020 emissions level be ten to twenty-five percent below the state's aggregate 1990 emissions level. Further, the statute sets an aggressive goal to reduce 2050 emissions to eighty percent below the state's 1990 emissions level.

Much like the CGWSA, the MGWSA first requires the EOEEA to "monitor and regulate emissions of greenhouse gases with the goal of reducing those emissions."[99] The statute gives the EOEEA express authority to promulgate regulations that require both the reporting and verification of statewide GHG emissions. Further, the EOEEA must monitor and enforce compliance with the MGWSA's mandates. In June 2009, the EOEEA promulgated final regulations establishing a regional GHG registry and reporting system for GHG emissions sources.[100] The reporting requirement encompasses any facility that "has one or more stationary emission sources that collectively emitted greenhouse gases in excess of 5,000 short tons of greenhouse gases in carbon dioxide equivalents during the previous calendar year," or any facility that is regulated under Title V of the federal Clean Air Act and Massachusetts' Air Operating Permit Program.[101] The reporting provision demands that any regulated entity report and certify direct emissions of GHGs each year.[102] Further, motor vehicle emissions from vehicles that operate in support of a given facility "more often than they operate in support of any other facility" are subject to the statute's yearly reporting mandate.[103] Finally, retail sellers of electricity must also report yearly emissions, distinguishing between biogenic and nonbiogenic GHG emissions.[104]

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97. *Overview of the Global Warming Solutions Act (GWSA)*, MASS. DEP'T OF ENVTL. PROT., http://www.mass.gov/dep/air/climate/gwsa.htm (last visited May 3, 2011).

98. *Id.*

99. MASS. GEN. LAWS ch. 21N, § 2 (2010).

100. 310 MASS. CODE REGS. § 7.71(2) (2011).

101. *Id.* § 7.71(3)(a)(1)-(2).

102. *Id.* § 7.71(5)(a)(1)(a).

103. *Id.* § 7.71(5)(b).

104. *Id.* § 7.71(5)(g). "'Biogenic Greenhouse Gas Emissions' means emissions of carbon dioxide that result from the combustion of biogenic (plant or animal) material, excluding fossil fuels." *Id.* at 7.71(2) (emphasis omitted).

The MGWSA then directs the EOEEA to ascertain the baseline statewide GHG emissions level in 1990 and then "reasonably project what the emissions level will be in calendar year 2020 if no measures are imposed to lower emissions other than those formally adopted and implemented as of January 1, 2009."[105] This "business as usual" level will serve as a benchmark for the state to measure the Act's success. Most importantly, the MGWSA sets target GHG emissions reductions to be achieved by 2020. Again, MGWSA sets an aggressive emissions target that seeks to limit statewide emissions for 2020 to ten to twenty-five percent below the state's 1990 emissions level.[106]

To achieve the 2020 emissions limit, the MGWSA directs the EOEEA to analyze the feasibility of emission reduction measures.[107] Like California's statute, the MGWSA allows the EOEEA to consider market-based compliance mechanisms to achieve Massachusetts' aggressive emissions targets. While not expressly naming cap-and-trade, the statute suggests that the EOEEA adopt "monetary and nonmonetary incentives for sources and categories of sources."[108] Finally, the MGWSA is no paper tiger: the EOEEA has the authority to impose up to a $25,000 per day civil administrative penalty on any person who fails to comply with or otherwise violates the statute.[109]

B. Massachusetts Clean Energy and Climate Plan for 2020

On December 29, 2010, EOEEA Secretary Ian A. Bowles published a comprehensive report detailing the "clean energy revolution" that has commenced in Massachusetts.[110] Drafted pursuant to the MGWSA, this "Clean Energy and Climate Plan for 2020" (CECP) recognizes Massachusetts' growing "green" economy and outlines some of the unique measures the state will adopt to realize its 2020 emissions target. Specifically, the plan's "integrated portfolio of policies" proposes measures that target GHG emissions from buildings, electricity producers and consumers, transportation sources, and nonenergy sources.[111]

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105. MASS. GEN. LAWS ch. 21N, § 3(a) (2010).
106. *Id.* § 4(a).
107. *Id.* § 4(b).
108. *Id.*
109. *Id.* § 16.
110. MASS. OFFICE OF ENERGY & ENVTL. AFFAIRS, MASSACHUSETTS CLEAN ENERGY AND CLIMATE PLAN FOR 2020 (2010), *available at* http://www.mass.gov/Eoeea/docs/eea/energy/2020-clean-energy-plan.pdf [hereinafter MASSACHUSETTS CLEAN ENERGY AND CLIMATE PLAN FOR 2020].
111. *Id.* at 13-87.

The CECP identifies buildings as the source category with the greatest potential for GHG emissions.[112] Accounting for over fifty percent of the energy used in Massachusetts, the CECP calls for an expansion of the energy efficiency efforts mandated by the state's Green Communities Act (GCA) of 2008 to realize a 9.8% reduction in GHG emissions by 2020.[113] The GCA marked a shift in the way the state encourages the use of renewable energy and energy efficiency programs by increasing the competitiveness of energy efficiency with respect to direct procurement of additional power, assisting communities with economic aid for sustainable development, and increasing the proportion of renewable power purchased by the state.[114] The CECP notes that the state will invest over $2 billion through the GCA, with anticipated returns of over $6 billion while creating thousands of clean energy jobs.[115] Since 2007, the state has already added 4500 clean energy sector jobs and predicts an additional 42,000 to 48,000 jobs created by 2020.[116]

Pursuant to the CECP, the state will adopt an energy rating and labeling program for buildings that will provide the equivalent of the EPA's miles-per-gallon rating on cars and light trucks.[117] Further, the state will begin to offer incentive rebates to building owners who retrofit their buildings with higher levels of insulation and more energy-efficient windows to reduce air leakage.[118] The state also intends to expand efficiency programs to commercial and industrial heating oil, develop a market for solar thermal water and space heating in both residential and commercial buildings, and encourage tree planting around new housing developments to mitigate heating and cooling loads.[119]

The CECP next addresses potential GHG reductions in the electricity supply sector.[120] The plan recognizes the importance of the Massachusetts Renewables Portfolio Standard (RPS), a measure expanded by the GCA that requires retail electricity suppliers to buy a growing percentage of their electricity sales from renewable sources.[121] The CECP also identifies the EPA's pending power plant regulations as a source of future reductions.[122] Clean energy imports will account for the

112. *Id.* at 14.
113. *Id.* at 15, 91.
114. 3 ENVTL. LAW INST., LAW OF ENVIRONMENTAL PROTECTION § 22:61 (2010).
115. MASSACHUSETTS CLEAN ENERGY AND CLIMATE PLAN FOR 2020, *supra* note 110, at 15.
116. *Id.* at 4-7.
117. *Id.* at 23.
118. *Id.* at 26.
119. *Id.* at 15-16.
120. *See id.* at 37.
121. *Id.* at 38.
122. *Id.* at 39.

greatest GHG reductions in the electricity sector. Two Massachusetts utilities, NSTAR and Northeast Utilities Services Company, in partnership with Hydro Quebec and with the support of Governor Deval Patrick, are working to bring hydroelectric power to the state from Canada via a new transmission line. When completed, the line will bring enough clean energy to satisfy fifteen percent of Massachusetts' current electricity demand. This measure alone will help reduce Massachusetts' aggregate GHG emissions by 5.4% below the "business as usual" level by 2020.[123]

Significant reductions are also anticipated from regulations aimed at the transportation sector.[124] Some of the new initiatives proposed by the CECP include a host of clean car consumer incentives like variable sales and excise taxes that reward vehicles with superior fuel efficiency.[125] Further, the state hopes that lower light vehicle emissions standards and higher fuel efficiency standards for medium and heavy-duty vehicles, will generate GHG reductions. Finally, a Pay-As-You-Drive program, currently in the proposal stage, would encourage automobile insurance companies to convert a large fixed annual premium into a variable cost based on miles traveled, thus incentivizing reductions in discretionary driving.[126] Taken together, measures targeting the transportation sector should produce a 7.6% GHG emissions reduction by 2020.[127]

Finally, the CECP identifies a number of nonenergy emissions reductions sources and cross-cutting policies that would play a small but integral role in realizing the state's 2020 emissions target.[128] One measure borrowed from California's Board involves reducing GHG emissions from motor vehicle air conditioning.[129] This provision would reduce direct GHG emissions from motor vehicle air conditioning systems by using low GWP refrigerants and improving the efficiency of air conditioning compressors, fans, and motors. Further, the CECP describes a pilot program designed to reduce SF_6 emissions from leakages in gas insulated switchgear used in electricity transmission and distribution systems.[130] Finally, the MGWSA requires state agencies to consider climate change impacts when they issue permits.[131] The

123. *Id.* at 45.
124. *Id.* at 49-70.
125. *Id.* at 49.
126. *Id.* at 61-63.
127. *Id.* at 91.
128. *Id.* at 71-87.
129. *Id.* at 73-74.
130. *Id.* at 77-78.
131. *Id.* at 87.

EOEEA, in collaboration with other state agencies, aims to implement this requirement in selected state agencies.

V. ANALYSIS: TOWARDS A MODEL STATUTE

Admittedly, the threat of global warming will not be solved with a few state statutes. However, California and Massachusetts have accomplished a laudable feat by making global warming a tangible priority. Both the CGWSA and the MGWSA are impressive in their breadth and aggressive in their emissions targets. Couching GHG emissions reductions in terms of a new "clean energy economy" makes each state's promise of "green" jobs believable and attractive to their respective constituents. Both states took the pragmatic first step of assigning scoping power to their lead environmental agency. The scoping process helps facilitate a multisector approach that targets the major GHG emissions sources: electricity producers and suppliers, industrial, commercial, and residential buildings, mobile sources, and products with high GWP potential. Ultimately, the statutes are working blueprints that other states and the federal government could mimic to set and realize long-term GHG emissions reductions and begin to end this nation's dependence on foreign and domestic fossil fuels.

GHG emissions reporting and certification is the critical first stage to any global warming statute. Both the CGWSA and the MGWSA demand authenticated reporting statements from regulated emitters on an annual basis.[132] Accurate emissions figures allow the regulating agency to set a sufficiently stringent initial cap that avoids the "over-allocation" issues evidenced by the RECLAIM program and the EU ETS.[133] Once a reasonable cap has been set, market based compliance mechanisms should be harnessed to facilitate the most efficient GHG emissions reductions. Today, cap-and-trade programs are the EPA's preferred regulation method, particularly when applied to pollutants like GHGs that transcend state boundaries.[134] GHG cap-and-trade programs could be tailored to individual states or geographic regions to achieve the greatest reductions. California's proposed cap-and-trade program will eventually integrate into a regional program termed the Western Climate Initiative (WCI).[135] The WCI joins western states and Canada in a regional emissions trading program that could serve as the model for a federal

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132. CAL. HEALTH & SAFETY CODE § 38530(a) (2010); MASS. GEN. LAWS ch. 21N, § 2 (2010).

133. *See supra* text accompanying notes 74-80.

134. *See* CAL. CAP-AND-TRADE PROGRAM, *supra* note 6.

135. ANDREEN ET AL., *supra* note 10, at 16.

scheme that divides the nation into regional trading markets. Similarly, Massachusetts has signaled its commitment to multistate emissions trading by joining the Regional Greenhouse Gas Initiative (RGGI). The RGGI joins twelve Mid-Atlantic states in a regional cap-and-trade program for carbon emissions from electric power plants. The program encompasses sixteen percent of the U.S. population and, if commitments are met, would address ten percent of this country's GHG emissions. Again, federal aid would only bolster the efficacy of this initiative.

While a cap-and-trade or similar market-based program should be a critical element of any global warming statute, future statutes should adopt a broad reduction scheme that grants incentives to various sectors. The CECP's tax incentives for fuel-efficient vehicles and buildings are two examples of the MGWSA's multisector approach that targets stationary source emissions from electricity suppliers and consumers, mobile transportation sources, and new and existing industrial, commercial, and residential buildings.[136] Economic incentives for individuals and businesses who harness clean technologies are a great way to encourage emissions reductions. Finally, civil administrative penalties like the ones imposed by the Massachusetts legislature for noncompliance are essential. Significant penalties further encourage compliance and lend a degree of legitimacy to the scheme.

At the federal level, the EPA's recent decision to add GHGs to the list of regulated New Source Review pollutants should be applauded.[137] However, this is only a first step towards facilitating a culture shift within the federal government towards clean energy. Title IV of the CAA and the success of the federal cap-and-trade program for acid deposition should encourage federal officials that a cooperative federalism model can work for GHG emissions reductions.

VI. CONCLUSION

Climate change is the most pressing environmental issue facing this country. In the few years since they passed their respective statutes, both California and Massachusetts have devised impressive technological and regulatory approaches to help curb GHG emissions. These measures have begun a culture shift towards renewable, clean energy sources. Ultimately, the CGWSA and the MGWSA evidence proactive state efforts that would be impossible without the cooperative federalism

136. *See supra* text accompanying notes 110-131.

137. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31,514, 31,520 (June 3, 2010).

model. That model should continue to be harnessed to facilitate future state innovation.