

CLEAN AIR THE NATURAL WAY: A CASE FOR HARMONIZING GLOBAL AUTO EMISSIONS STANDARDS

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But we can never do nothing . . . Once we are aware that the status quo is action, we can then compare its discoverable advantages and disadvantages with the predicted advantages and disadvantages of the proposed reform, discounting as best we can for our lack of experience. On the basis of such a comparison, we can make a rational decision which will not involve the unworkable assumption that only perfect systems are tolerable.

I. INTRODUCTION

Developing countries across the world are highly susceptible to climate change.² The number of people across the world without adequate access to water is projected to reach 2.6 billion by 2025, nearly nine times the population of the United States. And this is just one disturbing example of poverty exacerbated by the rise in average global temperatures, and a result of rapid fossil fuel consumption in the industrialized world.³ A single gallon of gasoline emits twenty pounds of carbon dioxide into the atmosphere; multiplying that number by every car driven in the U.S. balloons the figure to over 1.7 billion tons of carbon dioxide emitted into the atmosphere every year.⁴ And while the costs of inaction get higher, there is widespread agreement that substantial and economically viable solutions for reducing global greenhouse gas (GHG) emissions in the near future exist.⁵

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1. Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. MAG. 1243, 1247-48 (1968), available at <http://www.sciencemag.org/cgi/content/full/162/3859/1243> (last visited Sept. 9, 2010).

2. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [IPCC], THE REGIONAL IMPACTS OF CLIMATE CHANGE: AN ASSESSMENT OF VULNERABILITY, 3 (Nov. 1997) (prepared by Robert Watson, Marufu Zinyowera, and Richard Moss), available at <http://www.ipcc.ch/pdf/special-reports/spm/region-en.pdf> (last visited Sept. 16, 2010).

3. *Id.*

4. U.S. Dep't of Energy, Energy Efficiency and Renewable Energy, *Reduce Climate Change*, available at <http://www.fueleconomy.gov/feg/climate.shtml> (last visited Oct. 28, 2010); Env'tl. Prot. Agency, Office of Transp. & Air Quality, *Emissions Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel*, Feb. 2005, available at <http://www.epa.gov/oms/climate/420f05001.pdf> (last visited Oct. 28, 2010).

5. RICHARD B. ALLEY, ET AL., A REPORT OF WORKING GROUP I OF THE

This article argues that major automotive manufacturers can adopt a single global emissions standard with the help of effective government regulation, and that both sides can benefit from such action. The implementation of a single emission standard offers automakers the primary benefit of improved economic efficiency in global markets. Equally important is a recognition that strict emission standards will contribute to the reduction of greenhouse gas emissions, simultaneously helping to reverse the effects of global warming. In light of the combination of market and environmental benefits, this article attempts to reconcile competing positions held by regulatory bodies and auto manufacturers. The fear held by regulatory bodies that strict regulation in only some jurisdictions (as opposed to all of them) will result in automakers leaving the tightly regulated markets is misplaced in this context; one need only look to the heightened standards employed by California and the presence of every automaker in that highly regulated market to overcome such fears. The alternative to harmonization, and that which largely exists today, is a host of varying regulations that the auto industry has reluctantly accepted in order to continue operating in as many markets as possible.

As an introductory matter, the impact of greenhouse gas emissions resulting from transportation will be discussed. Following that, the threats that global warming pose, as evidenced by near unanimity in science, will be considered. Next, this article will attempt to provide a backdrop of events and conditions that leave us where we are today. In spite of the available technologies that reduce emissions and improve fuel consumption in automobiles, many which meet or even exceed the strictest jurisdictional standards, there are currently a variety of auto emissions regulations throughout the world.

A discussion of the demands that must be met by implementing a single standard will be raised, and suggestions offered to alleviate some of the challenges posed. This will lead to a host of ways in which a new standard can be reached. While a single standard implemented by the auto industry itself is unlikely, with the encouragement of effective government regulation it is not unachievable. A new standard in emissions output will allow the auto industry to reach a higher level of economic efficiency than if they were to continue under the current

varied regulatory requirements present across jurisdictions. In sum, harmonization offers a chance for automakers to improve their economic efficiency by providing an economy of scale, even in spite of increased costs required for technological adoption, and it has the ancillary effect of helping reverse the effects of climate change.

II. BACKGROUND

In May of 2009, United States President Barack Obama applauded the introduction of a single national emission and fuel consumption standard, the result of challenging negotiations between regulators and market actors.⁶ The certainty and predictability of the new policy was welcomed by the auto industry, and it highlights the value of harmonizing multiple regulatory standards for automakers.⁷ Major automakers agreed to drop any pending litigation enacted as a result of conflicting standards across the country as well, citing interests in working together with the government to enact a single emissions standard across America.⁸ Up to that point, several manufacturers had sought remedy in the courts for what they argued was an improper use of government authority to regulate emissions output in such varied ways.⁹ The new standard will impose a 35.5-mile per gallon (mpg) average requirement across an automaker's fleet (a manufacturer's full line of vehicles in production in a model year) to be met by 2016, and it represents a significantly cleaner and more efficient standard than those leading up to it.¹⁰

The auto industry welcomed the joint regulation introduced between the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA), approving its timetable to implement new technologies and its clarity.¹¹

6. Press Release, Office of the Press Sec'y, The White House, President Obama Announces Nat'l Fuel Efficiency Policy, (May 19, 2009), *available at* http://www.whitehouse.gov/the_press_office/President-Obama-Announces-National-Fuel-Efficiency-Policy/ (last visited Sept. 22, 2010).

7. *Id.*

8. Several of the world's largest auto manufacturers expressed support for the new joint regulation, including Honda, Toyota, Ford, GM, Daimler, BMW and Volkswagen, *see* U.S. Env'tl. Prot. Agency, Transp. & Climate, A New Generation of Clean Vehicles: Commitment Letters, *available at* <http://www.epa.gov/oms/climate/regulations.htm> (last visited Oct. 1, 2010).

9. John M. Broder, *Obama to Toughen Rules on Emissions and Mileage*, N.Y. TIMES, May 18, 2009, *available at* <http://www.nytimes.com/2009/05/19/business/19emissions.html> (last visited Sept. 17, 2010).

10. *Id.*

11. *Id.*

Environmentalists similarly have applauded the new national standard, specifically because it will implement the toughest fuel economy standards (which in turn will lead to a reduction of harmful emissions) that will result in a forty percent cleaner standard than the current one.¹²

The auto industry's support for the new regulation came at the heels of near financial collapse for the three largest automakers in the United States (General Motors (GM), Chrysler, and Ford) and their individual economic hardships likely played a part in their support.¹³ GM and Chrysler each received billions of dollars in federal funding to prevent their collapse, and while the support for the new national standard was likely influenced by their need for financial help, all parties are in agreement that the new standard is better than any mix of standards previously in place.¹⁴

In order to achieve a single emissions standard across the world, automakers must adopt the technology employed in their strictest jurisdictions across all of their markets. A unification of emissions standards, as evidenced by the new U.S. national program, makes sense from an economic standpoint because it provides the benefit of economies of scale and principles of efficiency, but also for other market-based reasons that will be explored further. The benefit of a single standard, from an environmental standpoint, is the reduction of greenhouse gas emissions that are a cause of global warming. Market actors, regulators, and the public stand to gain from a globally harmonized emission standard and the externality costs born by adopting a single standard can be overcome if regulators and manufacturers work in cooperation with one another.

The argument that global harmonization is not feasible because of the differing costs and benefits between states will be discussed, and rejected, based on an analysis of the Porter Hypothesis. Applied to this context, the Porter Hypothesis provides that market actors can act in harmony with environmental regulation and still improve their competitiveness in the marketplace.¹⁵ Further, the Porter Hypothesis argues that each (market actors and environmental regulation) shares common goals with the other, and instead of competing to better themselves, it contends that innovative market actors can gain market share over their competitors even if they adopt stricter regulatory

12. *Id.*

13. Broder, *supra* note 9.

14. *Id.*

15. Michael E. Porter & Claas van der Linde, *Toward a New Conception of the Environment-Competitiveness Relationship*, 9 J. ECON. PERSP. 97, 97 (1995).

standards.¹⁶ While the theory would likely become meaningless in an instance of full market harmonization (because acting in harmony would mean full and equal participation by all auto makers globally), it can act as a propellant to reaching a single standard by encouraging aggressive market actors to adopt a single standard in the face of many, ultimately paving the way for others to follow.

While this article is based on the premise that it is logical for market actors to adopt one standard and employ it globally, because they stand to gain from a single standard across all of their fleets, it will serve some purpose if it merely raises important questions that confront regulators and automakers, challenging them to consider the validity of a more efficient policy. Such a consideration may force a comprehensive retooling of emissions regulation in the auto industry that supports the adoption of tougher standards. The challenge of improving emissions standards may remain for further discussion, yet considering a single global standard is not only realizable but also represents a stride in the right direction towards curing the harms caused by auto emissions.

The case for global harmonization in controlling greenhouse gas emissions is not new, and the risks posed by individuals acting in their own interests have been made.¹⁷ Berkeley Professor of Law Daniel Farber warned more than ten years ago that environmental problems are not exclusive to individual jurisdictions; they do cross imaginary lines and impact all of us. As he described, chlorofluorocarbons (CFCs) emitted in India can injure the ozone layer around the earth; sewage discharged in Switzerland can affect the water quality in Holland; and smokestacks in Ohio can cause acid rain in New England.¹⁸ The economic argument for a coordinated solution in environmental regulation is undeniable, as both Farber and New York University Law School academic Richard Revesz have pointed out.¹⁹

Various methods offer ways in which we can counter the negative effects of climate change, including an agreement between affected jurisdictions or a centralized regulation by some higher governmental authority.²⁰ Although other valid methods exist, harmonization is an

16. *Id.*

17. See Daniel A. Farber, *Environmental Federalism in a Global Economy*, 83 VA. L. REV. 1283 (1997).

18. *Id.* at 1301.

19. See Richard Revesz, *The Race to the Bottom and Federal Environmental Regulation: A Response to Critics*, 82 MINN. L. REV. 535 (1997); see also Farber, *supra* note 17.

20. Farber, *supra* note 17, at 1301.

approach that this article supports as the most effective means with which we can overcome unstable degrees of auto emissions standards. The need to continue to improve on current environmental policies is essential at this junction in history, and in the case of auto emissions, it is essential to adopt fewer strict policies (or just one).

The global community is steadily reaching a consensus that the world is warming.²¹ Global warming poses serious consequences that threaten our biodiversity, cause serious flooding, and lead to fluctuations in precipitation everywhere.²² Of the primary sources of greenhouse gas emissions, the transportation sector accounts for 13%.²³ Carbon dioxide is the most prevalent greenhouse gas released because of human activity; its annual growth rate in atmospheric concentration was higher in the period from 1995 to 2005 (1.9 ppm) than it was for the period beginning in 1960 and ending in 2005 (1.4 ppm).²⁴ The need to implement environmental reduction practices in the auto industry is an urgent one. Indeed, the atmospheric lifetime of carbon dioxide ranges between five and two hundred years.²⁵ And global increases in carbon dioxide concentrations are due primarily to burning fossil fuels, of which auto emissions are one of the greatest contributors.²⁶ In sum, we are increasingly putting more carbon dioxide into the atmosphere in spite of the growing recognition of its long-term, negative impact on the environment.

The United States, the European Union, and China are the largest suppliers of carbon dioxide emissions globally, and together in 2004

21. PEW CTR. ON GLOBAL CLIMATE CHANGE, GLOBAL WARMING BASICS INTRODUCTION, *available at* <http://www.pewclimate.org/global-warming-basics/about> (last visited Sept. 17, 2010).

22. *Id.*

23. PEW CTR. ON GLOBAL CLIMATE CHANGE, GLOBAL ANTHROPOGENIC GHG EMISSIONS BY SECTOR, *available at* <http://www.pewclimate.org/facts-and-figures/international/by-sector> (last visited on Sept. 17, 2010).

24. ppm (parts per million) or ppb (parts per billion, 1 billion = 1,000 million) is the ratio of the number of greenhouse gas molecules to the total number of molecules of dry air. For example, 300 ppm means 300 molecules of a greenhouse gas per million molecules of dry air. *See* RICHARD B. ALLEY, ET AL., A REPORT OF WORKING GROUP I OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SUMMARY FOR POLICYMAKERS IN CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, 2 (2007), *available at* http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm (last visited Sept. 16, 2010).

25. PEW CTR. ON GLOBAL CLIMATE CHANGE, MAIN GREENHOUSE GAS NOTES, *available at* http://www.pewclimate.org/global-warming-basics/facts_and_figures/climate_science_basics/main_ghg_notes.cfm (last visited Sept. 16, 2010).

26. GLOBAL ANTHROPOGENIC GHG EMISSIONS BY SECTOR, *supra* note 23.

they accounted for almost 50% of the total amount emitted into the atmosphere.²⁷ In the United States, transportation sources accounted for 27% of the Country's total greenhouse gas emissions in 2003, and it remains one of the Country's fastest growing sources of GHG emissions.²⁸ The subject of this article primarily aims to address emissions standards for "light-duty" vehicles, which are primarily used for personal transportation.²⁹ Light-duty vehicles in the United States accounted for 62% of total transportation emissions in 2003, making them one of the greatest contributors of auto emissions in the country.³⁰ The tightening of just light-duty vehicles emissions standards could dramatically impact the presence of GHG in the atmosphere.

III. THE HISTORY AND STRUCTURE OF EMISSIONS REGULATION

A. Differing Global Emissions Standards

In the first decade of the twenty-first century there remained several different benchmarks for measuring emissions in light duty autos across industrialized nations, and perhaps tellingly, each country has its own regulatory scheme to match.³¹ Leading up to its newly agreed to national standard, the United States regulated carbon dioxide emissions through the Corporate Average Fuel Economy (CAFE) standard.³² CAFE required each automaker to meet specific fleet average fuel economy levels for all light duty autos.³³ The European Union operates in a different fashion. There, the automobile industry has voluntarily agreed to meet overall vehicle fleet carbon dioxide emissions levels in coordination with the government.³⁴ Australia similarly has a voluntary agreement between automakers and

27. PEW CTR. ON GLOBAL CLIMATE CHANGE, INTERNATIONAL ANNUAL CO₂ EMISSIONS, *available at* <http://www.pewclimate.org/facts-and-figures/international/annual-emissions> (last visited Sept. 16, 2010).

28. U.S. ENVTL. PROT. AGENCY, GREENHOUSE GAS EMISSIONS FROM THE U.S. TRANSPORTATION SECTION: 1990-2003, 6 (2006), *available at* <http://www.epa.gov/otaq/climate/420r06003.pdf> (last visited Sept. 15, 2010).

29. *Id.* at 7.

30. *Id.*

31. Feng An & Amanda Sauer, PEW CTR. ON GLOBAL CLIMATE CHANGE, COMPARISON OF PASSENGER VEHICLES FUEL ECONOMY AND GHG EMISSION STANDARDS AROUND THE WORLD, 4 (2004), *available at* http://www.pewclimate.org/docUploads/Fuel%20Economy%20and%20GHG%20Standards_010605_110719.pdf (last visited Sept. 16, 2010); *See infra* APPENDIX, Table 2.

32. An & Sauer, *supra* note 31, at 5.

33. *Id.*

34. *Id.*

government.³⁵ The primary distinction between CAFE regulations in the U.S. and those in Europe and Australia is the former's requirement that each manufacturer adhere to a permitted emissions standard, while the latter requires that a single benchmark for emissions is met by the industry as a whole.³⁶

In Japan and China, fuel economy standards are based on a weight classification system.³⁷ There, each vehicle must comply with the standard in force for its weight class.³⁸ This method of standardization is seen as well in Taiwan and South Korea, where an engine size classification system is employed.³⁹ To confuse things a bit more, China follows the EU's testing procedures while Taiwan and South Korea mirror the United States' CAFE system, and Japan operates its own testing practice.⁴⁰

There is a myriad of differing emissions standards for vehicles across the globe; Table 3 compares the United States, European Union, and Japan's emissions requirements for particulate matter and nitrogen oxides, highlighting the varying standards across the three countries in just one type of light-duty auto emission.⁴¹ While the U.S. requires 40 mg/km, or less, the EU, under its current Euro 5 standard, allows for 60 mg/km.⁴² And while differences in the nitrogen oxide standards represent various regulatory schemes, they are not indicative of the available technologies. One only need infer that if improved technologies are available in one jurisdiction, they can be made available in others if barriers to entry were removed. If an international automaker can produce cars that emit only 40 mg/km of nitrogen oxides in the U.S., there is not a gap in technology between jurisdictions preventing that standard to exist uniformly. The gap rests in varying degrees of regulation.

B. The Kyoto Protocol

In July of 2001, 178 countries came to a coordinated agreement

35. *Id.*

36. *Id.*

37. An & Sauer, *supra* note 31, at 5.

38. *Id.*

39. *Id.*

40. *Id.*

41. L.G. WESSELINK ET AL., THE IMPACT OF EURO 5: FACTS AND FIGURES, NETH. ENVTL. ASSESSMENT AGENCY REPORT, 3 (Feb. 2006), *available at* <http://www.rivm.nl/bibliotheek/rapporten/500043002.pdf> (last visited Sept. 21, 2010); *See infra* APPENDIX, Table 3.

42. WESSELINK ET AL., *supra* note 41.

that required all industrialized participants to reduce their individual emissions into the atmosphere.⁴³ The Kyoto Protocol, as its known, represents the largest coordinated effort of industrialized nations to address climate change. The United States, however, was not a party, citing the overly burdensome requirements of developed countries to commit to reductions and the negative impact it would have on the American economy.⁴⁴

The United States' failure to adopt the Kyoto Protocol was looked at by the rest of the developed world with agonizing distaste. British Deputy Prime Minister John Prescott expressed a desire to freeze all relations with America, French Prime Minister Lionel Jospin denounced Washington for "a serious unilateral act," and it was a primary concern of German Chancellor Gerhard Schroeder during his first visit to the Bush White House.⁴⁵ A belief that the U.S. was continuing to protect the interests of the oil elite, and forgoing serious environmental concerns in doing so, were mixed with the reality of an international agreement that lacked a signature from one of the world's greatest contributors of greenhouse gases and the result was ruinous for progress on climate change.⁴⁶ The reality that a global initiative is nearly impossible without American support was discouraging to many Europeans, and that the United States, because of its stature, could undermine a treaty negotiated by more than 100 countries was a harsh reality for many participants.⁴⁷ The impact of the United States' absence in Kyoto went beyond political allegiances; it left one of the largest contributors of light-duty auto emissions divided internally, too.

The United States' failure to adopt the Kyoto Protocol helped perpetuate its own dual-regulatory emissions standard, yet one was in place in the U.S. well before Kyoto's creation – the California and the

43. Thomas Lin et al., *Science and Politics of Climate Change*, N.Y. TIMES, available at http://www.nytimes.com/interactive/2009/12/07/science/20091207_CLIMATE_TIMELINE.html (last visited Sept. 11, 2010).

44. United Press Int'l, *Bush Defends Rejection of Kyoto Treaty*, NEWSMAX.COM, Mar. 30, 2001, available at <http://archive.newsmax.com/archives/articles/2001/3/29/164418.shtml> (last visited Sept. 21, 2010); See *infra* APPENDIX, Table 4.

45. Bret Stephens, *Why Bush's "No" to Kyoto Vexed Europe*, WALL ST. J. EUROPE (Summer 2001), available at http://www.europeanaffairs.org/archive/2001_summer/2001_summer_78.php4 (last visited Sept. 11, 2010).

46. *Id.*

47. *Id.*

federal EPA standards.⁴⁸ Some time before Kyoto, as far back as the 1960s, California emerged as what would eventually be coined a 'super-regulator,' imposing stricter standards than that of the federal government and even entering into informal agreements with the European Union addressing climate issues.⁴⁹ California's actions exemplified the response to an absent harmonized standard: "If political institutions do not perform reasonably well, then the race to the bottom is a definite possibility, so multilateral regulation may turn out to be justified on that ground."⁵⁰

C. The Evolution of the U.S. Emissions Regulatory Framework

Prior to the national program implemented by the EPA and NHTSA, auto emissions regulation across the United States was a mixture of California and federal standards.⁵¹ Its evolution exposes the difficulty in reaching a unified standard across multiple jurisdictions, yet makes clear that reaching such a standard is not only possible but has benefits for all parties.

The first auto emissions standards emerged in California in the 1960s, following the region's fight with poor air quality that started in the 1940s.⁵² The State's Motor Vehicle Pollution Control Board created the first tail pipe emissions regulation in California in 1966, following the creation of the federal Clean Air Act of 1963 and the Motor Vehicle Air Pollution Control Act of 1965.⁵³ The California and federal regulations were initially based on the same benchmarks for emissions, and it marked the beginning of a 40-year struggle to regulate auto emissions between the two.⁵⁴ While other states like New York attempted to enact their own regulations for emissions standards,

48. Christina G. Hioureas & Bruce E. Cain, *Transatlantic Environmental Regulation-Making: Strengthening Cooperation Between California and the European Union*, Leuven Centre for Global Governance Studies, 11 (2009), available at <http://igov.berkeley.edu/content/transatlantic-environmental-regulation-making-strengthening-cooperation-between-california-a> (last visited Sept. 21, 2010).

49. Under the dual system in place in the United States prior to the new national standard, a 'super-regulator' described a state like California that adopted stricter environmental standards than federal ones, who in turn would follow suit, creating a cycle where the 'super-regulator' pushed regulation forward and federal regulation followed from behind. *See id.*; *see infra* note 52, at 1107.

50. Farber, *supra* note 17, at 1306.

51. *Id.* at 1301; *see also infra* APPENDIX, TABLE 1.

52. Ann. E. Carlson, *Iterative Federalism and Climate Change*, 103 NW. U. L. REV. 1097, 1110 (2009).

53. *Id.*

54. *Id.* at 1111.

Congress only permitted (through legislation) those states that had adopted regulation prior to 1966 to deviate from federal standards (i.e. California).⁵⁵

Amendments to the Clean Air Act in the 1970s delegated power to the EPA to regulate emissions and from that point forward, despite Congress's delayed implementations of stricter standards, both the EPA and California's Air Resources Board continued to tighten emissions requirements for automakers.⁵⁶ Despite the delays in implementation, California enacted stricter standards throughout the 1970s and 1980s, and the federal government followed with numerous increased restrictions.⁵⁷

Dramatic improvements in emissions technology used in light duty autos were seen in the 1990s, largely in response to California's low emissions vehicle (LEV) and zero emissions vehicle (ZEV) programs.⁵⁸ The technologies exceeded California's Air Resource Board's expectations, and they responded with increasingly stricter standards; the LEV and ZEV programs succeeded in large part because they allowed automakers to spread emissions requirements over an entire fleet, so if one car dramatically exceeded the requirements another could fall behind.⁵⁹

Throughout the implementation of these increased regulations, the auto industry has fought their lack of clarity and difficulty to comply. What is clear, however, is that improved fuel economy leads to improved emissions standards, and the auto industry is capable of implementing the needed technologies into their fleets – what they opposed, in large part, was the lack of uniformity across U.S. jurisdictions.

The newly proposed program created by a joint effort of the U.S. Department of Transportation and the U.S. Environmental Protection Agency will apply to model years 2012 through 2016, and the requirements will allow for light-duty fleets to be built on a single platform across the entire country.⁶⁰ The program specifically aims to: (1) Increase fuel economy by approximately five percent every year; (2) Reduce greenhouse gas emissions by nearly 950 million metric tons; (3)

55. *Id.*

56. *Id.* at 1115.

57. Carlson, *supra* note 52, at 1117.

58. *Id.* at 1119.

59. *Id.*

60. Notice of Upcoming Joint Rulemaking to Establish Vehicle GHG Emissions and CAFE Standards, 74 Fed. Reg. 24008-9 (May 22, 2009).

Save the average car buyer more than \$3,000 in fuel costs, and; (4) Conserve 1.8 billion barrels of oil.

Under the new requirements, the auto industry must make new vehicles that can average 35.5 miles per gallon by 2016.⁶¹ Margo Oge, Director of the Office of Transportation and Air Quality of the EPA, describes the national program as an introduction of regulation that will allow automakers to build a national fleet that meets all of the requirements imposed by both the EPA and NHTSA in addition to meeting the goals imposed by California, among others, in greenhouse gas reductions requirements for model year 2012 through 2016.⁶²

The broad goal of harmonizing the two agencies' standards includes preserving manufacturer flexibilities in meeting the standards.⁶³ In doing so, the new standard will increase costs to manufacturers that will likely pass to consumers, but not exceed \$3,000 – which is a realistic amount a driver can expect to save on fuel costs over the life of the vehicle. New vehicles are estimated to cost an additional \$1,300 to reach the 2016 standards, yet those costs will be realized by the owner over three years.⁶⁴ Environmental Protection Agency Administrator Lisa Jackson projects that a new car, under the new standard, will result in a savings of \$3,000 over the life of a car as a result of more efficient fuel consumption.⁶⁵

The United States Supreme Court has played a role in the new national standard's fruition as well, granting the proper authority to regulate federal standards to the EPA. *Massachusetts v. E.P.A.* was more than an acknowledgement of the importance of addressing climate change; its ruling required the EPA to address emissions standards across the country.⁶⁶ In that case, Massachusetts challenged the EPA's refusal to limit carbon dioxide emissions from automobiles, alleging that it was harmed by climate change.⁶⁷ Specifically, Massachusetts

61. Chris Isidore & Suzanne Malveaux, *Obama Defends Auto Bailout, Touts New Fuel Rules*, CNNPOLITICS.COM, Sept. 15, 2009, available at <http://www.cnn.com/2009/POLITICS/09/15/obama.autos/index.html> (last visited Sept. 17, 2010).

62. *National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks: EPA/NHTSA Public Hearing*, 4 (2009), available at <http://www.epa.gov/oms/climate/regulations/ny-hearingtranscript-epanhtsa-final.pdf> (last visited Sept. 17, 2010).

63. Notice of Upcoming Joint Rulemaking to Establish Vehicle GHG Emissions and CAFE Standards, *supra* note 60, at 24010.

64. Isidore & Malveaux, *supra* note 61.

65. *Id.*

66. *Massachusetts v. E.P.A.*, 548 U.S. 497, 499 (2007).

67. Daniel A. Farber, *Adapting to Climate Change: Who Should Pay?* 23 J. LAND USE

argued that it was the victim of eroded coastlines along its border, and that as a result it would be required to spend its own money to cure the problem.⁶⁸ In his opinion, Justice Stevens acknowledged the EPA's concern of "a causal connection between man-made greenhouse gas emissions and global warming."⁶⁹ Furthermore, the Court recognized that although a reduction in auto emissions would not, by itself, reverse the effects of global warming, it nonetheless would represent a step in the right direction.⁷⁰ The Court acknowledged a relationship between the rise in global temperatures and the measurable increase in the concentration of carbon dioxide in the atmosphere.⁷¹ Further, "when carbon dioxide is released into the atmosphere, it acts like the ceiling of a greenhouse, trapping solar energy and retarding the escape of reflected heat."⁷²

Calling global warming "the most pressing environmental challenge of our time," a group of States, local governments, and private organizations, alleged in a petition for certiorari that the Environmental Protection Agency (EPA) has abdicated its responsibility under the Clean Air Act to regulate the emissions of four greenhouse gases, including carbon dioxide.⁷³ Petitioners asked the Court to answer two questions concerning the meaning of § 202(a)(1) of the Act: (1) whether the EPA has the statutory authority to regulate greenhouse gas emissions from new motor vehicles; and (2) whether its stated reasons for refusing to do so are consistent with the statute.⁷⁴ The outcome required the EPA to address the effects of global warming and climate change by regulating harmful emissions from automobiles. Among other things, it helped pave the way for the current national program being implemented in the United States.

D. The Auto Industry Has Supported a Clear, Unified Standard in the Past

The automobile industry has been lobbying for unified emissions standards in the United States dating back to the 1960s.⁷⁵ Following

& ENVTL. L. 1, 2 (2007).

68. *Id.* at 1.

69. *Massachusetts v. E.P.A.*, 548 U.S. at 499.

70. *Id.* at 500.

71. *Id.* at 504.

72. *Id.* at 504-505.

73. *Id.* at 504.

74. *Massachusetts v. E.P.A.*, 548 U.S. at 505.

75. Richard Revesz, *Federalism and Environmental Regulation: A Public Choice Analysis*, 115 HARV. L. REV. 553, 585-86 (2001).

California's enactment of the motor vehicle pollution control program (the first regulation of automobile emissions in the United States), the federal government introduced the Air Quality Act in 1967.⁷⁶ The federal regulation on auto emissions preempted both weaker and more stringent regulations imposed by states (except California's).⁷⁷ In 2004, following California's enactment of its own regulation of auto related emissions; the auto industry challenged its authority to do so and insisted on following a federal standard that would ensure a consistent fuel economy program.⁷⁸ Whether the auto industry encouraged federal legislation that sought to harmonize emissions standards because of cost minimizing concerns, or to reduce greenhouse gas emissions, is nonetheless indicative of the industry's preference towards harmony and of the benefits of harmonization for profit-seeking market actors.

Available data provides proof that light-duty autos, a growing section of the global economy, significantly contribute to greenhouse gas emissions.⁷⁹ The growth of automobiles with advanced technology, despite availability, is predicted to comprise less than five percent of total light duty miles in 2025.⁸⁰ Advanced technologies in autos include hybrids, diesel, and flexible-fuel designs, all of which are currently in the marketplace.⁸¹ Nevertheless, while automakers have not adopted a unified standard that employs their best technologies in their fleets worldwide, they have sought a regulatory standard that harmonizes multiple jurisdictions' emissions standards (both in the lobbying efforts seen in the 1960s in the United States, and in President Obama's recent National Program) in a way that hints at support for further harmonization across global markets.

IV. CASES FOR AND AGAINST HARMONIZATION

Harmonization, to be clear, represents the point at which all parties are acting in uniformity with each other. It is distinct from coordination, or instances where parties work together to reach a common goal with

76. *Id.*

77. *Id.*

78. Bureau of Nat'l Affairs, Daily Env't Report News, *Climate Change: Automakers, Dealers Challenge Regulation in California to Limit Vehicle Carbon Dioxide*, Dec. 8, 2005, 235 Den A-12 2004, available at http://news.bna.com/deln/DELNWB/split_display.adp?fedfid=8521195&vname=dennotabllissues&fn=8521195&jd=den_04_235_a_128&split=0 (last visited Sept. 21, 2010).

79. GLOBAL ANTHROPOGENIC GHG EMISSIONS BY SECTOR, *supra* note 23.

80. *Id.*

81. *See generally* GREENHOUSE GAS EMISSIONS FROM THE U.S. TRANSPORTATION SECTION: 1990-2003, *supra* note 28, at 42-43.

or without equal participation. The Kyoto Protocol, for example, is an instance of coordination. Each signatory agreed to meet its own goal in emissions reduction and on terms distinct from other signatories. This section offers an exploration of various reasons in support of and against harmonization. While some contend that unification poses unbearable costs for particular jurisdictions and therefore is unrealizable, others fear that it prevents experimentation that may lead to advancements in technology.

Those in favor of harmonization include believers in the ‘race to the bottom’ effect. The race to the bottom theory argues that jurisdictions will compete to retain industry by offering the least restrictive regulation, ultimately resulting in a ‘race’ to offer the regulations that is the easiest (or cheapest) to comply with.⁸² In a race to the bottom scenario, manufacturers are lured by lax environmental policies that entice them to enter into a particular market over other more restrictive ones.⁸³ In a system of dual-federalism where regulations are imposed at both a state and federal level, like in the United States, supporters argue that overcoming a race to the bottom requires sweeping federal legislation that imposes a single standard for all participants.⁸⁴ Similarly, if applied to a European context, an EU-wide standard would be required to avoid a race to the bottom across the continent between member countries. Further, a negative impact of the regulatory patchwork model, and a fear of a race to the bottom believer, is that it can undermine competition because of the increase in costs among varied jurisdictions.⁸⁵

In opposition to those who favor harmonization, some fear that adopting a harmonized standard across multiple jurisdictions will result in a lower, sub-optimal standard in order to mend the differences between loose and strict regulation.⁸⁶ Indeed, the federal government in the United States acknowledged that a unified standard imposed to on all states could be construed as an industry subsidy, and one that does not adequately address the harms posed by global warming.⁸⁷ Critics

82. Revesz, *supra* note 19, at 537-538.

83. *Id.*

84. *Id.*

85. Kirsten H. Engel, et al., *Subglobal Regulation of the Global Commons: The Case of Climate Change*, 32 *ECOLOGY L.Q.* 183, 230 (2005).

86. Kirsten H. Engel, *State Environmental Standard-Setting: Is There a “Race” and is it “to the Bottom”?*, 48 *HASTINGS L.J.* 271, 368 (1997).

87. *National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks: Public Hearing held by EPA/NHTSA*, 13-14 (Oct. 23, 2009), available at <http://www.epa.gov/oms/climate/regulations/ny-hearingtranscript-epanhtsa-final.pdf> (last

further argue that harmonization is inefficient because technologies can be more costly to adopt in certain jurisdictions than in others, and the result is unfair burdens imposed on some at the benefit of others.⁸⁸ Or even worse, opponents fear that technological advancements take a back seat to fighting various regulations, bringing a firm's innovativeness to a standstill.⁸⁹ An example to illustrate this point can be seen in the U.S., where major automakers were involved in litigation challenging the legality of regulations imposed on them, which arguably halted efforts to improve designs.⁹⁰ Following the adoption of the national program, all agreed to drop pending suits.⁹¹

Failures of harmonization are as prevalent as its successes in the literature. There are, however, ways to overcome the failures. The idea that environmental regulation can be expanded following support from a market actor (instead of in the face of disapproval) was seen following the Kyoto Protocol, and also recently in the United States with the creation of the single national program.⁹² Upon the realization that varying greenhouse gas regulatory regimes were unequal, industry members sought to harmonize the competing regulations in an attempt to cut costs associated with varying policies.⁹³

A key ingredient in a race to the bottom theory is the underlying premise that regulators and market actors have divergent interests.⁹⁴ For example, regulators often raise concerns for market development that fails to consider the future health of the environment, while the market actor is interested in making profits.⁹⁵ Following that notion, if a free trader were let open to roam, following this (race to the bottom) rationale, he would scurry off to the place that is the least expensive for him to conduct his business. If an environmentalist or policymaker had his way, following the same rationale, regulation would be crafted that would force market actors to take the future impact of their activities into account, and to regulate the impact accordingly. Even if overly

visited Sept. 17, 2010).

88. *Climate Change: Automakers, Dealers Challenge Regulation in California to Limit Vehicle Carbon Dioxide*, *supra* note 78.

89. *See id.*

90. *See* Env'tl. Prot. Agency, "Transportation and Climate: Regulations and Standards" (May 2010), available at <http://www.epa.gov/oms/climate/regulations.htm> (last visited Sept. 16, 2010).

91. *See* Commitment Letters, *supra* note 8; Broder, *supra* note 9.

92. *See* The White House, Office of the Press Sec'y, *supra* note 6.

93. *See* Revesz, *supra* note 75, at 573.

94. *See* Farber, *supra* note 17.

95. David M. Driesen, *Sustainable Development and Market Liberalism's Shotgun Wedding: Emissions Trading Under the Kyoto Protocol*, 83 IND. L.J. 21, 56 (2008).

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simplified, this distinction is irrational; policymakers and free trade proponents are not so separate in their goals.⁹⁶ Despite competing beliefs, the interests of both have the potential to benefit from a harmonized system across jurisdictional boundaries. To be clear, the relationship is more of a balancing act; policymakers do not want their business constituents to be uncompetitive in the market place as a result of strict regulation, nor do competitive market actors wholly sacrifice long-term growth for short-term profits. This leaves room for compromise and mutually beneficial regulation.

Competing positions on whether harmonization is good for reducing greenhouse gas emissions and environmental policy in general continue to be debated. Those who favor a unified regulation across multiple jurisdictions include followers of the ‘race to the bottom’ theory. They fear that absent harmonization climate change will not only remain stagnant, but that it will continue to worsen. That fear resonates across all debates on global warming and environmental policy, and is not exclusive to race to the bottom followers.

Coordination between regulators and the auto industry has resulted in the removal of trade barriers between the EU and the United States.⁹⁷ Policies designed in furtherance of trade relations between the two countries offer an example of the success and appreciation policymakers and market actors have for one another.⁹⁸ If the lessons learned are applied to the auto industry’s adoption of a unified emissions standard, regulators can successfully work toward harmonizing emissions standards across state lines in conjunction with (and not in opposition to) the manufacturers. One way of achieving this is by breaking down the barriers that exist between nations who will not allow vehicles designed for one jurisdiction to come into their own.

Establishing a global auto emissions standard is an opportunity for automakers to increase their efficiency in the marketplace, and it would help strengthen their reputations globally. For example, some have argued that a primary role in California’s decision to enter into a Memoranda of Understanding (MOU) with the European Union on environmental regulation was their interest in being considered a leader in addressing climate change.⁹⁹ It also provides an example of the benefit of coordination.

Automakers who adopted a unified emissions standard across

96. Farber, *supra* note 17, at 1301.

97. *Id.*

98. *Id.* at 1318.

99. Hioureas & Cain, *supra* note 48, at 4.

jurisdictions, adhering to the strictest standard of all of the places they sell vehicles, would signal to the industry and environmental leaders their commitment to addressing global climate change. This benefit, one in support of harmonization, would work particularly well for an automaker whose record on climate change is poor. As an example, consider Turkey's adoption of the European Convention on Human Rights and Fundamental Freedoms; it signaled to the European Union that Turkey wanted to address concerns about its record on human rights.¹⁰⁰ If General Motors were to adopt a global emissions standard across all of its fleets, its reputation would improve at a time when its competitiveness in the marketplace has diminished markedly.

A. The Emergence of a Super Regulator

The presence of a single emissions standard that automakers adopt across their fleets would not pose a threat to further advancements in emissions reductions following implementation, contrary to what those opposed to harmonization contend. Specifically, the emergence of a super-regulator, exemplified by California, could continue to drive improvements in emissions regulation in spite of a universal standard. The harmonized emissions standard could act as a benchmark for automakers, yet implementing improvements in emissions output following the adoption of a single standard could lead to a competitive advantage for those who participate over those who do not.¹⁰¹

Under a model of iterative federalism, the federal government designates a state for 'special regulator' powers (super-regulator states).¹⁰² This model, described by UCLA academic Ann Carlson, explains how California was permitted to deviate from uniform national automobile emissions standards so long as it implemented more stringent regulations than the federal ones.¹⁰³ California has been recognized as the country's leader in enacting statewide policies and regulations in motor vehicle emissions reductions.¹⁰⁴ California was uniquely poised to take this position in part because it is permitted to

100. *Id.*

101. See Carlson, *supra* note 52, at 1102.

102. ANN E. CARLSON, *California Motor Vehicle Standards and Federalism: Lessons for the European Union*, in HANDLING GLOBAL CHALLENGES MANAGING BIOSAFETY/BIODIVERSITY IN A GLOBAL WORLD: EU, US, CALIFORNIA AND COMPARATIVE PERSPECTIVES 78, 78 (Jo Swinnen et al. eds.) available at http://www.transatlantic.be/publications/edited_report_26june.pdf (last visited Sept. 22, 2010).

103. *Id.*

104. *Id.* at 78-79.

adopt regulations that are better than those created by the EPA in emissions standards, which was re-affirmed by the *Massachusetts v. EPA* decision.¹⁰⁵ The California Air Resources Board existed before the Clean Air Act created the Environmental Protection Agency in 1970 – as a result California has authority to pass more stringent air pollution standards than the Federal Government, an authority affirmed by the Supreme Court’s decision. Further, other states were permitted to adopt California’s standards, but no other state could independently surpass the standards set by the Federal Government.¹⁰⁶

As demonstrated by California, if only one state out of fifty adopts a more stringent standard for regulating greenhouse gas emissions than the federal standard, a possible testing ground emerges. The enactment of the new national program demonstrates the benefit of a super-regulator, and the model can be transferred to the European Union in adopting a widely accepted greenhouse gas emissions regulation by first going through a member state. In the U.S., the result of the dual-standard seen leading up to the national standard was a “two car” economy in terms of auto emissions.¹⁰⁷ About a third of the country follows the California standards and the remaining states sell federally certified cars.¹⁰⁸ Carlson argues that the Clean Air Act in combination with the State’s political and regulatory leadership resulted in California achieving super-regulator status, and the relationship between California and the federal government under Carlson’s example provides an important step towards the recently enacted national program.

The combination of iterative federalism and the emergence of a super-regulator help overcome a fear that stagnation will result from the adoption of a single standard across the world. Combined, they can prevent the stagnation effect that critics of harmonization cite as one of its primary failures. Iterative federalism offers a framework for the European Union if a harmonized emissions standard was adopted by automakers selling in the territory – with certain super-regulator states emerging, if they haven’t already.¹⁰⁹ Germany, who began the reduction

105. PEW CTR. ON GLOBAL CLIMATE CHANGE, STATE AND LOCAL NET GREENHOUSE GAS EMISSIONS REDUCTION PROGRAMS, *available at* <http://www.pewclimate.org/states.cfm?ID=51> (last visited Sept. 22, 2010).

106. *Id.*

107. CARLSON, *supra* note 102, at 78.

108. *Id.*

109. Ann Carlson suggests that Scandinavia, the Netherlands, Austria and Germany are all potential Super-Regulators because they have shown a greater concern for environmental issues than other member states, *see* FRANS VAN WARRDEN, *Governing*

of lead in gasoline in the 1970s, could drive innovation as a super-regulator that still continues to push for to higher standards.

Iterative federalism schemes have the advantage of preserving technological advancement while gaining the benefits of harmonization. In the United States, having 50 different state-bureaucracies with individual regulatory schemes can harm manufacturers because they still have to comply with each scheme in order to stay in the marketplace.¹¹⁰ Further advantages are seen in economies of scale, where the geographic center of a super-regulator can provide the benefits of having several firms working on innovating emissions technology in close proximity to one another, allowing for the transfer of ideas and professionals.¹¹¹ Harmonization across multiple jurisdictions would likely require either some type of 'super-regulator' to drive innovation (in the case of a jurisdiction), or an innovative manufacturer in the marketplace that continues to push forward with newer technologies. Yet, a single standard like the new national program in the U.S. does offer the advantages of clarity and uniformity for all parties to use as a starting point.

B. Avoiding the Tragedy of the Commons and a Race to the Bottom

The auto industry does not need to uniformly adopt a harmonized emissions standard at the same time. It is possible for one automaker to adopt a harmonized standard across jurisdictions, or for several manufacturers to collectively agree to offer a single emissions standard across all of its fleets globally – even if some choose not to participate. The “tragedy of the commons” described by Garrett Hardin has been applied to challenges of climate change because, like his “tragedy,” climate change policies often lack incentive for individual nations to adopt stricter policies.¹¹² The risk to them, of decreasing their benefit from the “commons” without being able to fully prevent environmental change, results in inaction.¹¹³

The tragedy of the commons in the case of a stricter, globally harmonized emissions standard may exist because of the disincentive of

Global Commons, Public-Private-Protection of Fish and Forests, in HANDLING GLOBAL CHALLENGES MANAGING BIOSAFETY/BIODIVERSITY IN A GLOBAL WORLD: EU, US, CALIFORNIA AND COMPARATIVE PERSPECTIVES 78, 78 (Jo Swinnen et al. eds.), available at http://www.transatlantic.be/publications/edited_report_26june.pdf (last visited Sept. 22, 2010).

110. CARLSON, *supra* note 102, at 99.

111. *Id.* at 96.

112. Engel, *supra* note 85, at 190.

113. *Id.*

automakers to incur costs for adopting technologies to fleets that would not otherwise need them, and for passing that cost along to customers in a competitive marketplace.¹¹⁴ In the case of harmonized emissions, the inaction of all automakers uniformly to adopt a uniform standard could nonetheless be overcome if some or even one were to act. The tragedy of the commons serves to demonstrate that some action may be better than none, even if it only reaches a part of the desired outcome (of full harmonization).

An example of inaction demonstrating the Tragedy's logic – the refusal of the United States to adopt the Kyoto Protocol – is overcome in instances where a super-regulator emerges. The super-regulator acts as a driving mechanism toward achieving the desired result. When California adopted strict emissions standards, it not only forced automakers to adopt the requirements, it also led to the national program standard that encompassed earlier regulations imposed in California.

The fear of a race to the bottom justifies the enactment of a harmonized standard; believers of the theory argue that market actors will veer towards jurisdictions that offer very loose standards in the absence of a single policy. The result is a perpetually declining response to climate change that can only be overcome with harmonization. In the automotive industry, a market actor will provide cars with emissions standards that meet the jurisdiction in question's regulations. Thus, as a result of a race to the bottom scenario, the costs born from multiple regulations become a burden to the consumer, and he faces the uncertainty of a patchwork regulatory scheme. He pays higher prices charged by the manufacturer, who seeks to recover the expenses resulting from differing standards. The burdens transferred to the consumer become a negative externality of environmental regulation imposed on automakers, who must compete to reduce those costs to stay competitive, an externality that would disappear if a globally harmonized standard were established. Costs to the consumer, in a harmonized setting, would flatten as the costs of adoption were spread across all participating jurisdictions.

Ultimately, harmonization on a global scale would lead to more efficient production practices and reduced uncertainty in costs imposed on new car buyers. When manufacturers are confronted with costs in response to new regulation, the burden of complying with multiple regulations can be more costly than adopting the strictest. Even worse, under the myriad of differing regulations that address emissions in

114. Hardin, *supra* note 1, at 1244-45.

today's system, when one jurisdiction seeks to contain a byproduct of light-duty autos more than other contaminants, and a neighboring jurisdiction seeks to contain a different one, the result is high costs, uncertainty, and inefficient production. All of which can be overcome by a globally imposed harmonization policy.

Cooperation between automakers and regulators in the newly adopted U.S. national program offers some insight into who bears the costs of implementing an improved standard that replaces multiple ones that were, on the whole, less restrictive. In press releases following the program's announcement, the President made declarations with the Agencies involved about the costs being a wash for all parties.¹¹⁵ He admitted that manufacturers would pass costs borne by the implementation of improved fuel and emissions standards to buyers of new autos, who in turn would recuperate those costs by saving on fuel over the life of the vehicle.¹¹⁶ This is a somewhat wishful selling strategy: that people should be excited by the reform of emissions standards in spite of increasing costs for new vehicles, even if those costs can be regained over the life of the vehicle through fuel savings. In the final analysis, however, while short-term costs may rise, in the long-term manufacturers and consumers are able to recuperate their increased expenditures under the new standard.

C. *The Porter Hypothesis*

Expanding the new national program in the United States to the global market presents hurdles, yet the means by which it could occur have been articulated. The Porter Hypothesis was developed almost twenty years ago, describing a shift in the definition of competitiveness between environmental and industrial goals.¹¹⁷ It offers a model by which auto manufacturers could improve their global competitiveness even in the face of stricter regulation. As the harms of industrial growth on the environment emerged, the relationship between regulators and market actors were often polarized.¹¹⁸ When policymakers pushed for tougher restrictions, industry fought back and the result was deconstructive and inefficient.¹¹⁹ The Porter Hypothesis sought to

115. Office of the Press Sec'y, *supra* note 6; Notice of Upcoming Joint Rulemaking to Establish Vehicle GHG Emissions and CAFE Standards, 74 Fed. Reg. 24007, 24009 (May 22, 2009); Isidore & Malveaux, *supra* note 61.

116. Isidore & Malveaux, *supra* note 61.

117. Porter & van der Linde, *supra* note 15, at 97.

118. *Id.*

119. *Id.*

redefine this dichotomy, attempting to mend the perception of contention between the two by arguing that they actually had similar goals.¹²⁰ When the argument was first introduced, the technologies available to automakers were more limited than today, and likewise, environmental restrictions were not as prevalent. Yet, consistent with the Porter Hypothesis, an innovative automaker can act as a catalyst for harmonizing emissions standards globally by unifying its fleets across multiple jurisdictions. Doing so would not only allow that manufacturer to realize cost-reductions and increases in their market share, it would also demonstrate to the industry the benefits of a harmonized standard.

Environmental regulation can serve as a trigger for innovation, and in this case, for encouraging major auto manufacturers to adopt a single emissions standard in their fleets globally, by using “innovation offsets” to absorb the costs of adopting a harmonized standard.¹²¹ Innovation offsets represent savings to a market actor who employs innovative technologies in response to regulation, generating more in profits than the costs of compliance.¹²² The Porter Hypothesis also argued that innovation offsets could be beneficial to a global firm beyond covering the costs of compliance because they can lead to absolute advantages over firms who aren’t required to adhere to strict regulation.¹²³ In other words, firms who do not have to adhere to strict regulation cannot compete with those who already meet those strict standards, so those in compliance face less competition.

If we define innovation as positive adaptations that respond to society’s demands more effectively than current systems, then a harmonized emissions standard would fall under the benefits of the Porter Hypothesis. The costs of compliance for manufacturers would be recuperated by innovation offsets and early market entry gains, and potential for increased revenue could even exceed compliance costs. The costs of adopting a harmonized standard globally, therefore, would not need to be passed on to car purchasers necessarily.

V. CONCLUSION

The details of how a single emissions standard would play out if employed across the world demands further analysis, yet the idea that benefits are realizable is based not only on theoretical principles, but demonstrated by the United States’ new national program as well.

120. *Id.*

121. *Id.*

122. Porter & van der Linde, *supra* note 15, at 97.

123. *Id.* at 98.

Various methods of harmonization could be used to achieve a single standard, and in the emergence of a super-regulator or a market actor adopting the underpin of the Porter Hypothesis, the need for industry harmonization would not be required. The benefits of an early-market entry by one market actor could act as encouragement for all of the major automakers to adopt similar standards globally.

The race to the bottom argument offers valid reasons for adopting a single emissions standard globally, and the fear that one standard has the potential to be too relaxed is not misplaced. Yet, both the innovation offsets offered by the Porter Hypothesis and the emergence of a super-regulator serve to ameliorate such fears. Effective policy should provide a meaningful benchmark for emissions and still allow for deviations that continue to drive innovative improvements to auto emissions and, ultimately, the reversal of harmful climate change. Given the benefits, harmonization should be seen as a step forward in reducing greenhouse gas emissions and reversing global warming, and also as a means of increasing the auto industry's economic efficiency.

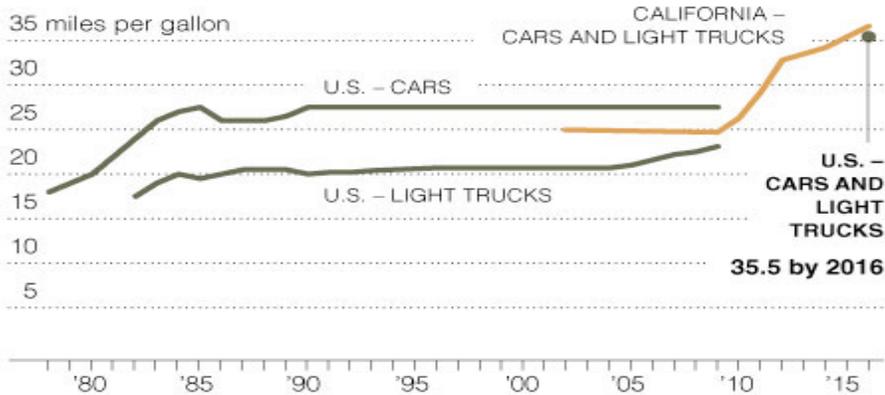
VI. APPENDIX

Table 1¹²⁴

Making Vehicles More Efficient

A new national fuel-efficiency standard for cars and light trucks was influenced by California's tough auto-emission rules.

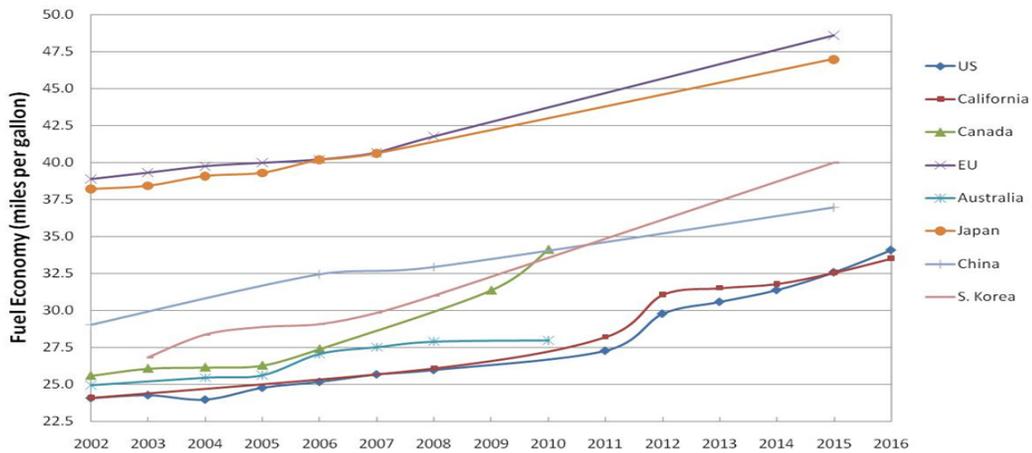
Fuel-efficiency standards



Sources: California Air Resources Board; National Highway Traffic Safety Administration

THE NEW YORK TIMES

Table 2¹²⁵



124. John M. Broder, *Obama to Toughen Rules on Emissions and Mileage*, N.Y. TIMES, May 18, 2009, available at <http://www.nytimes.com/2009/05/19/business/19emissions.html> (last visited Nov. 1, 2010).

125. PEW CENTER, COMPARISON OF ACTUAL AND PROJECTED NEW PASSENGER VEHICLES, available at <http://www.pewclimate.org/federal/executive/vehicle-standards/fuel-economy-comparison> (last visited Nov. 1, 2010).

Table 3¹²⁶*Table 1 Euro 4 and Euro 5 emission requirements and the emission requirements in Japan and the United States (COM, 2005)*

		Passenger car Petrol		Passenger car diesel		Light commercial vehicles ^{c)}	
		Particulate matter	Nitrogen oxides	Particulate matter	Nitrogen oxides	Particulate matter	Nitrogen oxides
		<i>mg/km</i>					
Euro 4	2005	-	80	25	250	25 / 60	80 / 390
Euro 5	2008/ 2009 ^a	5 ^{b)}	60	5	200	5	60 / 310
Japan	2009	5	50	5	80	7	50 / 150
USA	2004/ 2009	6	40	6	40	6 / 10	70 / 120

a) Assuming political decision making in 2006.

b) For lean burn direct injection.

c) Low values: light commercial vehicles operating on petrol; high values: heavy commercial vehicles operating on diesel.

Table 4¹²⁷

**Meeting the Kyoto Challenge:
Some Do, Others Don't**

The Kyoto Protocol aims to reduce greenhouse gas emission levels to at least 5 percent below 1990 levels. The agreement sets goals for individual countries, ranging from Germany's 21 percent reduction to Spain's limit of a 15 percent increase.

Data exclude emissions from land use, land-use change and forestry.



Sources: National greenhouse gas inventory data for 1990 to 2006, U.N. Framework Convention on Climate Change; THE NEW YORK TIMES

127. Elisabeth Rosenthal, *Obama's Backing Raises Hope for Climate Pact*, N.Y. TIMES, Feb. 28, 2009, available at <http://www.nytimes.com/2009/03/01/science/earth/01treaty.html> (last visited Nov. 1, 2010).