A DANGEROUS PRECEDENT: HOW THE ENDANGERMENT FINDING EXPANDED THE EPA’S REGULATORY POWERS

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Executive Summary
Most modern observers would be surprised to know that the Clean Air Act (CAA or the Act) does not directly regulate greenhouse gas (GHG) emissions. Neither the 1970 version of the Act (H.R. 17255, 1970) nor the 1990 amendments (S. 1630, 1990) used the term “greenhouse gas,” and carbon dioxide (CO₂) is only mentioned in a nonregulatory section of the statute (42 U.S.C. §7403). Yet, the EPA has promulgated numerous GHG emissions regulations over the past decade through various sections of the Act. How this became possible is one of the most important and complex stories of U.S. environmental regulations over the past 2 decades.

As climate change became a larger political issue in the 1990s, a coalition of environmental organizations petitioned the EPA to regulate GHGs from motor vehicles under the CAA (International Center for Technology Assessment, 1999). After bringing in the State of Massachusetts as a plaintiff, the coalition successfully brought a lawsuit before the Supreme Court in 2006. The Court ruled 5-4 in favor of the plaintiffs and decided that GHG emissions met the CAA’s definition of “air pollutant” (Massachusetts v. EPA, 2007, p. 4). Therefore, the EPA was compelled to determine whether GHG emissions endangered public health or welfare and, if so, to regulate those emissions.

This decision is remarkable given not only the Act’s silence on GHG emissions but also the fact that CO₂, which is essential to life, is different from every other pollutant regulated under the Act. Pollutants such as particulate matter and soot cause direct harm to human health and, although they can be transported in the atmosphere, are generally local in extent. CO₂ diffuses almost uniformly around the globe, and its supposed harm comes indirectly through its effect on global temperatures. The Court never clarified why the CO₂ we emit every time we exhale and why water vapor, the most common GHG, are also not subject to regulation. As Justice Scalia noted in his dissenting opinion, it seems that everything from “Frisbees to flatulence” could be an air pollutant under the Court’s definition (Massachusetts v. EPA, 2007, p. 63).

Following this decision, the EPA under President Obama issued an endangerment finding in 2009 for GHG emissions from motor vehicles (Endangerment and Cause or Contribute Findings for Greenhouse Gases, 2009) and promulgated fuel economy regulations—the only known way to reduce those emissions—in 2010 and 2012. Then it went beyond the Supreme Court’s ruling—through regulatory maneuvers that are still being litigated—by attempting to restrict emissions from stationary sources, including power plants and oil and gas facilities. If allowed to continue, these regulations will likely cost hundreds of billions of dollars to implement and broaden the EPA’s reach to almost every corner of the economy.
Despite these enormous stakes, these regulatory actions and subsequent legal battles have taken place away from the halls of Congress and largely outside of the public view. Many policymakers and their aides, especially state lawmakers, are unaware of how much power the EPA has been granted to set limits on GHGs, much less the complex legal and scientific reasoning that underpins the arguments for and against regulation. This paper aims to bring this story to light and educate policymakers and leaders in the energy and environmental policy space on the need to stop the EPA’s ability to regulate GHG emissions under the CAA.

**Introduction**

Imagine the scene surrounding the creation of the Clean Air Act of 1970 (CAA or the Act). Concern for the environment was at an all-time high, and President Nixon was about to establish the U.S. Environmental Protection Agency (EPA). Numerous state laws had been enacted in the preceding decade, and landmark federal laws, including the National Environmental Policy Act, were fresh on the books. Lawmakers knew they were passing a historic bill, and Sen. Edmund Muskie, who was planning to challenge Nixon in the presidential election, championed the bill with rhetoric reminiscent of today’s environmental activists. As he introduced the bill in the Senate, Muskie declared that “the fight against [air] pollution is not just a matter of cleaning up the environment but a necessity for man’s survival” ([Environmental Policy Division, 1974, p. 1,470](#)).

Yet, few people foresaw at the time the amount of authority the Act was granting to the then-nascent EPA. History records little public opposition to the Act as it was being developed, except from Sen. Robert P. Griffin of Michigan and the auto industry ([Kenworthy, 1970](#)). The bill ended up passing Congress by wide margins, with some discussion about the increase in federal authority over the states ([Daniels et al., 2020, p. 921](#)).

A significant flaw of the CAA is its broad and malleable definition of “air pollution.” Section 302 ([42 U.S.C. §7602](#)) defines “air pollutant” as “any air pollution agent or combination of such agents … which is emitted into or otherwise enters the ambient air.” Classifying greenhouse gases as “air pollution” according to this definition is fraught because GHGs do not directly pollute the air. In fact, the two most significant GHGs, water vapor and carbon dioxide ($CO_2$), are essential to life on earth. Regulating CO$_2$ emissions through the CAA while avoiding regulating water vapor requires another rhetorical leap: GHG emissions must be considered “air pollution agents” based on the degree to which they contribute to increasing global temperatures beyond a certain ideal level. This definition is fundamentally different from that of every other pollutant regulated under the CAA, which are defined as air pollutants because they are known to cause direct harm to human health.

Another remarkable feature of the CAA, at least to modern readers, is that it never uses the term greenhouse gas and does not contain any explicit directive to regulate GHG emissions. Carbon dioxide is mentioned only once, in

**The definition of greenhouse gas emissions is fundamentally different from that of every other pollutant regulated under the CAA.**

Section 103(g) ([42 U.S.C. §7403](#)), as part of a directive for the EPA to conduct research into “nonregulatory strategies and technologies” for reducing air pollutants. Another climate change term, global warming potential, is used in Section 602(e) ([42 U.S.C. §7671](#)) under a directive to study the effects of certain chlorofluorocarbons and halogens, which are commonly used as refrigerants and fire retardants. The Act makes a clear admonition that the provision “shall not be construed to be the basis of any additional regulation under this chapter.”

Congress made clear its intention not to regulate GHGs through the Act, and it has continued to defer action on GHG emissions by not ratifying international agreements such as the Kyoto Protocol and by not amending the CAA or passing separate legislation. In fact, when the Act was amended in 1990, the original Senate version had a provision to establish CO$_2$ emissions standards for motor vehicles ([S. 1630, 1990, §206](#)), which was removed before the bill was voted on.

Nevertheless, the lack of clarity about the status of GHGs under the CAA has fostered significant legal and regulatory maneuvering to use the Act to regulate GHGs. A broad interpretation of the EPA’s authority to regulate GHGs would mean that almost no industry or activity would fall outside of the EPA’s regulatory reach. Even the narrower regulations on vehicles or power plants that have already been promulgated, such as new fuel economy regulations under the CAA, which are defined as air pollutants because they are known to cause direct harm to human health.
A Brief History of Congressional Inaction on Climate Change

Twenty-two years after the original passage of the CAA, President George H.W. Bush signed the United Nations Framework Convention on Climate Change (UNFCCC, 1992; Center for Climate and Energy Solutions, n.d.), and the Senate gave its advice and consent to the treaty in October 1992. That same year, the passage of the 1992 Energy Policy Act included the first renewable energy production tax credit (42 U.S.C. §13317). These two policies marked the beginning of the United States’ fight to reduce GHG emissions.

The passage of the UNFCCC laid the foundation for future agreements, but when the Kyoto Protocol was set for ratification in 1997, lawmakers chose not to ratify it and instead adopted a nonbinding resolution which stated that the United States would not enter into any international climate agreement that could have serious implications for the U.S. economy unless developing countries were held to comparable standards (S. Res. 98, 1997). Because developing countries were not held to comparable emissions standards under the Kyoto Protocol, the Clinton administration and the Senate left open the question of joining the other countries. This question was answered when the George W. Bush administration formally announced in 2001 that the U.S. would not sign the treaty (Bush, 2001).

The most significant attempt to regulate GHGs prior to the Obama administration was the Climate Security Act (S. 2191, 2007), which died in the Senate in 2008. Congress also failed to pass the Waxman-Markey cap-and-trade bill in 2009, shortly after President Obama took office (H.R. 2454, 2009). Proposed climate legislation flooded Congress during President Obama’s first term, but none of the proposals passed. Only recently did Congress vote to phase out the use of certain hydrofluorocarbons (H.R. 133, 2021, pp. 1,074–1,090), despite not ratifying the Kigali Amendment to the Montreal Protocol that provides for international regulation of hydrofluorocarbon emissions (Amendment to the Montreal Protocol, 2016). The provision was included in the omnibus appropriations act in December 2020, which Energy and Environment News reported was largely the result of a heavy lobbying effort from companies with patented replacement refrigerants (Sobczyk & Koss, 2020).

Renewable energy tax credits are the only impactful pieces of climate legislation in the last 20 years to become law. Although Congress passed a multiyear extension in 2015 (H.R. 2029, 2015) with a plan to phase out the production tax credit for wind over 4 years, it granted wind developers a 1-year extension in the 2020 budget (H.R. 1865, 2019).

KEY ACTIONS TOWARD REGULATING GHGs UNDER THE CLEAN AIR ACT

1970: The landmark Clean Air Act of 1970 is passed. Climate change is not a consequential environmental concern at the time, and the Act only has one mention of global warming with no regulation of GHG emissions.

1990: A set of amendments to the CAA are passed. A Senate provision to establish CO₂ standard for motor vehicles is removed before the bill comes to a vote, and no other GHG regulations are advanced in the bill’s final version.

1999: A coalition of environmental advocacy groups petitions the EPA to regulate GHG emissions from motor vehicles under Section 202 of the CAA.

2003: The EPA denies the petition, claiming the CAA does not provide it with authority to address climate change. The petitioners respond by filing a lawsuit.

2005: The D.C. Court of Appeals rules in favor of the EPA but does not decide on the question of the EPA’s authority to regulate GHG emissions, instead deferring to the agency’s policy judgment.

2006: The Supreme Court grants a writ of certiorari to review the case, effectively deciding that the petitioners, having brought in the State of Massachusetts as a plaintiff, have standing to sue.

2007: The Supreme Court rules 5-4 in favor of the petitioners, overruling the D.C. Circuit’s deference to the EPA, establishing GHGs as “air pollutants” under the CAA, and requiring the EPA to decide whether GHG emissions endanger public health or welfare.

2009: President Obama is sworn into office, and the EPA finalizes its endangerment finding for GHG emissions from motor vehicles in December.

2010 & 2012: New fuel economy standards and GHG emissions limits are set for new motor vehicles, first for model years 2012 to 2016, which are still in effect, and for model years 2017 to 2025, which were later rolled back by the Trump administration.

2012: The Endangerment Finding is upheld by the D.C. Circuit following a lawsuit that claimed the Finding failed to adhere to certain procedures required for a significant rulemaking.

2020: The EPA under President Trump promulgates the Safer Affordable Fuel-Efficient Vehicles Rule, which reduced the fuel economy requirements for model years 2021 to 2026 but did not modify or challenge the original endangerment finding.

2021: The Biden administration directs the EPA to revise or rescind the Safer Affordable Fuel-Efficient Vehicles Rule, and the EPA moves to reinstate the waiver for California to set its own fuel economy standards.
In 2018, Congress also passed a 2-year budget expanding financial incentives for investing in renewable energy technology and extending tax credits that incentivized carbon capture (H.R. 1892, 2017).

A broad interpretation of the EPA's authority to regulate GHGs would mean that almost no industry or activity would fall outside of the EPA's regulatory reach.

It is clear, from both the CAA and subsequent actions, that Congress has not reached a consensus on whether and how to regulate GHG emissions. Nevertheless, after the 1990 CAA Amendments failed to include GHG regulations and the Kyoto Protocol was not ratified, environmental groups were seeking a new way to regulate GHGs. In 1999, a group led by the International Center for Technology Assessment petitioned the EPA to regulate GHG emissions from motor vehicles under Section 202 of the CAA (International Center for Technology Assessment, 1999). After the EPA denied that petition in 2003 (Control of Emissions, 2003), claiming it lacked the authority to regulate GHG emissions under the CAA, the petitioners filed a lawsuit that would ultimately reach the Supreme Court and would open the door for GHG regulation under the CAA.

Classifying Greenhouse Gases Emissions as Air Pollution: Massachusetts v. EPA

That court case acquired the title Massachusetts v. EPA because the environmental groups brought in the State of Massachusetts to address the issue of legal standing. The question of standing was central to this case and continues to be an important issue in various forms of climate-related litigation today. The groups claimed Massachusetts had standing because it is a coastal state that was dealing with increasing costs related to global sea-level rise. In all, 12 states and 3 cities joined in the lawsuit (Massachusetts v. EPA, 2005a, p. 2). Automotive manufacturers and several states, including Texas, supported the EPA in the case (p. 3).

The U.S. Court of Appeals for the D.C. Circuit ruled in favor of the EPA but did not rule on whether the EPA has the authority to regulate GHG emissions under the CAA (Massachusetts v. EPA, 2005a, p. 10). It instead deferred to the EPA's policy judgment under Section 202(a)(1) to not regulate those emissions (p. 15). The court was split on the question of the petitioners' standing to sue (p. 16). However, the Supreme Court granted a writ of certiorari to review the case in 2006 (Massachusetts v. EPA, 2005b), and, in 2007, ruled 5-4 in favor of the petitioners, both in granting them standing (Massachusetts v. EPA, 2007, p. 2) and in ruling that the EPA has the authority to regulate GHG emissions because such emissions meet the CAA's "capacious definition of 'air pollutant'" (p. 4). This ruling is key because, if GHGs are indeed air pollutants, the EPA cannot avoid its "statutory obligation" under the CAA to determine whether GHGs endanger public health or welfare.

The majority opinion defining GHGs as air pollution appears to create more questions than answers. As Justice Scalia quipped in his dissenting opinion, everything from "Frisbees to flatulence" could be classified as an air pollutant (Massachusetts v. EPA, 2007, p. 63) under the Court's ruling that the CAA's definition "embraces all airborne compounds of whatever stripe" (p. 32). The Court's definition does not set some sort of minimum standard for what types of human emissions are considered "air pollutants" and what types are not. The definition implies that if GHG emissions lead to an increase in global temperatures beyond a certain ideal level, then they are "air pollution agents," but it does not define that level. Absent some limiting principle to this definition, the CO₂ we emit every time we breathe out or the water vapor emitted from all manner of human activities could be subject to regulation.

The question then becomes, what is the ideal global temperature, and how much must certain GHG emissions contribute to warming to be considered air pollutants? Different sections of the CAA set standards to justify regulating air pollutants from various sources based on the degree of harm to human health, but no such standard is given for the definition of air pollutants in Section 302 itself (42 U.S.C. §7602). Notably, the majority opinion is silent on this question. Chief Justice Roberts addresses it to some degree in his dissent, noting that tracing the ascribed harm of rising sea levels in Massachusetts back to the tiny fraction of emissions that the EPA could have regulated is "far too speculative" (Massachusetts v. EPA, 2007, p. 49). The question of significance will come up repeatedly in the rule-makings that follow from this court case.

GHG emissions are also fundamentally different from every other pollutant regulated under the CAA in that they are well-mixed in the atmosphere—that is, GHG concentrations are roughly uniform across the globe and emissions in the U.S. have the same effect on the global climate as emissions in China. Also, their effect on human health is indirect through their effect on global temperature, which is difficult to predict and will occur over the span of decades, if not centuries. As the EPA noted in its denial of the petition, other CAA pollutants are defined as such because...
they contribute to air pollution, a term that “cannot be interpreted to encompass global climate change” (*Control of Emissions*, 2003, p. 52,928). Justice Scalia puts a finer point on the issue, noting that the dictionary definition of “pollute” is to “render impure or unclean” and that GHGs cannot be said to pollute the air in this sense (*Massachusetts v. EPA*, 2007, p. 65).

In the end, the Court ruled that “EPA can avoid promulgating regulations only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do” (*Massachusetts v. EPA*, 2007, p. 5). Again, the question of significance, which, as we argue above, is fundamental to the Court’s classification of GHG emissions as “air pollutants,” is ignored.

This confusing statement obscures what the EPA was actually required to do under CAA Section 202(a)(1) (42 U.S.C. §7521(a)(1)) before promulgating regulations, namely, to determine whether GHG emissions from vehicles “cause, or contribute to, air pollution which may reasonably be anticipated to endanger the public health or welfare.” After the election of President Obama, the EPA did just that in 2009, issuing an endangerment finding for GHG emissions from vehicles (hereafter referred to as the Endangerment Finding or the Finding) and initiating an unprecedented avalanche of regulations.

**The Endangerment Finding for Vehicle Emissions: A Regulatory Car Wreck**

In order to promulgate the Endangerment Finding, the EPA had to undertake a formal rulemaking process. Although an Advance Notice of Proposed Rulemaking (APNR) for responding to the Supreme Court ruling was issued in July 2008 (*Regulating Greenhouse Gas Emissions*, 2008), no formal action was taken under the Bush administration. However, the newly elected Obama administration proposed a rule in April 2009 (*Proposed Endangerment Finding, 2009*), and, after compiling over 380,000 public comments, it finalized the Finding in December 2009 (*Endangerment and Cause or Contribute Findings for Greenhouse Gases, 2009*).

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*Figure 1*

*The 95% Confidence Range of the Trends in Global Temperatures Projected by a Collection of Climate Models, Along With Observations of the Same Quantity*

Because the rule was promulgated so quickly, many shortcuts were taken. First, the EPA did not submit the proposed rule to the Scientific Advisory Board (SAB), which it is required to do by law for most new CAA regulations (42 U.S.C. §4365(c)(1)). The SAB is not required to offer its advice and comments, nor is the EPA administrator bound to follow its opinions, but the EPA must make the rule available, along with “relevant scientific and technical information.”

This flaw was cited in a 2012 lawsuit seeking to overturn the Finding, but the D.C. Court of Appeals denied the lawsuit. The Court’s opinion was that the EPA did not trigger this requirement because it did not submit the Finding to another federal agency for “formal review and comment” (Coalition for Responsible Regulation v. EPA, 2012, p. 35). However, at least two more recent petitions to overturn the Finding dispute this opinion (Liberty Packing Company LLC, 2017; Competitive Enterprise Institute, 2019) and claim that the statute applies to this rulemaking process and that an SAB review would have resulted in substantial changes to the rule.

The EPA’s Office of Inspector General (Beusse et al., 2011) also found that the agency failed to follow many of the Office of Management and Budget’s peer-review requirements for a “highly influential scientific assessment” (Final Information, 2005, p. 2,671). In order to be subject to those requirements, an assessment must “have a potential impact of more than $500 million in any one year on either the public or private sector or that the dissemination is novel, controversial, or precedent-setting, or has significant interagency interest.” The Finding and its Technical Support Document (TSD) clearly meet those requirements in all respects, but the EPA disputed that the TSD was a “scientific assessment” in and of itself (Beusse et al., 2011, p. 54). Instead, the EPA claimed that the TSD was merely a synthesis of assessments from other U.S. government agencies and the United Nations Intergovernmental Panel on Climate Change (IPCC; p. 53).

Had either of these peer-review processes taken place, they could have highlighted numerous scientific problems with the EPA’s determination that GHG emissions from vehicles “may reasonably be anticipated to endanger the public health or welfare.”

First, GHG emissions from U.S. vehicles represent a small and declining share of global GHG emissions. Transportation sources emitted about 26% of total U.S. GHG emissions in 2009, increasing to 29% of emissions in 2019 (EPA, 2021a) as emissions from power plants declined. U.S. emissions were 15% of the global total in 2009, falling to less than 13% in 2019 (United Nations Environment Programme, 2020, pp. 4, 5) and likely to fall even further as emissions from developing nations continue to grow. Climate models developed by the EPA predict that, in 2100, the effect on global temperatures of eliminating all U.S. CO\textsubscript{2} emissions by 2050 would be 0.126°C (Bennett, 2019). The effect of eliminating vehicle emissions would be roughly a third of that number, even smaller than the 0.1°C error margin in our estimates of global temperatures (see “temperature timeseries: yearly and decadally smoothed, with uncertainties,” Global graph in Osborn, 2021).

Regarding climate models, the models used by the IPCC, the EPA, and other government agencies have shown a consistent warming bias compared to recent historical data. At the time of the Finding, Dr. Patrick Michaels and Paul C. Knappenberger found that actual temperatures over the

![Figure 2](Deaths per Decade From Droughts, Floods, Storms, Extreme Temperatures, and Wildfires From 1920 to 2020)

**Figure 2** Deaths per Decade From Droughts, Floods, Storms, Extreme Temperatures, and Wildfires From 1920 to 2020

**Climate-Related Deaths Down 99% Since the 1920s**

prior 15 years fell near the bottom 5% range of the predictions of the IPCC models relied upon by the EPA (Michaels & Knappenberger, 2009, p. 507).

Despite the evidence for less warming than what the models are predicting, the most recent group of IPCC models actually increase the range of projected warming from GHG emissions compared to the prior model set (Hausfather, 2019, “Many higher sensitivity models” section). Also, while most climate models have been tuned to match measurements of surface temperatures, they are unable to replicate temperature trends in the bulk troposphere—the portion of the atmosphere up to a few miles above the earth’s surface—a serious deficiency reiterated in a 2020 study (McKitrick & Christy, 2020).

If there are any negative impacts of warming on human mortality, those impacts have been far outweighed by improvements in our ability to adapt to the climate.

The CAA is also not designed to consider one of the most important societal questions regarding climate change: the cost of adapting to rising temperatures versus the cost of reducing emissions. If the air pollutant in question is deemed to endanger human health, the CAA says its emissions must be regulated. For standard forms of air pollution, such as soot and smog, the only forms of adaptation possible are not to go outside or to wear masks, which are harmful to our well-being in other ways. Therefore, reducing emissions using pollution control technologies, to the degree that such reductions actually improve public health, is usually the most cost-effective means to mitigate the risks from air pollution.

Adapting to changes in temperature, sea level, precipitation, and so on is something that we already do in many ways. Because of our growing wealth, deaths from climate-related causes worldwide have fallen by 99% over the past century (see database Guha–Sapir, 2020 and database homepage The International Disasters Database, n.d.). If there are any negative impacts of warming on human mortality, those impacts have been far outweighed by improvements in our ability to adapt to the climate. However, the Finding, following the design of the CAA, explicitly does not consider adaptation in its assessment of whether GHG emissions endanger public health (Endangerment and Cause or Contribute Findings for Greenhouse Gases, 2009, p. 66,512).

Furthermore, the terms used in Section 202 of the CAA—“may reasonably be anticipated to endanger”—are sufficiently vague that overturning the Finding on scientific grounds would be very difficult. The Oxford Dictionary (Oxford University Press, 2020) defines endanger as “to put at risk or in danger,” not necessarily to cause danger, and the phrase “may reasonably be anticipated” instead of “is proven” or “will” leaves a vast amount of latitude for the EPA administrator’s judgment. Although there is great uncertainty in the amount of warming that GHG emissions are causing, and it is entirely possible that the benefits of warming temperatures will outweigh the costs, it cannot be said that these emissions pose zero risk to the public welfare. Again, the lack of a clear definition for significance creates enormous holes in the CAA, and the Obama administration used those holes to enact a number of far-reaching GHG regulations.

2010 and 2012 CAFE Standards: Not a Good Cup of Coffee

The first GHG regulation to become final, following directly from the Endangerment Finding, was a new Corporate Average Fuel Economy (CAFE) standards in 2010 for new 2012 to 2016 light-duty vehicles (Light-Duty Vehicle Greenhouse Gas Emission Standards, 2010). Congress established the CAFE standards (42 U.S.C. §32902) in 1975 in response to the effects of the Arab oil embargo and a growing concern that the U.S. needed to conserve its limited oil supplies. The National Highway Traffic and Safety Administration (NHTSA) promulgated and enforced the standards. The shale revolution that began in the late 2000s showed that our domestic oil supplies are far more abundant than ever imagined, but, to this day, the myth of oil scarcity persists as a justification for the CAFE standards.

The problem with promulgating GHG regulations for vehicles is that the technology does not yet exist to capture vehicle GHG emissions and transform them into something else, as catalytic converters, filters, and exhaust fluid do with particulates and other pollutant emissions. Therefore, the only way to reduce those emissions is to improve fuel economy, forcing the EPA to do a joint rulemaking with the NHTSA to establish new CAFE standards. This is another example of how the CAA has been stretched beyond its reasonable limits to regulate GHG emissions.

Given the challenges inherent in improving the fuel efficiency of internal combustion engines at such a rapid rate, the rule is clearly designed to force increased adoption of more hybrid and electric vehicles (p. 25,328). The rule generously gave EVs the designation of emitting no GHGs, at least up to the first 200,000 EVs from each manufacturer (p. 25,341), despite the fact that there is no place in the U.S. where electricity is produced with zero GHG emissions.

This designation for EVs created a market for emissions credits that amounts to an enormous de facto subsidy for EV manufacturers. Because many automakers are struggling to ramp up their own EV manufacturing, they have chosen to comply with the standards by purchasing billions of dollars’ worth of credits—most notably from Tesla, which still depends on these credits to maintain its profitability (Beresford, 2020). As of model year 2019, only 3 out of 14 large manufacturers were meeting the EPA’s GHG standards (EPA, 2021b, Highlight #7). The other 11 relied on banked or purchased credits to meet the standards.

In 2012, the EPA and NHTSA followed up by promulgating CAFE standards for model years 2017 to 2025 (2017 and Later Vehicle Gas Emissions, 2012). This rule required 3.5% annual increases in fuel economy from 2017 to 2020, then 5% from 2020 to 2025, raising the fleet-wide average for light-duty vehicles to 48.7 miles per gallon (mpg) by 2025 (p. 62,640).

2020 SAFE Rule: Putting a Band-Aid on the Problem

These new CAFE standards proved quite punitive to automakers and consumers, forcing the adoption of smaller, more expensive, and less safe vehicles. In response to industry and consumer backlash, the Trump administration chose to relax the standards for model year 2021 to 2026 light-duty vehicles by promulgating the Safer Affordable Fuel-Efficient Vehicles Rule in 2020 (The Safer Affordable Fuel-Efficient Vehicles, 2020). The SAFE rule reduced the average annual fuel economy increase for those model years from 5% to 1.5% (p. 24,175).

The SAFE rule appropriately notes the many tradeoffs associated with improving fuel economy. First are the technology costs, which the rule estimates will be about $100 billion lower than under the original standards, for a savings of roughly $1,000 per new vehicle sold (The Safer Affordable Fuel-Efficient Vehicles, 2020, p. 24,181). Those costs can be offset by fuel savings, but the EPA and the NHSTA should not infringe upon the rights of consumers by forcing those tradeoffs. More important than the simple cost comparisons, the rule estimates that the increased adoption of newer, larger, and therefore safer vehicles will lead to nearly 3,300 fewer fatalities and over 46,000 fewer hospitalizations (p. 24,181). Safety is the often-forgotten hidden cost of the CAFE standards, and the SAFE rule, beginning with its name, is correct to highlight that issue.

Despite the positive aspects of this rule, it does nothing to amend or correct the flawed legal and policy justifications for the CAFE standards and accompanying GHG regulations. First, these standards infringe upon the freedom of auto businesses and consumers to build and purchase the cars that best suit their needs, subordinating the many tradeoffs in that decision to a singular goal of better fuel economy. Second, they were designed to address a problem, the notion that the U.S. will run out of oil, that has now been proven to be incorrect. Finally, they replace that justification with another rationale, regulating GHG emissions via the CAA, that, as we have shown, has a very tenuous legal foundation.

An important question to ask is whether these regulations appropriately address the assumed problem of GHG emissions. The 2010 CAFE standards projected lifetime CO₂ emissions reductions of 665 million metric tons (Light-Duty Vehicle Greenhouse Gas Emission Standards, 2010, p. 25,343) which was only 2.5% of total annual U.S. emissions from 2012 to 2016 (EPA, 2021a). The 2012 standards were projected to reduce emissions by a total of 1.84 billion tons from 2017 to 2025 (2017 and Later Model Year Vehicle Gas Emissions, 2012, p. 62,657). Assuming the 2012 standards had remained in effect through 2025, the total emissions reductions from the two regulations over more than a decade, about 2.5 billion tons of CO₂, would be equal to

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Table 1: Estimated CO₂ Emissions Reductions from 2012-2025 CAFE Standards

<table>
<thead>
<tr>
<th></th>
<th>Total emissions reductions (MMT CO₂)</th>
<th>Days of U.S. emissions (2019 annual rate)</th>
<th>Days of global emissions (2019 annual rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2012-2016 rule</strong></td>
<td>665</td>
<td>46</td>
<td>6</td>
</tr>
<tr>
<td><strong>2017-2025 rule</strong></td>
<td>1,840</td>
<td>128</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,505</td>
<td>174</td>
<td>24</td>
</tr>
</tbody>
</table>

less than half a year of U.S. CO₂ emissions and only 24 days of global CO₂ emissions (United Nations Environment Programme, 2020, p. 5).

It is also important to note that these standards and projections are based on regulatory assumptions, not on what is actually achieved in the real world. As noted in the EPA’s announcement for the 2012 standards, real-world CO₂ emissions are 25% higher per mile, and real-world fuel economy is 20% lower than the standards indicate (Office of Transportation and Air Quality, 2012, p. 6). Also, the assumption of zero CO₂ emissions for EVs, ignoring the upstream emissions from electricity production, is likely to further skew these results.

As a sign of how important these GHG regulations are, both economically and politically, the Biden administration moved on its first day to review the SAFE rule (Exec. Order No. 13990, 2021, Section 2). In April 2021, it began the process of repealing the first part of the rule, which prevented California from establishing its own fuel economy standards (California State Motor Vehicle Pollution Control Standards, 2021). Because California has the most vehicles of any state in the nation, and several other states have chosen to follow its lead, it is likely that a new federal rule will be harmonized with the standards that California sets. Regardless of the choices the Biden administration makes, GHG standards for vehicles will continue to be one of the most hotly contested EPA regulations for many more years to come.

Conclusion
The use of the CAA to regulate GHG emissions has led to a vast regulatory conundrum that was either ignored or not foreseen by the judges who wrote the majority opinion in Massachusetts v. EPA. The problems primarily stem from the fact that GHGs are not pollutants that directly harm human health and have fundamentally different characteristics from the pollutants the CAA was designed to regulate. The regulatory contradictions that resulted from this flawed decision can be summarized as follows:

1. Pollutants directly harm human health in such a way that high emissions and concentration levels in a local area can be translated into health impacts in that area. In contrast, GHG emissions affect the global climate, which is also subject to numerous poorly understood natural forces. Therefore, the effects and potential benefits of U.S. emissions reductions are almost impossible to measure.

2. Furthermore, GHG emissions in other countries have the same effects on the U.S. as local emissions. The supposed endangerment caused by GHG emissions will not be mitigated by local emissions controls alone. The CAA is not designed to incorporate the effects of emissions outside of U.S. borders, much less provide a framework for the U.S. to work with other countries to reduce emissions.

3. The regulation of GHGs under the CAA must rely on an assumption of a global temperature range that is “safe,” that is, not endangering the public health or welfare, and requisite GHG levels and emissions controls that are needed to maintain those safe levels. Humanity has spread across the globe by adapting to inherently dangerous environments and making them safe for human habitation, so the notion of “safe” and “dangerous” climates cannot be defined in the same way that safe and dangerous pollution levels are defined.

4. The CAA is built on the assumption that emissions reductions are the only way to mitigate the harms caused by air pollution effectively. This is true for air pollution such as soot and smog, which can only be adapted to by wearing masks outside or staying indoors with filtered air. In contrast, the evidence is becoming increasingly clear that improving resiliency and adaptation to the potential effects of climate change will be far more cost-effective than policies to reduce GHG emissions (Lomborg, 2020).

The primary problem with the implementation of GHG regulations under the CAA is that unelected EPA officials have been allowed to mold the CAA as they see fit, given the lack of direct references to regulating GHG emissions in the law and the broad authority imparted by Massachusetts v. EPA. Attempting to treat GHG emissions under a framework designed for real pollutants ignores the scientific realities of what GHGs and their effects are.

Unfortunately, the Biden administration is planning to expand GHG regulations under the CAA (Exec. Order No. 13990, 2021, Section 2), and the current Congress is likely to favor more GHG regulations. For now, the courts will decide which of these regulations will be allowed to stand, but future Congresses should act decisively to amend the CAA to protect the American people from this unwarranted and harmful expansion of the federal government’s regulatory powers.
References


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