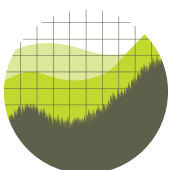




Shifting Gears

A New Approach to Reducing Greenhouse Gas Emissions from the Transportation Sector



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Introduction

Each year, the United States Environmental Protection Agency (EPA) establishes renewable fuel standards, which dictate the minimum volumes of various types of biofuel that refiners and importers must blend into the national fuel supply.¹ The Energy Independence and Security Act of 2007 provides annual target volumes, but EPA may deviate from these guidelines if it finds that the domestic supply of renewable fuel is inadequate to meet Congress's goals.² Recently, the agency did just that, proposing an overall quota for 2014 that is almost 3 billion gallons shy of the statutory target and more than 1 billion gallons below the quota EPA imposed in 2013.³

In defense of the shrunken standard, EPA cites two market constraints. First, there is limited demand for the most plentiful biofuel, ethanol, because most vehicles cannot tolerate gasoline that contains more than 10% (or, at most, 15%) ethanol.⁴ Second, there is a limited supply of any *non-ethanol* biofuels, because very few facilities are able to produce such fuels at a commercial scale.⁵ In other words, the U.S. can't yet use the biofuel it has and can't yet make the biofuels it needs.

Figure 1. Total Renewable Fuel Requirement, 2008–2014



Source: Energy Information Administration

In EPA's view, it is pointless to make refiners and importers purchase ethanol that consumers are unable to use. After all, biofuels only cut greenhouse gas emissions to the extent that they replace higher-carbon conventional fuel in American gas tanks. Unsurprisingly, not everyone agrees with EPA's assessment. Ethanol producers have criticized the agency for "buy[ing] into the oil industry's fictitious 10 percent ethanol 'blend wall' concept" and "halt[ing] the transformation of the liquid fuels marketplace just as it was beginning in earnest."⁶

Whatever the merits of EPA's reasoning, one thing is clear: a static or shrinking biofuels mandate will not achieve the renewable fuel program's "central policy goal" of reducing carbon pollution.⁷ If fuel standards are truly stuck in neutral, EPA must look to new regulatory tools to drive further cuts in transportation emissions.

As Policy Integrity has argued since 2009, EPA can most effectively and efficiently reduce transportation-related greenhouse gas emissions by adopting a cap-and-trade program for vehicle fuels under the Clean Air Act.⁸ This policy brief explores the practical benefits of—and legal authority for—a cap-and-trade program and finds the following:

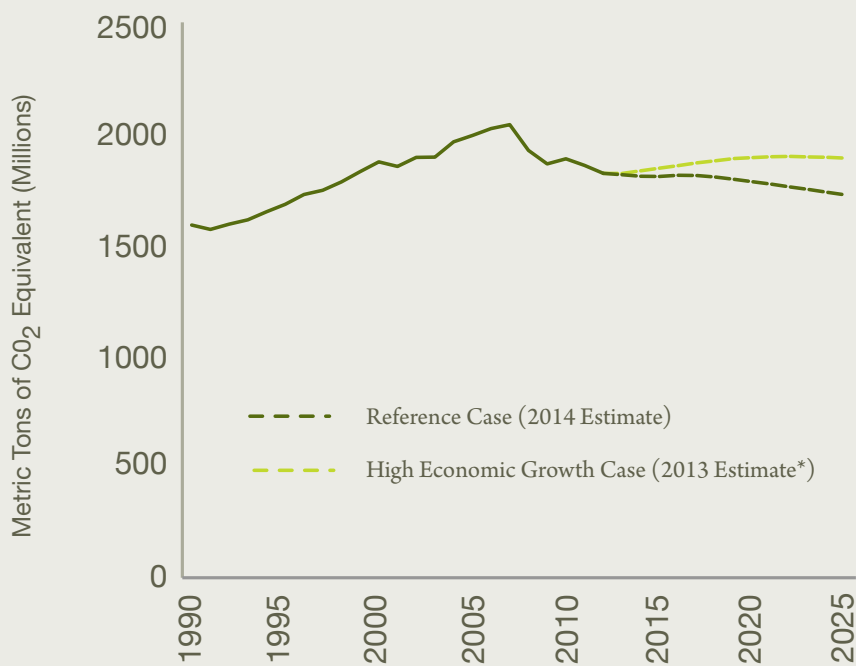
- Under existing policies, the future trajectory of U.S. transportation emissions is uncertain.
- A cap-and-trade program will guarantee continued absolute reductions in emissions.
- By allowing the market to identify the cheapest abatement strategies, a cap-and-trade program will achieve emissions reductions at the lowest possible cost.
- EPA already has authority under the Clean Air Act to implement a cap-and-trade program, either for vehicles alone pursuant to Section 211 or for both mobile and stationary sources pursuant to Section 115.
- A cap-and-trade program can operate alongside renewable fuel quotas and emission standards for new vehicles, though such requirements may compromise the efficiency of the trading scheme.

Destination Unknown: The Uncertain Trajectory of U.S. Transportation Emissions

The transportation sector is the second-largest source of greenhouse gases in the United States, accounting for 28% of total emissions in 2012.⁹ EPA currently regulates transportation emissions both directly—through fleet-wide emission standards for new motor vehicles (which are primarily satisfied by improvements in fuel economy)¹⁰—and indirectly—through annual quotas for renewable fuel use.¹¹ With substantial assistance from a recession-driven decrease in fuel demand, these policies have helped cut transportation emissions to 9% below 2005 levels.¹² There is no guarantee, however, that the programs will yield equally significant reductions in coming years.

As discussed above, the renewable fuel program has already stalled, with EPA proposing 2014 standards that are weaker than the requirements for 2013.¹³ And though emissions standards for new vehicles will continue increasing in stringency through 2025,¹⁴ the fuel savings they generate will be at least partially offset by growth in the total number of vehicle miles travelled (*i.e.*, increased driving).¹⁵ As a result, the Energy Information Administration (EIA) projects that transportation-related emissions will still hover at 10% below 2005 levels in 2020 and 13% below 2005 levels in 2025.¹⁶ Even those modest reductions are not guaranteed if the economy expands at a faster-than-expected clip: an earlier EIA report concluded that, assuming high economic growth and low inflation, transportation emissions could climb back to 5% below 2005 levels by 2025.¹⁷

Figure 2. Projected U.S. Transportation Emissions through 2025



*A 2014 High Economic Growth estimate is not yet available.

Source: Energy Information Administration

This pace of emissions reduction is grossly inadequate to meet the mitigation goals of the United Nations Framework Convention on Climate Change (UNFCCC), to which the United States is a party.¹⁸ In 2009, the UNFCCC pledged to hold the global average temperature at less than 2°C above pre-industrial levels,¹⁹ widely considered a tipping point for catastrophic climate change.²⁰ The Intergovernmental Panel on Climate Change’s (IPCC) Fourth Assessment Report concluded that maintaining a two-degree limit would require developed countries to reduce their total greenhouse gas emissions to at least 25% below 1990 levels by 2020 and 80% below 1990 levels by 2050.²¹

The Obama administration has repeatedly endorsed legislation that would achieve IPCC-scale reductions in U.S. emissions through a cap-and-trade program.²² While new legislation may be desirable, however, it is not a prerequisite to implementing a trading program, whether for the transportation sector alone or the U.S. economy as a whole. As detailed in Policy Integrity’s 2009 petition to the EPA, the agency already has the authority to establish a cap-and-trade program for vehicle-fuel emissions under Section 211(c)(1) of the Clean Air Act.²³ Even better, EPA can use its power under Section 115 of the Act to cap greenhouse gas emissions from both mobile *and* stationary sources.²⁴

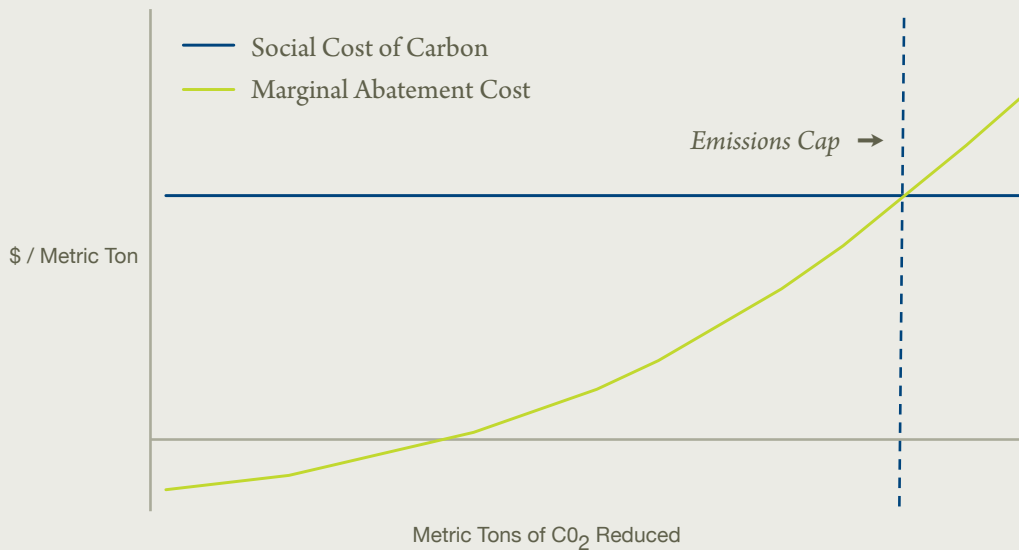
Wheeling & Dealing: The Advantages of Cap and Trade

Economists nearly all agree that the most efficient method to reduce greenhouse gas pollution is to give individual polluters maximum flexibility while still creating incentives for economy-wide emissions reductions.²⁵ A cap-and-trade program achieves these goals by mandating a total cut in emissions and allowing businesses to achieve those reductions in the cheapest manner possible. In a Clean Air Act-based trading system, EPA will “cap” the nation’s total emissions (either from vehicle fuels only, under Section 211, or all regulated sources, under Section 115) at a particular level and distribute a corresponding number of permits, or “emissions allowances,” to upstream emissions sources, such as oil refineries and fuel importers.²⁶ These sources can then “trade” (*i.e.*, buy and sell) permits with each other. Sources that can reduce emissions at a relatively low cost will benefit from doing so and selling any excess permits. Conversely, sources with relatively high abatement costs will be better off buying permits from others. In this way, the market will determine the most efficient allocation of emissions among regulated sources.

Predictable Results

A properly calibrated emissions cap will be set at the point where the marginal abatement cost (based on reasonable technology projections) is equal to the social cost of carbon—that is, the point where the price of preventing an additional ton of greenhouse gas emissions is equivalent to the harm the additional ton of emissions imposes on society. At that level, the cap incentivizes the market to perform all abatement that is cost-benefit justified. The cap can be tightened over time as abatement technologies improve or as the estimated costs of climate change increase.

Figure 3. Setting an Optimal Emissions Cap



Renewable fuel quotas and vehicle emissions standards, by contrast, are not set by reference to the social cost of carbon and do not ensure that market actors fully internalize the negative effects of their greenhouse gas emissions.²⁷ Indeed, existing programs cannot guarantee *any* decrease in greenhouse gas emissions, much less reduction to a socially optimal level. Total transportation fuel use has declined since 2007 due to a combination of increased fuel economy in new vehicles, higher gas prices, and a severe recession,²⁸ but economic winds can shift.²⁹ If demand for vehicle fuel begins to outpace annual increases in the renewable fuel supply and further gains in fuel economy, the transportation sector's emissions will rise once again. In the face of macroeconomic uncertainty, a cap-and-trade program better ensures precise and consistent emissions reductions.³⁰

Increased Flexibility and Reduced Compliance Costs

While a cap-and-trade program establishes a precise target for total emissions, it is indifferent to the means by which reductions are achieved. Technology mandates like renewable fuel quotas and vehicle emissions standards, on the other hand, “pick winners” among abatement strategies. More specifically, renewable fuel quotas prioritize the development of a low-carbon fuel supply over initiatives to reduce fuel demand (such as greater investment in electric cars or mass transit). Yet there is no reason to believe that biofuels are always the most cost-effective abatement option for the transportation sector. Under certain circumstance, increasing bus ridership may prove a cheaper means of reducing emissions than increasing the supply of butanol.³¹

EPA's vehicle emissions standards are similarly selective. They *do* focus on reducing fuel demand, but only from a narrow range of sources. Neither marine vessels nor aircraft—which together account for more than 10% of transportation emissions³²—are subject to the standards.³³ More significantly, the standards have no effect on emissions from cars that pre-date the 2012 model year.³⁴ (Only 6 million new cars are sold in a typical year, but there are over 230 million registered vehicles in the United States.³⁵) Thus, emissions standards operate on the implicit assumption that improving the fuel efficiency of new vehicles will consistently prove more cost effective than simply reducing the use of older vehicles.

A cap-and-trade program will not directly restrict emissions from individual downstream sources like cars and boats. By putting a price on carbon, however, the program will incentivize *all* market actors—not just regulated entities—to reduce their emissions by the cheapest means possible. If a refinery subject to a cap wants to increase production, it must either (1) lower its per-gallon emissions rate by using a greater percentage of low-carbon fuel, or (2) purchase additional emissions allowances. Either way, marginal production costs will rise, resulting in higher fuel prices for downstream consumers. These higher prices, in turn, will motivate individual consumers to adopt their own least-cost strategies for minimizing fuel use, such as carpooling, moving closer to their place of work, or investing in a more fuel-efficient vehicle.³⁶

Because low- and middle-income households spend a larger percentage of their income on energy, they will feel the effects of higher fuel prices more keenly than high-income households will.³⁷ Regressive effects can be avoided, however, if emissions allowances are auctioned to polluters, rather than freely allocated, and if auction revenue is subsequently returned to the public on a per capita basis.³⁸ Under an economy-wide Section 115 trading program, individual states will undoubtedly have the authority to collect and redistribute auction revenues.³⁹ It is less clear whether per capita rebates are possible under a vehicles-only program operated by EPA pursuant to Section 211.⁴⁰

Broader Cap, Bigger Benefits

While a cap-and-trade program for vehicle fuels will provide greater and more cost-effective emissions reductions than EPA's existing transportation policies, the agency can maximize efficiency by creating a single cap for mobile *and* stationary sources. A universal cap will lower per-unit compliance costs by expanding the range of abatement possibilities.⁴¹ Just as buses may sometimes generate cheaper emissions reductions than butanol, capturing methane from landfills may be more cost effective than either.⁴² And because a universal cap should still be set at the point where the marginal abatement cost equals the social cost of carbon, access to lower-cost abatement technologies will allow for a greater overall reduction in emissions.

A universal cap will also eliminate the possibility that emissions will “leak” from mobile to stationary sources.⁴³ For instance, if increased fuel prices lead consumers to switch to electric cars, vehicle fuel use will decline but electricity generation at power plants will increase (along with the power plants' greenhouse gas emissions). Under a universal cap, such inter-source leakage will be properly accounted for.⁴⁴

Licensed to Drive: EPA's Existing Authority to Implement Cap and Trade

Multiple provisions of the Clean Air Act empower EPA to cap greenhouse gas emissions from the transportation sector. As detailed below, a cap under Section 211 of the Act would apply to vehicles only, while a Section 115 cap could cover both mobile and stationary sources.

Option 1: Cap and Trade for Vehicle Fuels under Section 211.

Pursuant to Section 211(c)(1) of the Clean Air Act, EPA may control or prohibit the manufacture or sale of any fuel that (1) causes or contributes to air pollution that (2) may reasonably be anticipated to endanger the public health or welfare.⁴⁵ Greenhouse gas emissions generated by vehicle fuels undoubtedly “contribute” to air pollution within the meaning of Section 211(c)(1). The transportation sector is responsible for almost a third of U.S. greenhouse gas emissions,⁴⁶ and the “primary driver” of these emissions is “CO₂ from fossil-fuel combustion.”⁴⁷ EPA has previously found sources responsible for as little as 9%, 4%, 3%, and 1.2% of pollution to be “contributors.”⁴⁸ As for the second requirement, EPA expressly concluded in 2009 that “greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to endanger public welfare.”⁴⁹

Thus, under the express language of the Clean Air Act, EPA may “control or prohibit” the sale of greenhouse gas-emitting vehicle fuels.⁵⁰ In a cap-and-trade program, this “control” will be exercised by requiring upstream fuel sources to possess a sufficient number of allowances to cover the emissions-generating potential of any fuel they sell. While the word “control” is not explicitly defined in the Clean Air Act and is thus open to EPA’s reasonable statutory interpretation, EPA has historically interpreted the term to encompass the use of economic incentives, like emissions allowances, as regulatory tools. For instance, EPA used its authority to “promulgate regulations respecting the *control*” of stratospheric pollutants under Section 615 of the Clean Air Act to develop a system of tradable allowances for ozone-depleting substances.⁵¹ Even more relevant, EPA previously invoked its Section 211 authority to implement trading programs for both the lead⁵² and sulfur⁵³ content of gasoline. While the lead and sulfur programs involved tradable credits rather than allowances or permits, they nevertheless support a reading of Section 211(c)(1) as permitting control through a market-based regulatory mechanism like a cap-and-trade program.

Notably, Section 211 does not apply to aircraft fuels.⁵⁴ Pursuant to Section 601(e) of the Federal Aviation Act, however, the Federal Aviation Administration (FAA) is required to implement emissions standards for such fuels if EPA makes an endangerment finding under Section 231 of the Clean Air Act.⁵⁵ Once EPA makes such a finding, FAA can either use its regulatory authority to bring aircraft fuels within a trading system set up by EPA or establish its own system of controls.⁵⁶

Option 2: Cap and Trade for Mobile and Stationary Sources under Section 115.

Alternatively, EPA could cap mobile and stationary sources under Section 115 of the Clean Air Act, which is designed to address U.S. emissions that endanger public health and welfare in foreign countries. There are three prerequisites to action under Section 115:

- 1 EPA must have received “reports, surveys or studies” from a “duly constituted international agency.”⁵⁷
- 2 The reports received must give EPA “reason to believe that any air pollutant or pollutants emitted in the United States cause or contribute to air pollution” that “may reasonably be anticipated to endanger public health or welfare in a foreign country.”⁵⁸
- 3 EPA must determine that a foreign country “has given the United States essentially the same rights with respect to the prevention or control of air pollution occurring in that country.”⁵⁹

If these conditions are satisfied, EPA *must* require any states containing sources of the international air pollution to devise a plan to “prevent or eliminate” the danger to foreign health or welfare.⁶⁰

U.S. greenhouse gas emissions easily satisfy the Section 115 criteria. First, EPA has received numerous reports on climate change from a duly constituted international agency, the IPCC.⁶¹ Second, the IPCC reports make quite clear that U.S. greenhouse gas emissions “may reasonably be anticipated to endanger public health or welfare in numerous foreign countries.” The IPCC Fourth Assessment Report, for instance, finds a greater than 90% likelihood that greenhouse gas emissions associated with human activities—of which the U.S. is the second-largest source in the world⁶²—are driving global climate change.⁶³ The Fourth Assessment Report also details numerous harms that are projected to result from global climate change, including impacts related to malnutrition, extreme weather events, cardio-respiratory diseases, infectious diseases, food production, coastal erosion, water scarcity, economic development, ocean acidification, and ecosystem resilience in each region of the globe.⁶⁴

Section 115’s third requirement—that a foreign country affected by U.S. greenhouse gas pollution provide “essentially the same” pollution-preventing rights to the U.S.—is satisfied by foreign statutes such as the Canadian Environmental Protection Act (CEPA) and South African Air Quality Act (SAQA), both of which establish legal authority to prevent greenhouse gas emissions that negatively affect U.S. health and welfare. Section 166 of CEPA authorizes Canada’s Federal Minister of Environment to take preventative action if “a substance released from a source in Canada into the air creates, or may reasonably be anticipated to contribute, to air pollution in a country other than Canada.”⁶⁵ Greenhouse gases like carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are all listed in CEPA Schedule 1 as toxic substances, making them subject to regulation under Section 166.⁶⁶ In similar fashion, SAQA authorizes South Africa’s Minister of Environmental Affairs to prescribe measures to “prevent, control, or correct” any domestic emissions that may have a “significant detrimental impact on air quality, the environment or health” in a foreign country.⁶⁷ SAQA’s preamble emphasizes that “atmospheric emissions of ozone-depleting substances, *greenhouse gases* and other substances have deleterious effects on the environment, both locally and globally.”⁶⁸ Section 115’s reciprocity requirement may also be satisfied by existing international agree-

ments such as the UNFCCC and the European Union’s Emissions Trading System, which seek to benefit the entire global community—including the U.S.—by collectively reducing greenhouse gas emissions.⁶⁹

With reciprocity established, EPA is not just authorized but obligated to require all U.S. states and territories to revise their implementation plans to address the dangers that greenhouse gas emissions pose to foreign health and welfare.⁷⁰ As discussed earlier, EPA can best exercise this authority by setting state-specific emissions caps at the level where the marginal abatement cost equals the social cost of carbon.⁷¹ Further, while Section 115 does not empower EPA to *mandate* the form of any state’s implementation plan, EPA can certainly *encourage* states to adopt trading systems and to link their individual plans to create a nationwide marketplace for emissions allowances. Section 110 of the Clean Air Act explicitly authorizes the use of marketable permits and emissions auctions in state implementation plans.⁷²

Finally, because EPA has never set direct limits on greenhouse gas emissions from vehicle fuels, the states’ plans can encompass both mobile and stationary sources, thus achieving the efficiency benefits of a universal cap. Pursuant to Section 211(c)(4)(a) of the Clean Air Act, states are authorized to regulate vehicle-fuel emissions so long as the EPA has neither implemented its own controls for the relevant pollutant under Section 211(c)(1), nor issued a formal finding that no controls are necessary.⁷³ While EPA has indirectly targeted greenhouse gas emissions from vehicle fuels through the renewable fuel program, it has never used its power under Section 211(c)(1) to directly regulate such emissions.

Compatibility with Existing Programs

At least in the short term, any cap-and-trade program that EPA adopts will have to co-exist with renewable fuel standards, which EPA remains statutorily required to establish each year, and vehicle emissions standards, which have already been promulgated for model years 2017 to 2025. At worst, these standards will compromise the efficiency of the trading mechanism, but they will not reduce its efficacy. If the existing standards remain binding under a cap-and-trade regime—that is, if they are set at levels higher than the market would choose if subject only to an emissions cap—increased biofuel use and fuel economy improvements will muscle out more cost-effective abatement options and raise overall compliance costs. If, on the other hand, the targets are not binding, efficiency losses will be limited to unnecessary administrative costs. Under either scenario, emissions can still be reduced to a socially optimal level—just at a somewhat higher cost than if existing command-and-control policies were abandoned in favor of a purely market-based approach.

Conclusion

In light of the uncertain benefits of existing policies and the certain risk of continued global climate change, EPA should embrace a new, more comprehensive strategy for reducing greenhouse gas emissions from the transportation sector. A cap-and-trade program, which EPA is already authorized to implement under the Clean Air Act, will provide greater and more predictable reductions at the lowest possible cost.

Endnotes

- ¹ See 2014 Standards for Renewable Fuel Program, Proposed Rule, 78 Fed. Reg. 71,732, 71,732 (proposed Nov. 29, 2013) (to be codified at 40 CFR pt. 80).
- ² 42 U.S.C. § 7545(o)(7)(A).
- ³ See U.S. ENERGY INFO. ADMIN., THIS WEEK IN PETROLEUM, Nov. 20, 2013, <http://www.eia.gov/oog/info/twip/twiparch/2013/131120/twipprint.html>.
- ⁴ See 78 Fed. Reg. at 71,735; see also EPA, E15: Frequently Asked Questions, *available at* <http://www.epa.gov/otaq/regs/fuels/additive/e15/e15-faq.htm> (listing the vehicle types that may use a 15% ethanol blend).
- ⁵ See 78 Fed. Reg. at 71,735, 71,737 (“However, for 2014 and later years, the total volume of ethanol that can be consumed, and the total volume of non-ethanol renewable fuels that could reasonably be available, are together expected to be less than the volume requirements established in [the Energy Independence and Security Act] for advanced biofuel and total renewable fuel.”)
- ⁶ Letter from Bob Dinneen, President & CEO, Renewable Fuels Ass’n. to Gina McCarthy, Adm’r, EPA (Jan. 28, 2014), *available at* http://ethanolrfa.org/page/-/rfa-association-site/Regulatory%20Comments/RFA_Comments_EPA_2014_RVO_Proposed_Rule.pdf?nocdn=1.
- ⁷ 78 Fed. Reg. at 71,734.
- ⁸ See Petition from Inst. for Policy Integrity to EPA, “Petition for Rulemaking Under Sections 211 and 231 of the Clean Air Act to Institute a Cap-and-Trade System for Greenhouse Gas Emissions from Vehicle Fuels” (June 29, 2009), *available at* <http://policyintegrity.org/documents/7.29.09IPIPetitiontoEPA.pdf> [hereinafter 2009 Petition].
- ⁹ EPA, DRAFT INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2012 at ES-11 (2014), *available at* <http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>.
- ¹⁰ See, e.g., 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, 77 Fed. Reg. 62,624, 62,624 (Oct. 15, 2012) (codified at 40 C.F.R. pts. 85, 86 & 600).
- ¹¹ 78 Fed. Reg. at 71,734
- ¹² Compare U.S. ENERGY INFO. ADMIN., EMISSIONS OF GREENHOUSE GASES IN THE U.S. tbl.11 (2011), *available at* http://www.eia.gov/environment/emissions/ghg_report/tables_ghg.cfm (showing 2005 transportation emissions), with U.S. ENERGY INFO. ADMIN., ANN. ENERGY OUTLOOK 2014: EARLY RELEASE OVERVIEW tbl.18 (Dec. 16, 2013), *available at* http://www.eia.gov/forecasts/aeo/er/tables_ref.cfm (showing 2013 transportation emissions).
- ¹³ U.S. ENERGY INFO. ADMIN., THIS WEEK IN PETROLEUM, *supra* note 3.
- ¹⁴ 77 Fed. Reg. at 62,627 (explaining that emissions standards “will become more stringent on average in each model year from 2017 through 2025”).
- ¹⁵ U.S. ENERGY INFO. ADMIN., ANN. ENERGY OUTLOOK 2014: EARLY RELEASE OVERVIEW, *supra* note 12, Introduction (predicting 30% growth in vehicle miles travelled between 2012 and 2040).
- ¹⁶ See *id.* at tbl.18 (showing transportation emissions in 2020 and 2025).
- ¹⁷ See U.S. ENERGY INFO. ADMIN., ANN. ENERGY OUTLOOK 2013 tbl.18, *available at* <http://www.eia.gov/forecasts/aeo/data.cfm#co2emsec> (showing 2025 transportation emissions under “High Economic Growth” scenario).

- ¹⁸ See UNFCCC, List of Annex I Parties to the Convention, available at https://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php (last visited Feb. 28, 2014).
- ¹⁹ UNFCCC, Copenhagen Accord, Dec. 18, 2009, available at <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf>.
- ²⁰ See, e.g., 2007 Bali Declaration by Climate Scientists, available at <http://www.climate.unsw.edu.au/news/2007/Bali.html>.
- ²¹ IPCC, FOURTH ASSESSMENT REPORT, CONTRIBUTION OF WORKING GROUP III: MITIGATION OF CLIMATE CHANGE 776, Box 13.7 (2007), available at http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg3_report_mitigation_of_climate_change.htm.
- ²² See, e.g., John Carey, *Obama's Cap-and-Trade Plan*, BLOOMBERG BUSINESSWEEK (Mar. 4, 2009), available at <http://www.businessweek.com/stories/2009-03-04/obamas-cap-and-trade-plan>; President Barack Obama, Remarks by the President in the State of the Union Address (Feb. 12, 2013), available at <http://www.whitehouse.gov/the-press-office/2013/02/12/remarks-president-state-union-address> (urging Congress to “pursue a bipartisan, market-based solution to climate change, like the one John McCain and Joe Lieberman worked on together a few years ago”).
- ²³ 2009 Petition, *supra* note 8.
- ²⁴ See Petition from Inst. for Policy Integrity to EPA, “Petition for Rulemakings and Call for Information under Section 115, Title VI, Section 111, and Title II of the Clean Air Act to Regulate Greenhouse Gas Emissions” (Feb. 19, 2013), available at <http://policyintegrity.org/documents/Policy%20Integrity%20Omnibus%20GHG%20Petition%20under%20CAA.pdf> [hereinafter 2013 Petition].
- ²⁵ See J. Scott Holladay et al., INST. FOR POLICY INTEGRITY, *Economists and Climate Change: Consensus and Open Questions* viii (2009), available at <http://policyintegrity.org/publications/detail/economists-and-climate-change> (noting 91.6% of surveyed economic experts on climate change preferred market-based abatement mechanisms); see also Robert R. Nordhaus, *New Wine Into Old Bottles: The Feasibility of Greenhouse Gas Regulation Under the Clean Air Act*, 15 N.Y.U. Envtl. L.J. 53, 55-56 (2007) (citing Climate Stewardship Act of 2003, S. 139, 108th Cong. §§ 311-372 (2003); Robert N. Stavins, *Policy Instruments for Climate Change: How Can National Governments Address a Global Problem?*, 1997 U. Chi. Legal F. 293, 297-98 (1997)).
- ²⁶ Targeting upstream sources will keep the number of regulated entities relatively low and minimize the administrative burdens of the program.
- ²⁷ Cellulosic biofuel targets, for instance, are based on the “projected volume available during [the forthcoming] calendar year.” 42 U.S.C. § 7545(o)(7)(D)(i).
- ²⁸ U.S. ENERGY INFO. ADMIN., THIS WEEK IN PETROLEUM, *supra* note 3 (“The total demand for gasoline has been flat or decreasing since 2007 because of greenhouse gas and fuel economy standards for vehicles, fuel prices, and a sharp economic downturn followed by a slow recovery.”).
- ²⁹ See, e.g., U.S. ENERGY INFO. ADMIN., SHORT-TERM ENERGY OUTLOOK, Jan. 7, 2014, at 5 available at http://www.eia.gov/forecasts/steo/pdf/steo_full.pdf (noting that “motor gasoline consumption grew by 110,000 bbl/d (1.2%) [in 2013], the largest increase since 2004”).

- ³⁰ Just as it eliminates the possibility of too little abatement, a cap-and-trade program also ensures that regulated entities are not forced to abate too much. For example, as already discussed, overall demand for vehicle fuel has unexpectedly dropped since the renewable fuel program was enacted in 2007, due in significant part to the recession. Under a cap-and-trade program, regulated entities would receive credit for the “free” emissions reductions accompanying such a decline in demand and would not have to achieve those reductions by other, more expensive means. A renewable fuel target, on the other hand, must be met regardless of overall fuel demand, potentially forcing regulated entities to abate *beyond* the optimal level in times of falling demand.
- ³¹ See, e.g., U.S. DEP’T OF TRANSP., TRANSPORTATION’S ROLE IN REDUCING U.S. GREENHOUSE GAS EMISSIONS: VOLUME 2, TECHNICAL REPORT 5-11, available at http://ntl.bts.gov/lib/32000/32700/32779/DOT_Climate_Change_Report_-_April_2010_-_Volume_1_and_2.pdf (noting that expansion of both intra- and inter-city transit would offer high net savings).
- ³² EPA, DRAFT INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2012, *supra* note 9, at 3-19 tbl.3-12.
- ³³ U.S. DEP’T OF TRANSP., *supra* note 31, at 3-14 (“[T] here are no regulations that define fuel efficiency standards for railroads, marine vessels, and aircraft.”).
- ³⁴ Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25,324, 25,328 (May 7, 2010) (noting that the rule “covers passenger cars, light-duty trucks, and medium-duty passenger vehicles built in model years 2012 through 2016”).
- ³⁵ Compare DEP’T OF TRANSP., NATIONAL TRANSPORTATION STATISTICS tbl.1-11 (showing total number of light-duty vehicles registered in U.S. in 2011), with *id.* tbl.1-12 (showing total number of new passenger vehicles sold in 2011 and preceding years).
- ³⁶ A cap-and-trade program could more directly encourage downstream innovation by permitting the use of carbon offsets. Under an offset scheme, the emissions-reducing activities of entities not covered by the cap—such as local transportation departments or electric vehicle manufacturers—would generate credits that covered entities could purchase as a (potentially lower-cost) substitute for emissions allowances.
- ³⁷ See *Protecting LowerIncome Families While Fighting Global Warming: Hearing Before H. Subcomm. on Income Security and Family Support* 12 tbl.1, 111th Cong. (2009) (statement of Terry M. Dinan, Senior Advisor, Congressional Budget Office).
- ³⁸ *Id.* at 12.
- ³⁹ See 2013 Petition, *supra* note 24, at 15.
- ⁴⁰ See 2009 Petition, *supra* note 8, at 25.
- ⁴¹ See, e.g., Nathaniel O. Keohane, *Cap and Trade, Rehabilitated: Using Tradable Permits to Control U.S. Greenhouse Gases*, 8 REV. ENVTL. & ECON. POL’Y 42, 49 (2009) (“From an economic perspective, a cap . . . should cover as much of the economy as possible—not just in terms of the volume of emissions or the number of participants, but especially in terms of the variation in abatement opportunities. The broader the program, the greater are the gains from trade, and the lower are the total costs of meeting a given target.”).
- ⁴² See EPA, Landfill Methane Outreach Program, <http://www.epa.gov/lmop> (last visited Feb. 28, 2014) (noting that landfill gas “can be captured and used to fuel power plants, manufacturing facilities, vehicles, homes, and more”).
- ⁴³ Leakage is typically discussed in connection with international or interstate trading schemes, but the concern in these contexts is the same: in the absence of a universal cap, emissions may migrate from regulated to unregulated sources. See, e.g., RGGI EMISSIONS LEAKAGE MULTI-STATE STAFF WORKING GRP., POTENTIAL EMISSIONS LEAKAGE AND THE REGIONAL GREENHOUSE GAS INITIATIVE (RGGI): EVALUATING MARKET DYNAMICS, MONITORING OPTIONS, AND POSSIBLE MITIGATION MECHANISMS 1, <http://www.rggi.org/docs/20080331leakage.pdf>.

⁴⁴ Leakage could also be addressed (albeit less efficiently) by separately capping power-plant emissions under Section 111 of the Clean Air Act. See 2013 Petition, *supra* note 24, at 18.

⁴⁵ 42 U.S.C. § 7545(c)(1) (“The Administrator may . . . by regulation, control or prohibit the manufacture, introduction into commerce, offering for sale, or sale of any fuel or fuel additive for use in a motor vehicle, motor vehicle engine, or nonroad engine or nonroad vehicle if, in the judgment of the Administrator, any fuel or fuel additive or any emission product of such fuel or fuel additive causes, or contributes, to air pollution . . . that may reasonably be anticipated to endanger the public health or welfare . . .”).

⁴⁶ EPA, DRAFT INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2012, *supra* note 9, at ES-11 (noting that transportation accounts for 28% of U.S. greenhouse gas emissions).

⁴⁷ *Id.* at 3-17.

⁴⁸ See, e.g., Control of Emissions From Nonroad Large Spark-Ignition Engines, and Recreational Engines (Marine and Land-Based); Final Rule, 67 Fed. Reg. 68,242, 68,245 (Nov. 8, 2002) (“Nationwide, [spark-ignition] engines and vehicles are a significant source of mobile source air pollution. As described below, of all mobile source emissions in 2000 they accounted for about 9 percent of HC emissions, 4 percent of CO emissions, 3 percent of NO_x emissions, and 2 percent of direct PM emissions. The emissions from Large SI engines contributed 2 to 3 percent of the HC, NO_x, and CO emissions from mobile sources in 2000. Recreational vehicles by themselves account for about 6 percent of national mobile source HC emissions and about 2 percent of national mobile source CO emissions.”); *id.* at 68,248 (finding snowmobiles “contributed” to the pollution in a nonattainment area by emitting 1.2% of the total daily CO inventory in that area for 2001).

⁴⁹ Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,510 (Dec. 15, 2009).

⁵⁰ See U.S. DEP’T OF TRANSP., *supra* note 31, at 3-14 (noting that “there are no standards that specifically regulate greenhouse gas emissions for railroads, marine vessels, and aircraft”).

⁵¹ Protection of Stratospheric Ozone, 53 Fed. Reg. 30,566 (Aug. 12, 1988) (codified at 40 C.F.R. pt. 82) (emphasis added).

⁵² Regulation of Fuels and Fuel Additives; Gasoline Lead Content; Final rule, 50 Fed. Reg. 9,386 (Mar. 7, 1985); Regulation of Fuels and Fuel Additives; Banking of Lead Rights; Final rule, 50 Fed. Reg. 13,118 (Apr. 1, 1985). This program was codified at 40 C.F.R. pt. 80, but is no longer in effect. Under the program, EPA allowed companies to generate “credits” by producing gasoline with lower lead content than the standard required. These credits could then be “banked” for use at a later time as the lead content standards became stricter, or else traded to another company. See *Union Oil Co. of Cal. v. EPA*, 821 F.2d 678, 679-682 (D.C. Cir. 1987).

⁵³ Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements, 65 Fed. Reg. 6,698 (Feb. 10, 2000) (codified at 40 C.F.R. pts. 80, 85, and 86).

⁵⁴ See 2009 Petition, *supra* note 8, at 23.

⁵⁵ *Id.*

⁵⁶ *Id.* at 24.

⁵⁷ 42 U.S.C. § 7415(a).

⁵⁸ *Id.*

⁵⁹ *Id.* § 7415(c).

⁶⁰ *Id.* § 7415(b).

⁶¹ Indeed, when EPA issued its 2009 finding that greenhouse gases endanger U.S. health and welfare, the agency relied in part on the IPCC's reports. Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,510 Dec. 15, 2009). In that finding, EPA reasoned that it did not need to independently review the Panel's reports because EPA took "an active part in [their] review, writing, and approval." *Id.* at 66,511. EPA went on to state that the Intergovernmental Panel's assessments "have been reviewed and formally accepted by, commissioned by, or in some cases authored by, U.S. government agencies and individual government scientists. These reports already reflect significant input from EPA's scientists and the scientists of many other government agencies." *Id.* See also Statement: Intergovernmental Panel on Climate Change Approves Physical Science Report, Sept. 27, 2013, <http://www.whitehouse.gov/blog/2013/09/27/statement-intergovernmental-panel-climate-change-approves-physical-science-report> (announcing U.S. approval of the Fifth IPCC Working Group Report on the Physical Science Basis of Climate Change and stating that "the U.S. Government is committed to continued participation in IPCC activities").

⁶² IPCC, CLIMATE CHANGE 2007: WORKING GROUP III: MITIGATION OF CLIMATE CHANGE at 4.2.2 (2007).

⁶³ IPCC, CLIMATE CHANGE 2007: SYNTHESIS REPORT 27, 39 (2007).

⁶⁴ *Id.* at 48-54.

⁶⁵ Canadian Environmental Protection Act § 166(1).

⁶⁶ See *id.* § 56(1) (noting the applicability of Section 166(1) to Schedule 1 pollutants).

⁶⁷ National Environmental Management: Air Quality Act 39 of 2004 (S. Afr.) § 50(1) ("Transboundary Air Pollution").

⁶⁸ *Id.* (emphasis added).

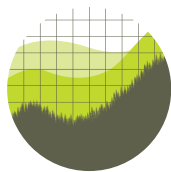
⁶⁹ 2013 Petition, *supra* note 24, at 10.

⁷⁰ EPA has previously identified significant sources of greenhouse gas emissions in all U.S. states and territories. See, e.g., EPA, Greenhouse Gas Reporting Program: Greenhouse Gas Data, <http://www.epa.gov/ghgreporting/ghgdata> (last visited Jan. 28, 2014).

⁷¹ While Section 115 refers to the "prevention" or "elimination" of international harm, courts have long recognized EPA's discretion under the Clean Air Act to determine "how much of the regulated harm is too much," *Whitman v. Am. Trucking Assoc.*, 531 U.S. 457, 475 (2001), and EPA can consider context when "deciding what risks are acceptable in the world in which we live," *id.* at 495 (Breyer, J., concurring) (quoting *NRDC v. EPA*, 824 F.2d 1146, 1165 (D.C. Cir. 1987)).

⁷² 42 U.S.C. § 7410(a).

⁷³ 42 U.S.C. § 7545(c)(4)(A).



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