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Climate Change Law in California and Massachusetts: Lessons for State Policymakers

*By Riti Chandiook**

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I. Introduction

This paper explores California's and Massachusetts' Global Warming Solutions Acts, the policy plans released by each state's lead regulatory agencies, and related laws that form each state's greenhouse gas regulatory framework. First, it examines California's renewable portfolio standard ("RPS") and Global Warming Solutions Act, including the legal battles California has faced in defending various aspects of its greenhouse gas regulation framework. Then, it discusses the laws comprising Massachusetts' greenhouse gas regulation framework, including the Regional Greenhouse Gas Initiative ("RGGI"), an agreement between several northeastern states to jointly limit their total greenhouse gas emissions. It will also examine legal hurdles RGGI has overcome. Finally, this paper sets forth elements critical to a greenhouse gas regulation framework using the early successes of California and Massachusetts as a model.

II. California

A. California's Renewable Portfolio Standard

In 2002, the California legislature established the state's first RPS, which required 20% of the energy from its investor-owned utilities to come from renewable sources by 2017.¹ In each of the following two years, the California Energy Commission ("CEC") published reports recommending acceleration of the RPS program to 33% by 2020.² The legislature responded to these recommendations in 2006 by passing S.B. 107, which increased the mandate to require 20% of electricity generated from renewable sources by 2010.³ To prevent utility recalcitrance, the legislature directed the California Public Utilities Commission ("CPUC") to require each retail electricity seller to procure at least 1% renewable energy generation additional to the amount procured the previous year.⁴ Publicly owned utilities set their own RPS goals at varying levels, but recognize the legislature's intent to attain

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1. S.B. 1078, ch. 516, §3, 2002 CAL. STAT. 2942, 2949 (codified as amended in scattered sections of CAL. PUB. UTIL. CODE).

2. Cal. Energy Comm'n, *California Renewable Energy Overview and Programs*, ENERGY.CA.GOV, <http://www.energy.ca.gov/renewables/> (last visited Feb. 10, 2015).

3. S.B. 107, ch. 464, 2006 Cal. Stat. 3298 (codified as amended in scattered sections of CAL. PUB. RES. CODE and CAL. PUB. UTIL. CODE).

4. S.B. 107, ch. 464, §9, 2006 Cal. Stat. 3298, 3309 (codified as amended at CAL. PUB. RES. CODE § 25746).

20% by 2010.⁵ The CEC was tasked with certifying eligible renewable energy sources (e.g., solar, wind, small hydro, and biomass facilities) and designing and implementing an accounting system to verify compliance with the RPS.⁶

By 2008, the CPUC had approved more than sixty-three gigawatts of renewable energy contracts for its investor-owned utilities—demonstrating the viability of renewable energy in an arena dominated by fossil fuels.⁷ In November 2008, Executive Order S-14-08 further accelerated California’s RPS goal by requiring that all retail sellers of electricity serve their load with 33% renewable energy by 2020.⁸ This executive action was implemented through the coordinated action of multiple state agencies, like the CPUC, CEC, California Air Resources Board (“CARB”), the Department of Fish and Game (for appropriate land use), and even the Western Governors’ Association (to facilitate efficient development of renewable energy through a regional cap-and-trade system).⁹

Unfortunately, California was only able to procure about 18% renewable energy sources by 2010, narrowly missing its stated goal.¹⁰ One author cites the overlapping and unclear lines of authority in implementing the standard as a primary cause of failing to meet the target.¹¹ In an effort to meet future goals, the state executive office directed the CPUC, CEC, and California Independent System Operator (“CAISO”), under a series of executive orders and the RPS statutes, to work together with stakeholders to identify how and where renewable energy can be developed.¹² Executive Order S-21-09 directs those agencies to “provide advice and assistance to, and cooperate with” CARB in its implementation of RPS-related regulation.¹³ Coordinating this united effort of agencies has proven to be a difficult task because they have struggled to coalesce their varying perspectives and harmoniously implement different facets of the RPS program.¹⁴ Additionally, inconsistent positions in related policy areas have resulted

5. Cal. Energy Comm’n, *California Renewable Energy Overview and Programs*, ENERGY.CA.GOV, <http://www.energy.ca.gov/renewables/> (last visited Feb. 10, 2015).

6. S.B. 107, ch. 464, §9, 2006 Cal. Stat. 3298, (codified as amended at CAL. PUB. RES. CODE § 25746).

7. Cal. Exec. Order S-14-08 (Nov. 17, 2008), <http://gov.ca.gov/news.php?id=11072>.

8. *Id.*

9. Cal. Exec. Order S-14-08, *supra* note 7.

10. Debroah Behles, *Why California Failed to Meet its RPS Target*, 17 HASTINGS W.-N.W. J. ENVTL. L. & POL’Y 163, 170 (2011).

11. *Id.* at 172.

12. *Id.*

13. *Id.*

14. *Id.*

from numerous executive orders directing different agencies to handle overlapping responsibilities, further slowing the administrative process.¹⁵

Nonetheless, in an effort to further California's ambitious effort, Governor Edmund Brown and the legislature passed S.B. XI-2, which codified the 33% by 2020 requirement.¹⁶ Critically, this bill applied to all electricity retailers in the state: investor and publicly owned utilities, electricity service providers, and community choice aggregators.¹⁷ In 2013, California's large investor owned utilities served 22.7% of their retail electricity sales with renewable power.¹⁸ While the 33% by 2020 goal seems difficult to reach, several California agencies have engaged in an iterative policy development process that is pushing electricity sales toward the ambitious goal. For example, the CPUC has been developing simpler procurement mechanisms to streamline the application process for renewable generators¹⁹ and has enjoyed the success of the California Solar Initiative, a program with a two billion dollar budget over ten years.²⁰ The CEC is administering a four hundred million dollar program, called the New Solar Homes Partnership, to offer incentives for solar installations and energy efficiency in new residential construction.²¹

In sum, RPS development in California has been mostly successful at procuring renewable generation, despite its struggles, because it has encouraged policy evolution to ensure effective and appropriate regulation of the burgeoning renewable industry. As regulators continue to develop policy tools to push utilities forward, they become better equipped and trained to regulate the growing industry. While it is impossible to design the perfect renewable procurement methods overnight, the development and availability of policy tools has proven critical in pushing California's RPS program in the right direction over time. Moreover, as this paper will reveal,

15. *Id.* at 172–73.

16. S.B. XI-2, ch. 1, § 20, 2011 Cal. Legis. Serv. 5775, 5791 (West) (codified as amended at CAL. PUB. RES. CODE § 399.15).

17. Cal. Energy Comm'n, *California Renewable Energy Overview and Programs*, ENERGY.CA.GOV, <http://www.energy.ca.gov/renewables/> (last visited Feb. 10, 2015). For discussion on importance of broad utility inclusion, see Miriam Fischlein & Timothy M. Smith, *Revisiting renewable portfolio standard effectiveness: policy design and outcome specification matter*, 46 POL'Y SCI. 277, 281 (2013).

18. *California Renewables Portfolio Standard*, CPUC.CA.GOV, <http://www.cpuc.ca.gov/PUC/energy/Renewables> (last visited Feb. 10, 2015).

19. See *e.g.*, CAL. PUB. UTILS. COMM'N Ruling 11-05-005.

20. Cal. Energy Comm'n, *California Renewable Energy Overview and Programs*, ENERGY.CA.GOV, <http://www.energy.ca.gov/renewables/> (last visited Feb. 10, 2015).

21. *What is the New Solar Homes Partnership?*, GOSOLARCALIFORNIA.ORG, <http://www.gosolarcalifornia.org/about/ns hp.php> (last visited Feb. 10, 2015).

the RPS is relatively immune to legal challenges when compared to the Global Warming Solutions Act, which mandates that regulated entities begin internalizing the costs of carbon emissions.²²

B. California's Global Warming Solutions Act

1. Background and Current Scoping Plan Status

The Global Warming Solutions Act of 2006 ("AB 32") requires California to reduce its greenhouse gas emissions to 1990 levels by 2020.²³ Pursuant to this goal, the legislature directed CARB to adopt regulations that "achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions."²⁴ The bill also directed CARB to adopt market-based compliance mechanisms.²⁵ In the broader context of quarreling over climate change in national politics, California defined carbon dioxide as a "greenhouse gas"²⁶ and declared that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California."²⁷

In order to fulfill AB 32's goals, CARB is required to develop, and update every five years, a Scoping Plan that identifies technologically feasible and cost-effective regulations for reducing greenhouse gas emissions.²⁸ These regulations will be evaluated using a cost-benefit analysis that takes into account both economic and noneconomic benefits of the plan.²⁹ Moreover, CARB must coordinate with the CPUC and CEC in publishing its plan³⁰ and conduct public workshops to gather comments on plan updates.³¹ These general statutory directives proved beneficial in future litigation over the Scoping Plan because they gave CARB broad authority to design and implement climate change law.

22. California Global Warming Solutions Act of 2006, ch. 488, 2006 Cal. Stat. 3419 (codified at CAL. HEALTH & SAFETY CODE § 38500).

23. *Id.*

24. CAL. HEALTH & SAFETY CODE § 38562 (West 2014).

25. HEALTH & SAFETY § 38570.

26. HEALTH & SAFETY § 38505(g). The other gases included in this definition are methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride.

27. HEALTH & SAFETY § 38501(a).

28. HEALTH & SAFETY § 38561(a).

29. HEALTH & SAFETY § 38561(d).

30. HEALTH & SAFETY § 38561(a).

31. HEALTH & SAFETY § 38561(g).

Key regulatory elements of the initial Scoping Plan included expanding energy efficiency programs (e.g., setting building and appliance standards), increasing the state's RPS goal to 33% by 2020, strengthening greenhouse gas emission standards on passenger vehicles, supporting development of the California high speed rail project, and developing a cap-and-trade program.³² The initial plan and the May 2014 Update identified and recommended greenhouse gas reduction measures in six key areas of the state's economy: energy, transportation, agriculture, water, waste management, and natural and working lands.³³

Pursuant to California's zero net energy building goals, the CEC updated new residential construction energy efficiency standards to 25%, and 30% for nonresidential construction.³⁴ It also adopted efficiency standards for televisions, battery chargers, and is considering creating additional appliance categories to regulate consumer electronics, lighting, and water appliances.³⁵ Additionally, the Scoping Plan supports demand response programs, localized renewable energy, and energy storage.³⁶ Together, these developments will better equip California's electric grid and regulators for emerging technologies from the energy industry that are designed to further enable renewable procurement.

In the transportation sector, the Advanced Clean Cars program, part of the Zero Emission Vehicle Regulation, requires 15% of new cars sold in California to be plug-in hybrid, battery electric, or fuel cell vehicles by 2025.³⁷ Ten other states have adopted California's Zero Emission Vehicle Regulation, expanding the reach of California's policy to nearly a quarter of the United States vehicle market.³⁸ Another major component of the Scoping Plan is investment in the high-speed rail project, predicted to be running from San Francisco to Los Angeles by 2029.³⁹ California also adopted a low-carbon fuel standard in 2009 that requires the carbon intensity of transportation fuels to be reduced by at least 10% by 2020.⁴⁰

32. AIR RES. BD. & CAL. ENVTL. PROTECTION AGENCY, FIRST UPDATE TO THE CLIMATE CHANGE SCOPING PLAN 4 (2014), *available at* http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

33. *Id.* at 35.

34. *Id.* at 37.

35. *Id.*

36. *Id.* at 39–41.

37. *Id.* at 47.

38. *Id.*

39. *Id.* at 5. The Scoping Plan is devoid of specific elements designed to bolster the high-speed rail project besides coordinate among state agencies to study and invest in the project.

40. *Id.* at 48.

However, CARB noted that “[a]chieving the GHG and air quality goals will require a renewable portfolio of transportation fuels—including electricity and hydrogen—well beyond the current policy trajectories.”⁴¹ CARB added that by the end of 2014 it would consider extending the standard with more aggressive targets for 2030 to push development of a renewable portfolio of transportation fuels.⁴²

AB 32 and the Scoping Plan have also taken on California’s agricultural sector in an effort to reduce the industry’s methane, carbon dioxide, nitrous oxide, and black carbon emissions, which accounted for about 8% of California’s total greenhouse gas emissions in 2012.⁴³ However, CARB has not been as successful in the agricultural sector as it has been in the transportation sector. For example, the initial plan included the installation of manure digesters to reduce methane emissions as a voluntary strategy, and unsurprisingly, adoption of these digesters in dairies has not increased to the levels that CARB expected.⁴⁴ CARB asserts that the minimal success in the agricultural sector may be due to the limited research in this area and that there are a wide variety of farm sizes, animals, and crops produced, which make it difficult to find any “one-size-fits-all” emission reduction or carbon sequestration strategies.⁴⁵

Another component of the Scoping Plan is the Cap-and-Trade Regulation, a strategy enabled by AB 32’s market compliance mechanism chapter. In January 2013, CARB launched the second-largest greenhouse gas cap-and-trade program in the world with a hard and declining cap on approximately 85% of total statewide greenhouse gas emissions.⁴⁶ Currently, offsets and respective protocols exist for the six greenhouse gases identified by AB 32, as well as for emissions of greenhouse gases prevented through forestry, urban forestry, manure digesters, and ozone-depleting substance destruction.⁴⁷ In January 2014, California and Quebec linked their cap-and-trade programs and the two states have worked together to harmonize regulations and coordinate a joint auction platform.⁴⁸ However, the May 2014 Update to the Scoping Plan lacked details about what is

41. *Id.* at 49.

42. *Id.*

43. *Id.* at 57.

44. *Id.*

45. *Id.* at 58.

46. *Id.* at 86.

47. *Id.*

48. *Id.* at 87. CARB is also considering coordination with international sector-based offset programs like REDD+. *Id.*

planned to further bolster the cap-and-trade program, besides program review and further research into offset protocol development.⁴⁹

The May 2014 update to the Scoping Plan also addressed other sectors of California's economy, such as water, waste management, natural lands, green buildings, and short-lived climate pollutants. CARB has been most successful in the transportation and energy sectors, where there has been a significant drop in carbon emissions since 2007.⁵⁰ Despite 2012, the first year of increased total carbon emissions since 2007,⁵¹ California's per capita greenhouse gas emissions have decreased by 11.6% between 2000 and 2012.⁵² California's agencies are continuing to plan and develop regulation of the identified industries. However, since the initial scoping plan, CARB's regulations have faced several legal challenges, some raising major constitutional issues.

2. Legal Challenges to AB 32

Various elements of AB 32 have been subject to challenges in state and federal court. However, CARB is well positioned to issue regulation in California that addresses climate change because AB 32 has largely withstood those legal battles. In state court, environmental justice organizations contended that the cap-and-trade program was too flawed to be a reasonable interpretation of AB 32. Additionally, in federal court, ethanol and fossil fuel interests challenged CARB's low carbon fuel standards ("LCFS") on Commerce Clause grounds. These legal battles are addressed in turn.

i. State Court Challenges

Before CARB could even adopt cap-and-trade regulations to implement AB 32, it faced opposition from environmental justice organizations in California. For example, the Association of Irrigated Residents and a group of other environmental plaintiffs sued CARB over its early endorsement of a cap-and-trade program in its 2009 Scoping Plan.⁵³ In *Irrigated Residents*, the petitioners alleged that the 2009 Scoping Plan:

49. *Id.*

50. *Id.* at 99.

51. Carbon emissions increased in 2012 largely due to increased natural gas generation of in-state electricity due to the closure of the San Onofre Nuclear Generating Station, a drought year decreasing hydropower generation, and an 11.3% population increase over the ten years prior. *See id.* at 90.

52. *Id.*

53. *Assoc. of Irrigated Residents v. Cal. Air Res. Bd.*, 143 Cal. Rptr. 3d 65, 70 (Cal. Ct. App. 2012).

(a) [F]ails to achieve the maximum technologically feasible and cost-effective reductions; (b) fails to require emissions reduction measures for significant sources of emissions, namely industrial and agricultural sources; (c) does not develop any policies to avoid the pitfalls of other greenhouse gas emission trading programs and fails to address how [C]ARB will monitor and enforce reductions in a regional market; (d) fails to assess the likely impacts of proposed policy choices and regulatory programs and fails to propose policies to ensure that compliance with chosen measures will not disproportionately impact already overburdened communities; and (e) fails to prevent increases in criteria and toxic co-pollutant emissions. Instead the Scoping Plan's analysis acts as a *post hoc* rationalization for the policy decisions already chosen by [C]ARB.⁵⁴

The trial court held that the plan did not violate the requirements of AB 32, nor had CARB acted arbitrarily and capriciously in selecting the measures it included in the 2009 Scoping Plan.⁵⁵ Further, the trial court rejected almost all of the plaintiffs' contentions, but did find that CARB had failed to adequately analyze alternatives to the cap-and-trade program and provided no meaningful discussion about the carbon tax alternative.⁵⁶ CARB quickly corrected this mistake and upon doing so, the trial court discharged its earlier writ of mandate that prevented further implementation of the Scoping Plan.⁵⁷ Thus, the only issue remaining on appeal was whether the Scoping Plan is within the regulatory authorization conferred by AB 32.⁵⁸

The Court of Appeal employed a deferential standard of review because the adoption of the Scoping Plan was a quasi-legislative administrative action issued under the broad statutory mandates of AB 32.⁵⁹ "If it can be inferred from the authorizing legislation that a [public agency] has been granted considerable discretion to determine what is necessary to accomplish a valid legislative goal, a more deferential standard of review is

54. *Id.* at 71.

55. *Id.*

56. *Id.*

57. *Id.*

58. *Id.* at 71.

59. *Id.* ("Because agencies granted such substantial rulemaking power are truly 'making law,' their quasi-legislative rules have the dignity of statutes. When a court assesses the validity of such rules, the scope of its review is narrow. If satisfied that the rule in question lay within the lawmaking authority delegated by the Legislature, and that it is reasonably necessary to implement the purpose of the statute, judicial review is at an end." (internal citations omitted)).

appropriate.”⁶⁰ In this context, the court rejected the petitioners’ argument that CARB had not adopted the maximum reductions required by AB 32. The court concluded that:

It is hardly surprising that the scoping plan leaves some questions unanswered and that opinions differ as to many complex issues inherent in the task. After reviewing the record before us, we are satisfied that [CARB] has approached its difficult task in conformity with the directive from the Legislature, and that the measures that it has recommended reflect the exercise of sound judgment based upon substantial evidence. Further research and experience likely will suggest modifications to the blueprint drawn in the scoping plan, but the plan’s adoption in 2009 was in no respect arbitrary or capricious.⁶¹

Therefore, AB 32 survived an early challenge because it was a broadly worded statute that conferred expansive rulemaking authority to implementing agencies. As the court noted, CARB conducted intensive reviews of its recommendations before adopting the 2009 Scoping Plan and these reviews also shielded CARB’s regulatory authority.⁶² The court recognized that the Scoping Plan is an iterative process that will develop over time, even if CARB had not immediately adopted as many direct emission control mechanisms as the plaintiffs sought.⁶³

Another battle over CARB’s cap-and-trade program was addressed in *Citizens Climate Lobby v. California Air Resources Board*,⁶⁴ where the petitioners, Citizens Climate Lobby and Our Children’s Earth Foundation, challenged CARB’s use of standardized additionality mechanisms in the offset component of the cap-and-trade program.⁶⁵ An emission reduction is “additional” if it would not have occurred without the financial incentive

60. *Id.* at 72 (citing *San Francisco Fire Fighters Local 798 v. City & Cnty. of San Francisco* (2006) 38 Cal.4th 653, 670).

61. *Id.* at 80.

62. *Id.*

63. *Id.* at 75 (“[C]ARB believes, based on the review of emission reduction opportunities conducted for the scoping plan, that significant reduction opportunities exist in the industrial sector that are more readily achieved through market mechanisms than through direct measures.” (quoting Appendix C of the Scoping Plan)).

64. *Citizens Climate Lobby v. Cal. Air Res. Bd.*, No. CGC-12-519554, 2013 WL 861396 (Cal. Super. Ct. Jan. 25, 2013).

65. *Id.* at *2.

provided by the offset credit.⁶⁶ If reductions are not additional, then the cap-and-trade program will not reduce greenhouse gas emissions beyond what would have occurred anyway.⁶⁷

Thus, in order to determine whether a given project applying for an offset is additional, CARB needed to determine both the level of emissions that would have occurred in the absence of each project and whether the project would have occurred in a counterfactual scenario where offset credits were not available.⁶⁸ Naturally, because of the inherent complexity of the task before the agency, the court favored a deferential standard of review, reminiscent of *Irritated Residents*.⁶⁹ First, the court reviewed CARB's standardized additionality regulation *de novo* and found that the agency acted within its legislative grant.⁷⁰ Then the court applied a highly deferential standard in all its other findings.⁷¹

The petitioners in *Citizens Climate* argued that CARB's mechanism to ensure additionality did not guarantee that reductions would be additional.⁷² The petitioners further contended that CARB adopted circular standards to define additionality, as opposed to making the determination on a case-by-case basis.⁷³ Ultimately, the court disagreed with the petitioners because CARB's "use of standardized mechanisms [was] supported by evidence contained in the administrative record" and AB 32's broad legislative grant did not foreclose standardized additionality mechanisms in evaluating offset projects.⁷⁴

While this case raised a legitimate issue—that the cap-and-trade program's biggest weakness is verifying that emissions are actually offset—the court offered support for CARB's standardized evaluation mechanism. It cited the Kyoto Protocol's Clean Development Mechanism ("CDM") as evidence that a project-by-project approach is ineffective because of its

66. *Id.* at *3.

67. *Id.*

68. *Id.* at *7.

69. *Id.* at *11–12.

70. *Id.* at *10, *15.

71. *Id.* at *20.

72. *Id.* at *34.

73. *Id.* CARB defined "additional" to mean a reduction is additional if it exceeds any greenhouse gas reductions that would otherwise occur in a conservative business-as-usual scenario. This was further defined as "the set of conditions reasonably expected to occur within the offset project boundary in the absence of the financial incentives provided by offset credits." *Id.* This is a rather circular definition; demonstrating the difficulty in actually ensuring that an offset will be "additional."

74. *Id.* at *20.

administrative complexity, inevitable delay, and cost.⁷⁵ The court also noted that the project-based approach is routinely criticized for being inaccurate, despite the fact that it is the most evolved offsetting program in the market.⁷⁶ Before reaching a legal conclusion, the court had essentially resolved the case in favor of CARB—with apt justification:

The earliest national and international cap-and-trade systems were created a decade ago and were not fully implemented until years later. The history is short and the practical experience limited. The Legislature delegates authority to agencies to promulgate regulations using their best judgment based on the currently available information It is not within the ambit of the Court to decide that one methodology trumps another when decisions are made based on extensive research, stakeholder and public input, and fact-based analysis.⁷⁷

Surviving this challenge was critical for AB 32's success because additionality is the crux of its offset programs. The appellate court's approval of CARB's methodology will allow the agency to continue to improve its cap-and-trade program and develop better verification procedures.

ii. Federal Court Challenges

AB 32 has survived many legal challenges in federal court as well. Most notably, the *Rocky Mountain Farmers Union* litigation raised constitutional questions regarding the LCFS as it applied to ethanol producers.⁷⁸ The LCFS applies to any entity selling transportation fuel in California and requires an approximately 10% average reduction in carbon intensity of those fuels by 2020.⁷⁹ In so doing, CARB mandated fuel producers to calculate the carbon intensity of, or emissions related to, extracting, refining, and transporting the fuel to California (called "pathways").⁸⁰ Further, producers exceeding the mandated carbon intensity

75. *Id.* at *11.

76. *Id.* at *7.

77. *Id.* at *11.

78. *Rocky Mountain Farmers Union v. Corey*, 730 F.3d 1070 (9th Cir. 2013), *cert. denied*, 134 S. Ct. 2884 (2014), and 134 S. Ct. 2875 (2014).

79. Cal. Exec. Order S-01-07 (Jan. 2007), *available at* <http://www.arb.ca.gov/fuels/lcfs/eos0107.pdf>.

80. CAL. CODE REGS. tit. 17, § 95481.38 (2015). While the regulations do not define the term "pathways," the Ninth Circuit noted that when CARB assigns a

threshold are required to purchase offsets in order to sell their product in California.⁸¹ This regulation inherently has a materially different impact on out-of-state producers than in-state producers.

The crux of the petitioners' complaint was that the fuel standard discriminates against out-of-state corn ethanol based solely on origin. The petitioners asserted that CARB's standard treated ethanol differently based on origin despite no difference in chemical composition and that CARB's standard furthered no legitimate state purpose.⁸² The district court applied a strict scrutiny standard and, while it reasoned that the LCFS served a legitimate state purpose, it ruled that CARB failed to show that its policy goals could only be achieved through discriminatory means.⁸³ Essentially, the district court concluded that CARB should have excluded from its lifecycle analysis geographic-specific factors, such as transportation emissions and production emissions (varying due to, e.g., some states employment of an RPS while states rely on a coal-heavy generation mix), because those factors are "inextricably intertwined with origin."⁸⁴ The district court also ruled that the fuel standard impermissibly engaged in the extraterritorial regulation of ethanol production.⁸⁵

The Ninth Circuit Court of Appeals largely disagreed with the trial court and directed it, on remand, to order the plaintiffs to prove that the fuel standard "imposes a burden on interstate commerce that is 'clearly excessive' in relation to its local benefits."⁸⁶ It noted first that if California is to assign different carbon intensities to ethanol from different regions, there must be "some reason, apart from their origin, to treat them differently."⁸⁷ A regulation is not facially discriminatory simply because it affects in-state and out-of-state interests unequally.⁸⁸ The court reasoned that even though all greenhouse gases mix in the atmosphere and "climate change risks are widely shared," California's interest in reducing them is not thereby lessened.⁸⁹ Moreover, the court recognized that the LCFS uses a lifecycle analysis to measure the carbon intensity of all fuel pathways and considers

cumulative carbon intensity value to the lifecycle greenhouse gas emissions of a fuel, it refers to them as "pathways." *Rocky Mountain Farmers Union*, 730 F.3d at 1081.

81. *Id.* at 1080.

82. *Id.* at 1077–78.

83. *Id.* at 1078.

84. *Id.* at 1088–89.

85. *Id.* at 1077–78.

86. *Id.* at 1078 (citing *Pike v. Bruce Church, Inc.*, 397 U.S. 137 (1970)).

87. *Id.* at 1089 (quoting *Philadelphia v. New Jersey*, 437 U.S. 617, 627 (1978)).

88. *Id.*

89. *Id.* at 1080–81 (citing *Massachusetts v. E.P.A.*, 549 U.S. 497, 522 (2007)).

geography only to the extent that it affects the actual emissions attributable to a pathway⁹⁰:

[I]f producers of out-of-state ethanol actually cause more GHG emissions for each unit produced, because they use dirtier electricity or less efficient plants, CARB can base its regulatory treatment on these emissions. If California is to successfully promote low-carbon-intensity fuels, countering a trend towards increased GHG output and rising world temperatures, it cannot ignore the real factors behind GHG emissions.⁹¹

Thus, the court held that California is “entitled to proceed” on the understanding that global warming is induced by rising carbon emissions because “if [California] is to have any chance to curtail GHG emissions, [it] must be able to consider all factors that cause those emissions when it assesses alternative fuels.”⁹² Accordingly, the Commerce Clause did not require California to ignore the “real differences in carbon intensity among out-of-state ethanol pathways These factors are not discriminatory because they reflect the reality of assessing and attempting to limit GHG emissions from ethanol production.”⁹³

The Vessel Fuel Rules are another aspect of AB 32 that was opposed in federal court. In *Pacific Merchant Shipping Association v. Goldstene*, the Vessel Fuel Rules survived Commerce Clause and field preemption challenges.⁹⁴ These rules mandated that vessel operators “use cleaner marine fuels in diesel and diesel-electric engines, propulsion engines, and auxiliary boilers” when they “operat[e] within twenty-four nautical miles off the California coastline.”⁹⁵ These rules would affect several global shipping fleets. For example, collectively, the ports of Long Beach and Los Angeles constitute the largest port in the United States, with over 40% of all national imports entering the country through these ports.⁹⁶

Ocean-going vessels frequenting California ports are a leading source of air pollution in the state due to their widespread use of low-grade bunker fuel.⁹⁷ This fuel contains an average of approximately 25,000 parts per million (“ppm”) of sulfur, along with nitrous oxide compounds and carbon

90. *Id.* at 1089.

91. *Id.* at 1090.

92. *Id.*

93. *Id.* at 1093.

94. *Pac. Merch. Shipping Ass’n v. Goldstene*, 639 F.3d 1154 (9th Cir. 2011).

95. CAL. CODE. REGS. tit. 13 §2299.2(b)(F) (2015).

96. *Pac. Merch. Shipping Ass’n*, 639 F.3d at 1159.

97. *Id.*

dioxide.⁹⁸ Comparatively, the diesel fuel used by trucks and other motor vehicles emit on average just 15 ppm of sulfur.⁹⁹ Moreover, California ports were ripe for more stringent atmospheric pollutant control because 80% of the state's population is exposed to the emissions from oceangoing vessels.¹⁰⁰

From an economic perspective, addressing this issue would have minimal impact on the American consumer. CARB estimated that compliance with the rules would result in approximately a six-dollar increase per twenty-foot shipping container; or in other words, an extra 12.5 cents in the cost of a plasma television or an additional 0.14 cents for a pair of athletic shoes.¹⁰¹ Nonetheless, the plaintiff, the Pacific Merchant Shipping Association ("PMSA"), sought a declaration that, insofar as the rules regulate "conduct seaward of California's three-mile boundary," the Submerged Lands Act and the Commerce Clause preempt CARB's authority.¹⁰²

Through the Submerged Lands Act, the United States "released to the coastal States its rights in the submerged lands within stated limits and confirmed its own rights therein seaward of those limits."¹⁰³ Thus, coastal states were granted exclusive title, subject to foreign commerce, navigation, national defense, and foreign affairs regulation by the federal government¹⁰⁴ up to three miles seaward of their shorelines to the lands and natural resources beneath navigable waters.¹⁰⁵ PMSA argued that not only is the federal interest in regulating the waters above these lands so exclusive as to overrule state jurisdiction, but also that CARB's rules assert the territorial dominion of California twenty-four miles seaward, even though the Act defined a state's boundary at three miles seaward.¹⁰⁶ In other words, PMSA argued that CARB's rules operate in fields historically operated by the

98. *Id.* (citing CARB studies from 2006).

99. *Id.* at 1160 (citing CARB studies from 2006).

100. *Id.* ("Vessel emissions constitute the single largest source of [sulfur oxide] emissions in the state, responsible for 40% of all such emissions. Furthermore, both NOx and SOx are precursors to fine particulate matter pollution ("PM 2.5"). It was estimated that the vessels' daily PM emissions represent the equivalent of approximately 150,000 big rig trucks traveling 125 miles per day . . . emissions are likely to be blown on-shore from beyond the geographical area actually covered by the [rules]." (citing CARB studies from 2006)).

101. *Id.* at 1176.

102. *Id.* at 1161.

103. *United States v. Louisiana*, 446 U.S. 253, 256 (1980).

104. 43 U.S.C. § 1314(a) (2011).

105. *Pac. Merch. Shipping Ass'n*, 639 F.3d at 1164.

106. *Id.* at 1165.

federal government, e.g., maritime commerce, conduct at sea outside of state boundaries, and the definition of state boundaries.¹⁰⁷ Unfortunately for PMSA, the court applied the “well established” presumption against preemption in this field due to the “historic presence of state law” in the area of air pollution.¹⁰⁸

First, the court stated that the Submerged Lands Act expressly reserves concurrent jurisdiction over the waters within this belt for the federal uses discussed above.¹⁰⁹ The court then went on to cite precedent from the Supreme Court¹¹⁰ and several coastal state supreme courts¹¹¹ to demonstrate that federal law, including the Submerged Lands Act, does not preempt CARB in this field. For example, the court cited *Huron Portland Cement Company v. City of Detroit, Michigan*, where the Supreme Court “refused to bar the prosecution of a ship owner for violating a municipal smoke abatement provision when its vessels were docked at the city’s port even though ‘[s]tructural alterations would be required in order to insure compliance.’”¹¹² The court in *Huron Portland Cement Company* also added, “[l]egislation designed to free from pollution the very air that people breathe clearly falls within the exercise of even the most traditional concept of what is compendiously known as the police power.”¹¹³ Thus, the district court’s denial of PMSA’s motion for summary judgment, as to its claim of implicit field preemption under the Act, was affirmed.¹¹⁴

Moving to the Commerce Clause argument, the court cited the two broad categories of state regulations that burden interstate commerce: (1) those whose central purpose is to regulate interstate commerce or otherwise discriminate against out-of-state interests; and (2) those that incidentally burden commerce.¹¹⁵ Regulations that regulate interstate commerce or discriminate against out of state interests are generally struck

107. *Id.* at 1166.

108. *Id.* at 1167.

109. *Id.* at 1168.

110. *See, e.g.*, *United States v. Louisiana*, 339 U.S. 699, 705 (1950); *Skiriotes v. Florida*, 313 U.S. 69, 77 (1941).

111. *See e.g.*, *State v. Stepansky*, 761 So.2d 1027, 1029–37 (Fla. 2000); *State v. Jack*, 125 P.3d 311 (Alaska 2005) (following *Stepansky*); *People v. Weeren*, 607 P.2d 1279, 1281–88 (1980).

112. *Pac. Merch. Shipping Ass’n*, 639 F.3d at 1171 (quoting *Huron Portland Cement Co. v. City of Detroit, Mich.*, 362 U.S. 440, 441 (1960).

113. *Id.* at 1167 (quoting *Huron Portland Cement*, 362 U.S. at 442).

114. *Id.* at 1176.

115. *Id.* at 1177.

down.¹¹⁶ Regulations that incidentally burden commerce are reviewed under a balancing test, where courts will determine if the burden of the imposed regulations outweigh their putative benefits and render the regulations unreasonable or irrational.¹¹⁷ Moreover, state legislation regulating commerce that takes place wholly outside of the state's borders is forbidden.¹¹⁸ However, "the general rule on preemption in admiralty is that states may supplement federal admiralty law as applied to matters of local concern, so long as state law does not *actually conflict* with federal law or *interfere* with the *uniform working* of the maritime legal system."¹¹⁹ Working in this framework, the court held that the rules do not conflict with either the Commerce Clause or the fundamental principles of maritime law.¹²⁰

First, the rules do not directly regulate interstate commerce because "the central purpose of the Vessel Fuel Rules is to protect the health and well-being of the State's residents from the harmful effects of the fuel used by ocean-going vessels."¹²¹ Moreover, the rules do not apply to commercial activities occurring wholly outside the territorial limits of California.¹²² Secondly, because the rules imposed a relatively light burden on interstate commerce, the court was permitted to balance the putative environmental benefits from regulating the carbon intensity of vessel fuels against the increased cost on vessels frequenting California ports.¹²³ The court concluded that "the exceptionally powerful state interest at issue here far outweighs any countervailing federal interests."¹²⁴

In sum, AB 32 and its implementing regulation, the Scoping Plan, has repeatedly withstood legal confrontations in its brief history in both state and federal court. While the specter of explicit federal preemption remains until Congress speaks on climate change, AB 32 has survived multiple constitutional challenges. Moreover, California courts have approved the main components of the Scoping Plan as well as CARB's regulatory jurisdiction under AB 32. CARB's experience regulating in this field has therefore been proven to rest on stable statutory and constitutional authority. California's successes, as well as those in Massachusetts, are a

116. See, e.g., *Brown-Forman Distillers Corp. v. New York State Liquor Auth.*, 476 U.S. 573, 579 (1986); *Philadelphia v. New Jersey*, 437 U.S. 617, 624 (1978).

117. *Pac. Merch. Shipping Ass'n*, 639 F.3d at 1177.

118. *Id.* at 1178.

119. *Id.*

120. *Id.* at 1179.

121. *Id.*

122. *Id.*

123. *Id.*

124. *Id.* at 1181.

guide for other states who are trying to design a climate change law that will survive the inevitable legal challenges.¹²⁵

III. Massachusetts

This section will examine the policy tools Massachusetts implemented within its borders to address climate change and the legal barriers the Regional Greenhouse Gas Initiative (“RGGI”) has faced as a *prima facie* regulation of the interstate market for carbon emissions.¹²⁶

A. Massachusetts’ GWSA and Clean Energy and Climate Plan for 2020

Massachusetts’ Global Warming Solutions Act was codified as the Climate Protection and Green Economy Act¹²⁷ and it directed state agencies to achieve 10% to 25% statewide greenhouse gas emission reduction below 1990 levels by 2020.¹²⁸ The statute directed the Executive Office of Energy and Environmental Affairs (“EEA”), in consultation with other agencies, to establish regulations requiring reporting of greenhouse gas emissions,¹²⁹ a baseline assessment for 1990 emissions and a 2020 business as usual scenario,¹³⁰ and target emission reductions that must be achieved by 2020.¹³¹ The agency was required to issue an action plan and regulations implementing these mandates.¹³²

In late December 2010, pursuant to the legislature’s direction, EEA released its Clean Energy and Climate Plan for 2020.¹³³ Somewhat

125. See *infra* Part B.2.

126. The states participating in this program are Massachusetts, Connecticut, Delaware, Maine, Maryland, New Hampshire, New York, Rhode Island, and Vermont. See REGIONAL GREENHOUSE GAS INITIATIVE, <http://www.rggi.org/> (last visited Feb. 9, 2014).

127. An Act Establishing The Global Warming Solutions Act, ch. 298, 2008 Mass. Acts 1154 (codified at Mass. Gen. Laws ch. 21N (2013)).

128. Mass. Gen. Laws ch. 21N, § 3(b) (2013) (“The secretary shall . . . adopt the following statewide greenhouse gas emissions limits: (1) a 2020 statewide emissions limit and a plan to achieve that limit pursuant to section 4”); *id.* at § 4(a) (“The secretary shall adopt the 2020 statewide greenhouse gas emissions limit pursuant to subsection (b) of section 3 which shall be between 10 per cent and 25 per cent below the 1990 emissions level and a plan for achieving said reduction.”).

129. *Id.* at § 5.

130. *Id.* at §§ 3(b); 4(a).

131. *Id.*

132. *Id.*

133. Mass. Exec. Office of Energy and Envntl. Affairs, Patrick-Murray Administration Announces Energy and Climate Plan to Reduce Greenhouse Gas

differently than California, a state that has a wealth of natural resources that will be directly impacted by climate change, Massachusetts framed its climate plan largely in economic terms. First, the EEA noted that the state imports over twenty-two billion dollars in fossil fuel resources—money that could remain in the state.¹³⁴ Moreover, EEA estimated that state employment in the energy efficiency sector rose 65% between 2007 and 2010; highlighting a market bolstered by climate-conscious policy.¹³⁵ After discussing the excellent economic opportunity before the commonwealth,¹³⁶ the EEA addressed the hazardous environmental impacts global warming will have on Massachusetts' climate, further demonstrating the impetus for the commonwealth's action.¹³⁷

EEA's plan employs an "integrated portfolio of policies" that is divided into five categories where new climate change regulation can be integrated with existing policy to reduce emissions¹³⁸: buildings, electricity supply, transportation, non-energy emissions, and cross-cutting policies.¹³⁹ While EEA's emission reduction goal is at 18%, ideally, it is estimating a roughly

Emissions by 25 percent by 2020 (Dec. 29, 2010), <http://www.mass.gov/eea/pr-pre-p2/pr-2010/press-release-re-clean-energy-and-climate-plan.html>.

134. IAN A. BOWELS, MASS. EXEC. OFFICE OF ENERGY AND ENVTL. AFFAIRS, MASSACHUSETTS CLEAN ENERGY AND CLIMATE PLAN FOR 2020, at 2 (2010), *available at* <http://www.mass.gov/eea/docs/eea/energy/2020-clean-energy-plan.pdf> [hereinafter Mass. 2020 Clean Energy & Climate Plan] ("All of [Massachusetts'] fossil-based energy resources—oil, natural gas, and coal—are derived from other regions of the country . . . and other parts of the world, many of them unstable or hostile to the United States . . . all spending on fossil fuel energy . . . flows out of state and fails to provide income to in-state businesses or employees.").

135. *Id.* at 1 ("Massachusetts launched the most aggressive energy efficiency program in the country, with estimated savings of over \$6 billion for residential, municipal, industrial, and commercial customers and 4,500 jobs projected."); *id.* ("Between 2007 and the end of 2010 . . . jobs in solar manufacturing, installation, and services [tripled] – while installed wind energy increased 10-fold.").

136. *Id.* at 5–6 ("Through both direct and indirect impacts, we estimate that these policies will create 36,000 jobs in Massachusetts in 2020, including about 13,000 via transportation policies and 23,000 via policies to improve efficiency of energy use in buildings.").

137. *Id.* at 9–11 (*e.g.*, summer temperatures would "feel like the current summer climate of the Carolinas," rainfall would increase by 12% to 30%, coastal lands would be subject to increased erosion, and the possibility of an outbreak of a water-borne disease would also increase.).

138. *Id.* at 13.

139. *Id.* at 80.

27% emission reduction by 2020, procured from the aforementioned sectors.¹⁴⁰

1. Buildings

Buildings are of particular focus for Massachusetts because they consume over 50% of the energy used in the commonwealth, primarily from natural gas heating and heating oils, as well as from electricity for air conditioning, lighting, ventilation, appliances, and industrial equipment.¹⁴¹ To achieve reductions in this arena, EEA proposed performance based energy codes to incentivize energy efficiency in new construction,¹⁴² as well as “deep” building retrofitting.¹⁴³ In addition, EEA proposed eventual wide-scale adoption of “residential building energy labeling that allows apples-to-apples comparisons of home energy performance in much the same way that miles per gallon (“MPG”) ratings allow fuel efficiency comparisons of cars and light trucks.”¹⁴⁴ The EEA also included a policy framework for solar thermal water and space heating in both residential and commercial buildings.¹⁴⁵

2. Electricity Supply

EEA’s policy proposals in the electricity supply sector sought to build on the existing RPS¹⁴⁶ and the commonwealth’s participation in RGGI¹⁴⁷ by implementing stricter power plant rules, increasing hydroelectric energy

140. EEA estimates that of the approximately 27% in emission reductions, 9.8% will come from buildings, 7.7% from electricity supply, 7.6% from transportation, and 2% from non-energy sources. *Id.* at 92.

141. *Id.* at 14.

142. *Id.* at 23.

143. *Id.* at 26 (*e.g.*, rebates for retrofits with higher levels of insulation, air leakage reduction, and thermally efficient windows).

144. *Id.* at 16.

145. *Id.* at 29 (“Hot water and space heating are large energy users that do not require very high grade fuels (unlike motor vehicles for example). This makes them excellent candidates for active solar heating, which has no fuel expense and can provide significant heating from a small roof, wall or ground-mounted system.”).

146. *Id.* at 40 (“Over the period from 2010 to 2020, the Massachusetts RPS classes will stimulate \$360 million annual investment, or \$3.9 billion in cumulative investment in clean power generation that would not have occurred on its own. This is expected to create approximately 900 full-time construction jobs throughout that period.”).

147. *Id.* at 42 (“Over \$120 million in auction proceeds has been invested in energy efficiency projects across [Massachusetts] since 2009 . . .”).

imports from Canada, and establishing a clean energy performance standard (“CPS”).¹⁴⁸ Massachusetts expects to bring its older coal-fired power plants offline in response to EPA’s more stringent power plant rules.¹⁴⁹ EEA estimates that Massachusetts could achieve a net reduction of 1.2 million metric tons of carbon dioxide equivalent¹⁵⁰ in 2020 if two of its aging coal plants were replaced by natural gas-fired power plants.¹⁵¹ The CPS is a proposed “market-based framework” that incentivizes performance standards of power plants supplying Massachusetts’ electricity.¹⁵² In order to do so, EEA proposes a doubling of hydroelectric power imports, increasing capacity from regional nuclear plants, and stimulating power generation technology evolution.¹⁵³

3. Transportation

In the transportation sector, Massachusetts will improve vehicle efficiency, reduce vehicle miles traveled, and bolster the commonwealth’s existing policy to reduce the carbon intensity of vehicle fuel sold in the commonwealth.¹⁵⁴ Currently, Massachusetts is in conformance with EPA’s 27.5-MPG standard and expects to reach the 35.5-MPG goal by 2016. Moreover, Massachusetts will adopt California’s MPG and greenhouse gas emission standards for vehicle fuels (expected to be more stringent than the federal standard) when they are implemented for model 2017 to 2020 vehicles.¹⁵⁵ In conjunction with the Clean Energy Biofuels Act, the EEA plans on implementing an LCFS similar to California’s standards.¹⁵⁶ To reduce the amount of vehicle miles traveled, Massachusetts is piloting a “pay as you drive” automobile insurance program that converts a large fixed annual premium into a variable cost based on miles traveled.¹⁵⁷ With transportation expected to account for about 40% of total greenhouse gas

148. *Id.* at 38–39.

149. *Id.* at 44.

150. Carbon dioxide equivalent, or “CO₂e,” is defined as “the amount of carbon dioxide by weight that would produce the same global warming impact as a given weight of another greenhouse gas” CAL. HEALTH & SAFETY CODE § 38505(c) (West 2014).

151. Mass. 2020 Clean Energy & Climate Plan, *supra* note 134, at 44.

152. *Id.* at 47 (“[CPS] applies an output-based performance standard to either portfolios of retail electricity sellers or to generators in terms of tons of pollution per megawatt-hour of electricity.”).

153. *Id.*

154. *Id.* at 49–51.

155. *Id.* at 53.

156. *Id.* at 57.

157. *Id.* at 61.

emissions in Massachusetts by 2020, EEA is confident that incentivizing a reduction in vehicle miles traveled will result in extensive economic¹⁵⁸ and public health benefits.¹⁵⁹ EEA also proposed to reduce sprawl and promote “smart growth”¹⁶⁰ by highlighting the need to coordinate transportation infrastructure and land use planning.¹⁶¹

4. Non-Energy Emissions

The non-energy emissions sector accounts for roughly 7% of Massachusetts’ greenhouse gas emissions. To curb these largely industrial pollutants, EEA proposed finding substitutes for high global warming potential refrigerants and emission reduction from disposal of plastic waste.¹⁶² EEA is particularly concerned about refrigerants used in motor vehicle air conditioning and industrial sources, as well as the need to retrofit these sources of greenhouse emissions to reduce leakage.¹⁶³ Additionally, EEA estimates that diversion of plastic from the waste stream into recycled goods will yield cumulative savings between sixty-nine and ninety-two million dollars from 2009 to 2020 while cutting emissions generated by plastic disposal.¹⁶⁴

5. Cross-Cutting Policies

Finally, EEA is developing a plan to implement its statutory mandate to “consider reasonably foreseeable climate change impacts, including additional [greenhouse] gas emissions” when reviewing and issuing permits,

158. *Id.* at 62 (“A nationwide study by the Brookings Institution found that [pay as you drive] insurance would reduce [vehicle miles traveled] by [eight] percent.”). An 8% reduction in vehicle miles traveled would result in nearly 2% reduction of statewide greenhouse gas emissions by 2020. *Id.*

159. *Id.* (“In the middle policy option, there would be an estimate reduction in crashes of 11,000, 7,000 fewer injuries, and 36 fewer fatalities, yielding \$420 million in total benefits, part of which would accrue to drivers in lower insurance rates.”).

160. “Smart growth” is compact mixed-use development that focuses on increased population density, building efficiency, and reducing vehicle miles traveled. *Id.* at 68.

161. *Id.* (“Large transportation cost reductions can be expected for residents and business due to reduced vehicle ownership and fuel consumption. High-density mixed-use development will increase building efficiency and make district energy and combined heat and power more feasible.”).

162. *Id.* at 71–72.

163. *Id.* at 73–76.

164. *Id.* at 79.

licenses, and other administrative approvals or decisions.¹⁶⁵ This “cross-cutting” policy will expand the Massachusetts Environmental Policy Act¹⁶⁶ and embed climate change adaptation into municipal planning.¹⁶⁷ Moreover, EEA will also expand Massachusetts’ existing “Leading by Example” program that “works to lower costs and reduce environmental impacts” of all executive agencies, quasi-public authorities, and the twenty-nine public institutions of higher education in the commonwealth.¹⁶⁸

In sum, Massachusetts’ multi-sector approach resembles CARB’s Scoping Plan in many ways. Both plans are governed by short and broadly written statutes that empower state agencies to make expansive rules that have far-reaching economic impacts. Moreover, both states recognize the dire need to restrict carbon emissions from their energy and transportation industries. However, Massachusetts frames its climate action plan in more explicit economic terms than California and often emphasizes the employment opportunities that EEA’s plans will create. Regardless of their differences, both plans serve as models for other states.

B. Other Laws Addressing Global Warming in Massachusetts

1. Clean Energy Biofuels Act of 2008

Biofuels are substitutes for fossil fuels and are derived from organic matter such as corn, soy, switchgrass, agricultural waste, wood, and waste vegetable oil.¹⁶⁹ Cellulosic biofuels refer to gasoline substitutes made from the fibrous matter of feedstocks (i.e., cellulose, hemicellulose, or lignin).¹⁷⁰ The advantages of cellulosic biofuels over fossil fuels become apparent upon analyzing the lifecycle greenhouse gas emissions of both fuels. Under the Act, these emissions are an aggregate of direct and “significant” indirect emissions, which relate to feedstock generation, extraction, distribution, and delivery where the mass values of all greenhouse gas emissions therefrom are adjusted to account for their relative global warming potential.¹⁷¹

165. *Id.* at 87 (*see* Mass. Gen. Laws ch. 21N, § 7 (2013)).

166. *Id.* at 81.

167. *Id.* at 85–86.

168. *Id.* at 83 (Dec. 29, 2010).

169. Ken Kimmel & Laurie Burt, *Massachusetts Takes on Climate Change*, 27 UCLA J. ENVTL. L. & POL’Y 295, 307 (2009).

170. Mass. Gen. Laws ch. 64A, § 1 (2013).

171. Mass. Gen. Laws ch. 64A, § 1 (“Lifecycle greenhouse gas emissions’ [are] the aggregate quantity of greenhouse gas emissions, including direct emissions and significant indirect emissions such as significant emissions from and use changes, as determined by the department in consultation with the department of environmental protection and the executive office of energy and environmental affairs, related to the

While replacing fossil fuels with bioenergy does not by itself reduce carbon emissions, biofuels can produce net climate benefits when the feedstock captures more carbon while it is growing than would otherwise be captured.¹⁷² To take advantage of these benefits, Massachusetts defined “eligible cellulosic biofuel” as one that “yields at least a 60 per cent lifecycle greenhouse gas emissions relative to the average lifecycle greenhouse gas emissions petroleum based fuel sold in 2005.”¹⁷³ In doing so, Massachusetts was the first state in the country to give preferential tax treatment to companies that develop gasoline substitutes from the cellulosic matter of feedstocks to support non-corn-based ethanol fuels.¹⁷⁴

Through this legislation, Massachusetts also adopted a LCFS—one that was in exact conformity with California’s standard. Under the Act, a LCFS is defined as “a legal requirement that the average lifecycle greenhouse gas emissions attributable to use of energy in an economic sector are equal to or below a specified numeric level . . . such as the requirement contained in California Executive Order S-1-07.”¹⁷⁵ The Act also directed EEA to develop and enter into (“to the extent possible”) an agreement with RGGI states that implements a region-wide LCFS.¹⁷⁶

Ultimately, the commonwealth is primarily relying on the development of a LCFS, supported by cellulosic biofuel, to obtain reductions in one of its biggest sources of greenhouse gas emissions—the transportation sector.¹⁷⁷ The Clean Energy Biofuels Act gave EEA statutory authority to include a LCFS

full fuel lifecycle, including all stages of fuel and feedstock production and distribution, from feedstock generation or extraction through the distribution and delivery and use of the finished fuel to the ultimate consumer, where the mass values for all greenhouse gases are adjusted to account for their relative global warming potential.”).

172. Timothy D. Searchinger et al., *Fixing a Critical Climate Accounting Error*, 326 Sci. 527, 528 (2009) (“Bioenergy . . . reduces greenhouse emissions only if the growth and harvesting of the biomass for energy captures carbon above and beyond what would be sequestered anyway and thereby offsets emissions from energy use.”).

173. Mass. Gen. Laws ch. 64A, § 1. Similarly, the federal government also takes these net lifecycle emissions benefits into account and defines “advanced” biofuels in the Clean Air Act as a “renewable fuel, other than ethanol derived from corn starch, that has lifecycle greenhouse gas emissions . . . that are at least 50 percent less than baseline lifecycle greenhouse gas emissions [of fossil fuels].” See 42 U.S.C. § 7545(o)(B)(i) (2012).

174. Kimmel & Burt, *supra* note 169.

175. Mass. Gen. Laws ch. 94, § 295G1/2(1) (2013).

176. An Act Relative to Clean Energy Biofuels, ch. 206, 2008 Mass. Acts 968.

177. See Mass. 2020 Clean Energy & Climate Plan, *supra* note 134, at 52.

that favors cellulosic biofuels in the commonwealth's Clean Energy Plan.¹⁷⁸ Moreover, the Act allows Massachusetts to fulfill the federal government's renewable fuel and cellulosic biofuel directives.¹⁷⁹ Thus, the Act is integral to the transportation component of Massachusetts' overall climate change regulation framework.

2. Green Jobs Act of 2008

Massachusetts passed the Green Jobs Act in 2008 to directly capitalize on the economic opportunity created by addressing climate change.¹⁸⁰ One of the goals of the statute was to promote job creation in the clean energy sector,¹⁸¹ specifically jobs in energy efficiency.¹⁸² The commonwealth had good reason to do so as well; according to a University of Massachusetts, Amherst study,¹⁸³ clean energy spending produces more jobs at all pay levels than the fossil fuel industry.¹⁸⁴ In order to actually create those jobs, however, the commonwealth needed to attract green business to Massachusetts, as well as train its existing workforce to serve this burgeoning industry.

Accordingly, the Act established the Massachusetts Clean Energy Technology Center¹⁸⁵ ("Center") to serve as the commonwealth's lead regulatory agency in fostering the clean energy economy.¹⁸⁶ To assist in financing the Center, the Green Jobs Act also established the Massachusetts

178. *See id.* at 51.

179. *See id.* at 51–52.

180. An Act Relative to Green Jobs in the Commonwealth, ch. 307, 2008 Mass. Acts 1371.

181. *Id.*

182. *See* Mass. Gen. Laws ch. 23J, § 1 (2013); *see also* Mass. Gen. Laws ch. 23J, §§ 2(a)(i)–(xi) ("The [Massachusetts Clean Energy Center] shall promote and advance the commonwealth's public interests by: (i) acting as the commonwealth's lead agency . . . in the promotion and development of jobs in the clean energy sector . . . (iii) stimulating the creation and development of new clean energy ventures that will form the foundation of a strong clean energy industry sector or cluster in the commonwealth . . .").

183. Prepared under commission from the Natural Resources Defense Council and Green for All.

184. ROBERT POLLIN ET AL., DEP'T OF ECON. & POLITICAL ECON. RESEARCH INST., UNIV. OF MASS., AMHERST, GREEN PROSPERITY: HOW CLEAN-ENERGY CAN FIGHT POVERTY AND RAISE LIVING STANDARDS IN THE UNITED STATES 10, 12 (2009), *available at* http://docs.nrdc.org/globalWarming/files/glo_09062504a.pdf.

185. A department under EEA. *See* Mass. Gen. Laws ch. 23J, § 2(a).

186. Mass. Gen. Laws ch. 23J, § 2(a).

Alternative and Clean Energy Investment Trust Fund (“Fund”).¹⁸⁷ Moreover, the Center has regulatory authority to enter into agreements with public or private clean energy entities to further research and development in clean energy jobs, aid in the promotion of environmental protection, and collaborate with government and business to foster clean energy investment.¹⁸⁸ As of 2014, the Center has invested nine million dollars into the sixteen companies in its portfolio, which have raised a total of \$535 million in additional investment from private sources.¹⁸⁹

Generally, the Center has been successful in bringing investment dollars and jobs to Massachusetts’ clean energy sector. For example, clean energy businesses in Massachusetts have added a total of 28,000 workers to their payrolls since 2010—a 47% increase.¹⁹⁰ Over 1,000 new businesses were established in Massachusetts’ clean energy sector between 2011 and 2014.¹⁹¹ Clean energy employment statewide grew over 10% between 2013 and 2014.¹⁹² Renewable energy workers account for nearly 21,000 jobs in Massachusetts and employers expect to add about 3,800 new employees between 2014 and 2015—representing the fastest growth rate of any technology area in the commonwealth at a rate of 18%.¹⁹³ Furthermore, Massachusetts predicted it would add renewable energy jobs at a rate of 13.3% from 2014 to 2015.¹⁹⁴ In comparison, statewide overall job growth

187. Mass. Gen. Laws ch. 10, § 35FF(a) (2013); *see also* Mass. Gen. Laws ch. 10, § 35FF(c) (the fund shall advance the following public purposes: “(1) to stimulate increased financing for the expansion of state-of-the-art clean energy research and development facilities by leveraging private financing and providing financing related thereto including, without limitation, financing for the construction or expansion of such facilities; (2) to provide grants to state educational institutions to develop a curriculum relative to clean energy and clean energy technology; (3) to make targeted investments in clean energy research and to promote manufacturing activities for new or existing advanced clean energy technologies; (4) to make matching grants to universities, colleges, public instrumentalities, companies and other entities to induce the federal government, industry and other grant-funding sources to fund the expansion of research and development in clean energy”).

188. Mass. Gen. Laws ch. 23J, § 3(a)(14). For a full description of the Center’s authority, *see id.* at §§ 3(a)(1)–(30).

189. MASS. CLEAN ENERGY CTR., MASSACHUSETTS CLEAN ENERGY INDUSTRY REPORT 2014, at 38 (2014), *available at* <http://images.masscec.com/reports/Web%20Optimized%202014%20Report%20Final.pdf>.

190. *Id.* at 1.

191. *Id.* at 24.

192. *Id.* at 25.

193. *Id.* at 14.

194. *Id.* at 1.

projections in the same period are less than 2%.¹⁹⁵ This growth is derived primarily from the energy efficiency, renewable energy, and associated financial and legal service industries.¹⁹⁶

The Green Jobs Act has proven fruitful in demonstrating the viability of environmentally conscious economic policies. Even in the face of diminished federal subsidies, the renewable energy and energy efficiency markets continue to flourish in Massachusetts. Preparing its workforce for a transition to a clean energy economy will prove critical for Massachusetts. While the rest of the national economy undergoes the same transition, Massachusetts' economy will be primed to accommodate green business and its policymakers will understand what approaches are most effective at both addressing climate change and driving economic growth.

3. The Regional Greenhouse Gas Initiative

RGGI is a regional cap-and-trade program administered by nine Northeastern and Mid-Atlantic states, including Massachusetts. RGGI's "CO₂ Budget Trading Program" sets a decreasing carbon emission cap and regulates emissions from fossil fuel power plants with a capacity of twenty-five megawatts or greater located in RGGI states.¹⁹⁷ The current programmatic emissions budget is ninety-one million tons of carbon dioxide, divided among each state in rough proportion to emitting sources.¹⁹⁸

Each state issues carbon allowances through their own RGGI implementing regulations.¹⁹⁹ Massachusetts has twenty-seven regulated sources, constituting 16% of RGGI's carbon dioxide budget.²⁰⁰ Similar to California's cap-and-trade system, Massachusetts and the other RGGI states rely on category-specific, or standardized, additionality measurements. Currently, there are five categories of offsetting projects that are eligible

195. *Id.*

196. *Id.* at 13–14.

197. REG'L GREENHOUSE GAS INITIATIVE, OVERVIEW OF RGGI CO₂ BUDGET TRADING PROGRAM 2 (2007), http://www.rggi.org/docs/program_summary_10_07.pdf.

198. Reg'l Greenhouse Gas Initiative, RGGI States Make Major Cuts to Greenhouse Gas Emissions from Power Plants (Jan. 13, 2014), http://www.rggi.org/docs/PressReleases/PR011314_AuctionNotice23.pdf.

199. *Regulated Sources*, RGGI.ORG (last visited Feb. 10, 2014), http://www.rggi.org/design/overview/regulated_sources. Massachusetts' regulations implementing RGGI are found at 225 MASS. CODE. REGS. §13.01 (2013) *et seq.* and 310 MASS. CODE. REGS. § 7.00 (2013) *et seq.*

200. REG'L GREENHOUSE GAS INITIATIVE, RGGI REGION – STATE SNAPSHOTS, http://www.rggi.org/docs/RGGI_Snapshots_Region.pdf.

allowances under RGGI, for example, carbon sequestration in American forest preservation projects.²⁰¹

Offset allowances are distributed through quarterly auctions.²⁰² They are tracked using an online platform that enables the public to view and download reports of program data and allowance activity.²⁰³ Allowances are allocated and transferred on the platform and offset projects can be registered on it as well.²⁰⁴ The largely positive first RGGI program review was published on February 7, 2013, and concluded that there were several opportunities to build on RGGI's success.²⁰⁵ However, despite RGGI's largely positive beginnings, constitutional questions still linger around the regional cap-and-trade program. The following section examines possible constitutional issues that several legal scholars have raised in the years following RGGI's enactment.

i. Compact Clause Challenges

Under the Compact Clause in Article I of the Constitution, "no state shall, without the consent of Congress . . . enter into any agreement or compact with any other state . . ." Interpreting this language literally, RGGI is an unconstitutional agreement among the states because they never sought congressional approval. However, the Supreme Court has interpreted the clause differently than the literal language of the provision.²⁰⁶ The clause is now read to prohibit "the formation of any combination tending to increase the political power in the states, which may encroach upon or interfere with the just supremacy of the United States."²⁰⁷

201. REG'L GREENHOUSE GAS INITIATIVE, FACT SHEET: RGGI OFFSETS, http://www.rggi.org/docs/Documents/RGGI_Offsets_FactSheet.pdf. Other eligible offsetting projects include landfill methane capture and destruction, reduction in emissions of sulfur hexafluoride in the electric power sector, reduction or avoidance of end-use combustion of fossil fuels due to increased energy efficiency in the building sector, and avoided methane emissions from agricultural manure management operations.

202. REG'L GREENHOUSE GAS INITIATIVE, FACT SHEET: RGGI CO₂ ALLOWANCE AUCTIONS, http://www.rggi.org/docs/Documents/RGGI_Auctions_FactSheet.pdf.

203. REG'L GREENHOUSE GAS INITIATIVE, FACT SHEET: RGGI CO₂ ALLOWANCE TRACKING SYSTEM, http://www.rggi.org/docs/Documents/RGGI_COATS_FactSheet.pdf.

204. *Id.*

205. Reg'l Greenhouse Gas Initiative, RGGI States Propose Lowering Regional CO₂ Emissions Cap 45% (Feb. 7, 2013), http://www.rggi.org/docs/PressReleases/PR130207_ModelRule.pdf.

206. See *generally* Virginia v. Tennessee, 148 U.S. 503 (1893).

207. *Id.* at 519.

In other words, agreements that do not encroach upon federal sovereignty do not require Congressional consent.²⁰⁸

One scholar recently considered and dismissed the possibility of a viable Compact Clause challenge to RGGI.²⁰⁹ Applying *Virginia v. Tennessee* to RGGI, Professor Funk noted, “RGGI does not limit the federal government’s authority to regulate [carbon dioxide] in any way it sees fit.”²¹⁰ Moreover, no state has delegated any of its sovereign powers to RGGI, Inc., the administrative body that implements each states’ respective RGGI laws.²¹¹ In fact, all of RGGI’s powers stem solely from individual states’ laws, which are “nothing more than reciprocal legislation” with no capacity to bind other member states.²¹² RGGI only limits greenhouse gas emissions of electricity generators within each member states’ borders and does not interfere with any existing federal regulatory scheme. Professor Funk concluded: “It appears that the Compact Clause, like the Non-Delegation Doctrine, has become a restriction in theory, but in practice the restriction rarely applies.”²¹³ Thus, in light of RGGI’s inability to legally bind its constituents, the member states would likely withstand a Compact Clause challenge.

ii. Federal Preemption Challenges

RGGI may be subject to two possible preemption arguments: field and conflict preemption. The Supreme Court has articulated that field preemption exists when:

[I]n the absence of explicit statutory language, state law . . . regulates conduct in a field that Congress intended the Federal Government to occupy exclusively. Such an intent may be inferred from a “scheme of federal regulation . . . so pervasive as to make reasonable the inference that Congress left no room for the States to supplement it,” or where an Act of Congress “touch[es] a field in which the federal interest is so dominant

208. *Ne. Bancorp, Inc. v. Bd. of Governors of the Fed. Reserve Sys.*, 472 U.S. 159, 175 (1985).

209. William Funk, *Constitutional Implications of Regional CO₂ Cap-and-Trade Programs: The Northeast Regional Greenhouse Gas Initiative as a Case in Point*, 27 UCLA J. ENVTL. L. & POL’Y 353, 358–62 (2009).

210. *Id.* at 360.

211. *Id.*

212. *Id.*

213. Funk, *supra* notes 209, at 361.

that the federal system will be assumed to preclude enforcement of state laws on the same subject.”²¹⁴

However, where “the field which Congress is said to have preempted includes areas that have been traditionally occupied by the States, congressional intent to supersede state laws must be clear and manifest.”²¹⁵

Today, the field preemption argument is easily defeated. However, if EPA continues to increase its regulation of greenhouse gas emissions, the field preemption argument against interstate cap-and-trade programs may strengthen considerably. For RGGI to be preempted under a field preemption theory, Congress must speak to the issue so thoroughly as “to make reasonable the inference that Congress left no room for the States to supplement it.”²¹⁶ In this context, only one federal law comes to mind—the Clean Air Act. However, the Clean Air Act only tangentially discusses greenhouse gas emission regulation²¹⁷ and vests regulatory authority with the states.²¹⁸ Thus, Congress has not clearly spoken about the field of interstate greenhouse gas emission as to preempt states from supplementing what little federal regulation currently exists.

Conflict preemption is a better argument against RGGI, but it would likely fail in court as well. This type of preemption exists when Congress

214. *English v. General Elec. Co.*, 496 U.S. 72, 79 (1990) (quoting *Rice v. Santa Fe Elevator Corp.*, 331 U.S. 218, 230 (1947)).

215. *Id.* (internal quotations omitted) (citing *Jones v. Rath Packing Co.*, 430 U.S. 519, 525 (1977), *Rice*, 331 U.S. at 230).

216. *Id.*

217. While there is no federal global warming solutions act, the Supreme Court has held that Congress delegated the authority to regulate greenhouse gas emissions to EPA. *See, e.g.*, *American Elec. Power Co. v. Connecticut*, 131 S. Ct. 2527, 2538–39 (2011) (“The Clean Air Act is no less an exercise of the Legislature’s considered judgment concerning air pollution regulation because it permits emissions until EPA acts. The critical point is that Congress delegated to EPA the decision whether and how to regulate carbon-dioxide emissions from power plants The Clean Air Act entrusts such complex balancing to EPA in the first instance [of decision-making], in combination with state regulators.” (internal quotations omitted)).

218. 42 U.S.C. § 7401(a)(3) (2012) (“The Congress finds that air pollution prevention . . . and air pollution control at its source is the primary responsibility of States and local governments”); *see also* *Engine Mfrs. Ass’n v. S. Coast Air Quality Mgmt. Dist.*, 541 U.S. 246, 260 (2004) (citing 42 U.S.C. § 7401(a)(3) and *Huron Portland Cement Co. v. Detroit*, 362 U.S. 440, 442 (1960) (“Legislation designed to free from pollution the very air that people breathe clearly falls within the exercise of even the most traditional concept of what is compendiously known as the police power.”)).

intends federal law to exclusively occupy a given field, when it is impossible for a private party to comply with both state and federal law, and when the challenged state law “stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress.”²¹⁹ In light of the fact that greenhouse gas regulation is virtually absent from the Clean Air Act, it is highly unlikely that Congress intended to completely preempt state regulation of greenhouse gas emissions. Moreover, compliance with state greenhouse gas emission regulations could actually help states satisfy their requirements under the Clean Air Act—dispelling the notion that a private citizen could not comply with both state and federal greenhouse gas emission laws.²²⁰

IV. Elements of an Effective Greenhouse Gas Regulation Framework

A successful climate change law should consider the experiences of California and Massachusetts. Both states have broadly worded statutes that use a cross-sector approach; a renewable portfolio standard that includes all electric power generators; and a statewide cap-and-trade program or joint program with other states. Furthermore, state policymakers should incorporate the early lessons learned in California and Massachusetts when adopting climate change regulations in their states. Developing an understanding of how legal challenges to climate change regulation were overcome in other states is critical for policymakers to shape flexible regulation that can withstand potential legal challenges.

A. Statutory Design

The first component of an effective climate change regulation statute is a broad delegation of lawmaking authority. In Massachusetts and California, such a delegation enabled important policy evolutions in greenhouse gas regulation and proved successful in shielding climate change regulation in California from legal challenge. Both states used short statutory language that delegated statutory authority in this field to public resource agencies. For example, in Massachusetts, the legislature directed

219. *Crosby v. Nat'l Foreign Trade Council*, 530 U.S. 363, 372–73 (2000) (internal quotations and citations omitted).

220. For a brief discussion about a conflict preemption challenge under the Supreme Court's decision in *American Insurance Ass'n v. Garamendi*, 539 U.S. 396 (2003) (holding that state law can be preempted by executive branch policy alone), see Shelley Welton, *State Dynamism, Federal Constraints: Possible Constitutional Hurdles to Cross-Border Cap-and-Trade*, 27 NAT. RES. & ENV'T 36, 38–39 (2012) (rejecting argument that an interstate cap-and-trade program could conflict with the executive branch's international negotiating stance on climate change).

the EEA to simply set a greenhouse gas emission reduction target and issue a plan to implement that reduction.²²¹ Similarly, the California legislature directed CARB to adopt regulations that “achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions.”²²²

Legislative grants like these have encouraged the development of climate change plans in both states because the broad authority provides agencies with the flexibility to quickly implement much-needed regulation, while also reviewing and building upon their early experiences. For example, the Massachusetts’ legislature directed the EEA to create a policy plan with essentially no parameters, except that the plan must implement a greenhouse gas emission reduction target chosen by the agency. This allowed interagency coordination within the commonwealth in developing a plan that addresses several sectors of the Massachusetts economy. Moreover, the Massachusetts Global Warming Solutions Act was an outgrowth of existing policy designed to begin a transition to a clean energy economy.²²³ The inherent complexity and unfamiliarity of climate change to policymakers means iterative policy development is necessary because it creates an opportunity for policymakers to learn from past mistakes and adapt to the evolving science of climate change. CARB’s Scoping Plan is an excellent example of an agency developing and consolidating institutional knowledge about climate change regulation. The entire state builds expertise as a result of one agency’s iterative experience in regulating this otherwise unregulated field. Empowering agencies to push forward climate change regulation gives legislators a bird’s-eye view of where such regulation is going. With this perspective in mind, lawmakers should arm agencies with broad statutory tools to address climate change.

A broad grant of statutory authority to the regulating agency also proved successful in protecting California’s Global Warming Solutions Act from multiple legal challenges. Fossil-fuel interests will undoubtedly challenge any climate change regulation in court, thus it would be wise for state legislators to preemptively protect agency discretion by granting agencies quasi-legislative authority under climate change statutes. Two cases challenging AB 32 are characteristic examples of how broad statutory authority protects agency discretion in choosing one regulatory mechanism over another. First, in *Irritated Residents*, the California appellate court

221. See generally Mass. Gen. Laws ch. 21N (2013).

222. CAL. HEALTH & SAFETY CODE § 38562 (West 2014).

223. For example, the Clean Jobs Act of 2008 established a center and a trust fund that serve as the commonwealth’s guide to the transition to a clean energy economy. See *supra*, note 185. This policy tool fosters private investment in clean energy, thereby spurring technology innovation and giving policymakers new mechanisms to address climate change.

concluded that rules implemented under AB 32 have the “dignity of statutes” because CARB was granted “quasi-legislative” rulemaking power.²²⁴ Second, in *Citizen’s Climate Lobby*, the California trial court noted that AB 32’s broad legislative grant enabled CARB to adopt standardized protocols for measuring additionality in its cap-and-trade program, even though no other comparable cap-and-trade program in the world used this strategy.²²⁵ These holdings allow CARB to experiment with different regulatory strategies without fear of adverse litigation because the broad grant of power afforded to the agency pressures courts to defer to CARB’s reasoning. California courts appear even more deferential to the agency’s expertise in this field than what is normally expected because they recognize that the legislature has limited their standard of review and the agencies themselves are still trying to figure out which policy approaches best address climate change. This deference enables policy evolution, which will eventually lead to more effective climate change regulation in the future.

Of course, there are drawbacks to yielding rulemaking authority to an agency. State legislatures would be granting authority to potentially influence the entire economy. It may be inappropriate to completely defer such far-reaching decision-making power to unelected individuals. Further, if some of these agencies are “captured” by powerful stakeholders, for example, utility companies, climate change regulation could be hijacked and become a secondary objective. Conversely, deferring statutory authority to an agency acknowledges the fact that agencies have more technical expertise than legislatures. In comparison to the lobbying efforts necessary to influence legislators, small stakeholders wielding only minor political influence have a better chance at affecting agency rules because the rulemaking process is more transparent and bound by enforceable procedural rules. Ultimately, both government bodies will have a role to play. Expert agencies will be better equipped to address climate change when they are given the freedom to be creative and iterative. State legislatures can empower an agency by delegating broad lawmaking authority, allowing the agency to learn from its experiences.

An effective climate change statutory regime must be broadly written in another sense as well. The statute must also include a cross-sector approach to minimizing greenhouse gas emissions. Both California and Massachusetts wisely allowed their agencies to regulate all major greenhouse gas emitters in their respective economies. Both states’ climate action plans include policies for individual sectors, such as agriculture, energy efficiency, transportation, marine vessels and ports, and energy

224. *Ass’n of Irrigated Residents v. Cal. Air Res. Bd.*, 143 Cal. Rptr. 3d 65, 71 (Cal. Ct. App. 2012).

225. *Citizens Climate Lobby v. Cal. Air Res. Bd.*, No. CGC-12-519554, 2013 WL 861396, at *6 (Cal. Super. Ct. Jan. 25, 2013).

generation. Massachusetts' plan even adds consideration of climatic impacts to its environmental policy act. A cross-sector approach to seeking emissions reductions is important because climate change has systematic consequences.

The most important economic sectors to address are energy generation and transportation. While addressing other sectors may depend on the specific situation of a given state, energy generation and transportation raises issues common to all states. Transitioning these two sectors to mainly renewable fuels can be achieved through an RPS and an LCFS. Pushing utilities and vehicle manufacturers to evolve their energy mix is best achieved by requiring them to reach certain quotas of purchased renewable energy. All states should adopt renewable portfolio standards that direct energy utilities to purchase incrementally increasing amounts of renewable energy over time. Both California and Massachusetts are already considering increasing their renewable energy goals because their initial efforts at establishing renewable portfolio standards have proven both viable and successful. California's LCFS is a model for ten other states, including Massachusetts, expanding the effect of California's relatively stringent transportation fuel rules to nearly 25% of the American vehicle market.²²⁶ Establishing fuel standards in both the energy and transportation sectors is crucial to regulating greenhouse gas emissions because they significantly contribute to climate change.

Major climatic variation will impact all natural resources, which inherently underlie all phases of a state's economy. Moreover, every sector of a state's economy contributes to climate change, even if those emissions disproportionately come from the transportation and energy generation sectors. Therefore, climate change regulation must take a top-down approach because the nature of climate change and its latent consequences are such that all phases of society are impacted by regulation, or lack thereof.

B. Cap-and-Trade Program

States must look to a market based compliance mechanism to achieve greenhouse gas emission reductions. California and Massachusetts have both adopted cap-and-trade programs as alternatives to direct taxation of emissions. Other states should either create or join existing cap-and-trade programs because this method of carbon regulation is the most politically palatable method of limiting greenhouse gas emissions. The experiences of California and Massachusetts demonstrate that regulating greenhouse gas

226. AIR RES. BD. & CAL. ENVTL. PROTECTION AGENCY, FIRST UPDATE TO THE CLIMATE CHANGE SCOPING PLAN 49 (2014), *available at* http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

emissions via a cap-and-trade program is politically viable, despite the logistical burdens presented by cap-and-trade.

Massachusetts and its neighboring northeastern states provide a great example of a successful, though nascent, regional cap-and-trade model. RGGI distributes offset allowances to industries in member states through an online platform that enables the public to view and download reports of program data and allowance activity.²²⁷ Through this program, Massachusetts has begun to target twenty-seven major emitters of greenhouse gas emissions in its state, which together constitute 16% of RGGI's total carbon budget.²²⁸

Smaller states should share expertise and support to begin regulating greenhouse gas emissions within their geographic regions, using RGGI as a model. Larger states can look to California's statewide cap-and-trade program. Capping regional emissions from a handful of states is likely more feasible when a state with the amount of California's emissions is not involved. By itself, California's greenhouse gas program is the second largest such program in the world and regulates several greenhouse gas emission sources in California beyond what is statutorily required by AB 32.²²⁹

These fledgling emissions trading mechanisms are an important first step in regulating greenhouse gas emissions; however, both programs have also drawn criticism. Notably, neither state adopted any direct tax on greenhouse gas emissions as a means of regulating such emissions. In California, CARB completely rejected a carbon tax as a market based compliance mechanism and provided meaningful evidence supporting this decision only after being directed to by a trial court.²³⁰ In place of a carbon tax, Massachusetts enacted extensive economic incentives for its economy to reduce greenhouse gas emissions.²³¹ Its participation in RGGI also indicates the commonwealth's preference against direct taxation as a method of regulating greenhouse gas emissions. Obviously, both states have avoided direct taxation because it is a politically unpalatable method of regulating greenhouse gas emissions. This is unfortunate because directly taxing emissions appears on its face to be an intuitively simpler method of curtailing emissions. If entities are specifically taxed, they are

227. See *Ne. Bancorp, Inc. v. Bd. of Governors of the Fed. Reserve Sys.*, 472 U.S. 159, 175 (1985).

228. See Reg'l Greenhouse Gas Initiative, RGGI States Propose Lowering Regional CO₂ Emissions Cap 45% (Feb. 7, 2013), http://www.rggi.org/docs/PressReleases/PR130207_ModelRule.pdf.

229. AIR RES. BD. & CAL. ENVTL. PROTECTION AGENCY, *supra* note 226 at 86.

230. *Ass'n of Irrigated Residents v. Cal. Air Res. Bd.*, 143 Cal. Rptr. 3d 65, 71 (Cal. Ct. App. 2012).

231. See, e.g., Mass. Gen. Laws ch. 23J (2013) *et seq.*

compelled to minimize the act resulting in higher taxes. Instead both states must now deal with the Achilles' heel of cap-and-trade programs—measuring the additionality of carbon emissions.

The inherent complexity of measuring additionality cannot be understated. Measuring additionality is a near impossible task and both California's program and the cap-and-trade program established by the Kyoto Protocol have endured this criticism.²³² When reviewing greenhouse gas emissions regulatory regimes, courts are also limited in their standard of review for two reasons: (1) statutory restrictions; and (2) they have essentially no expertise in determining whether one additionality measurement system is more reasonable than another.²³³ A direct tax on greenhouse gas emissions would avoid all of these issues and focus simply on the amount of emissions actually emitted by a given source—a task much more easily understood than measuring the amount of carbon emissions that would not have been emitted in the hypothetical scenario wherein a cap-and-trade program did not exist.

As a result of the underlying political unpopularity of taxing greenhouse gas emissions, states are left with an indirect method of forcing industry to reduce their carbon emissions. However, at this point in time, any method of regulating greenhouse gas emissions is sorely needed. Taxing carbon directly would probably be an easier and more effective method of regulating greenhouse gas emissions, but political feasibility must inevitably be considered when adopting a law with such far-reaching impacts. Currently, the most politically popular method of regulating a state's carbon emissions on a broad scale appears to be cap-and-trade. States should adopt policies to support a cap-and-trade program and either create their own system or join an existing one. California and Massachusetts have proven the early viability of these regional programs and have the growing institutional expertise needed to assist other states in participating in this effort. Even though standardized additionality mechanisms have come under fire, they could ultimately prove to be an improvement from traditional case-by-case measurement systems. States need to begin limiting greenhouse gas emissions as soon as possible and cap-and-trade appears to be the most politically feasible method of doing so.

232. See, e.g., *Rocky Mountain Farmers Union v. Corey*, 730 F.3d 1070 (9th Cir. 2013), *cert. denied*, 134 S. Ct. 2884 (2014), *and* 134 S. Ct. 2875 (2014); Cal. Exec. Order S-01-07 (Jan. 2007), *available at* <http://www.arb.ca.gov/fuels/lcfs/eos0107.pdf>.

233. See *Citizens Climate Lobby v. Cal. Air Res. Bd.*, No. CGC-12-519554, 2013 WL 861396, at *10 (Cal. Super. Ct. Jan. 25, 2013).

V. Conclusion

In sum, California and Massachusetts provide other states with models for regulating greenhouse gas emissions within their own states. Their experiences in designing policy and defending agency action in court highlight the challenges that other states should work to avoid when making their own climate change law. States should adopt both fuel standards and cap-and-trade programs as soon as possible because these are the best politically viable tools for reducing greenhouse gas emissions. The early efforts of California and Massachusetts should serve other states as a guide to establishing these regulatory programs.

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