

How Climate Policy Can Help Decarbonize Heavy Industry

Introduction

Heavy industry is the foundation of modern society. From steel and cement to paperboard and fertilizer, these globally traded goods are essential—and it is essential to our future that they be produced without worsening the climate crisis. Smart public policy can set the foundation of a major industrial renaissance as we collectively work to modernize our industrial base. The United States has a chance to lead the way by decarbonizing its industrial sector while supporting workers and communities and acting as a model for the global economy.

The work ahead is fundamentally creative. After all, we don't want to stop using steel, cement, or other manufactured products; we need these materials more than ever to build a green economy. But *how* we make them must change. Transforming heavy manufacturing in the U.S. represents a remarkable opportunity across a set of national priorities. With smart policy, we can secure supply chains, expand union jobs, commercialize new technologies, clear our air, and stabilize our climate.

Realizing these gains will strengthen industrial communities that have faced decades of underinvestment. Whole cities are hurting, and creaking facilities that lack modern pollution controls barely compete against brand new, highly efficient manufacturing plants abroad. Take the aluminum industry: In 1981, the U.S. produced over 30 percent of the world's aluminum in 23 primary aluminum smelters, employing tens of thousands of union workers. Forty years later, that global share has shrunk to 1.3 percent, in just six facilities—some of which are [shockingly dirty](#).

Even when industry has stayed in the U.S., a race-to-the-bottom approach (fueled partly by trade policies that neglected workers) has let big corporations shift manufacturing to anti-union and anti-regulatory states. This must change. And it can—with full deployment of the major investment tools in the Inflation Reduction Act (IRA) and Bipartisan Infrastructure Law (BIL), savvy use of Clean Air Act (CAA) standards, and solidarity to implement a wide range of worker-friendly policies.

But to get it done, we need to put industry at the center of climate policy and advocacy. For too long, the climate community has left the industrial sector at the bottom of its to-do list. The widespread perception that the sector is "hard to abate"—code for "expensive" and "infeasible"—obfuscates the reality that immediate opportunities to reduce emissions are all around us.

Consider:

- From [Namibia](#) to [Sweden](#), countries are investing billions of dollars to move from coal-based steel production to build new furnaces that rely on green hydrogen.
- The [First Movers Coalition's](#) 95 members have collectively made 120 commitments to purchase low-carbon products, totaling \$15 billion in demand.
- State transportation departments in the U.S. are [already testing](#) low-carbon concrete; innovative carbon-cutting startups make [steady progress](#) towards economies of scale.
- In the [aluminum industry](#), 81 percent of emissions are from electricity, which is already rapidly decarbonizing.
- Low-temperature industrial heat (<130°C) demand across several industries, including chemicals, pulp and paper, food and beverage, and more, is ready to electrify now. [Estimates](#) indicate industrial heat pumps powered by clean energy could avoid 217 million metric tons of CO₂ equivalents annually.
- In the absence of federal leadership, [states](#) are [moving forward](#) to require greater circularity in packaging and other single-use industrial goods.

In short, there are opportunities everywhere. The fundamental ingenuity of American companies faced with new challenges, operating in a global market that demands low-carbon goods, challenges the perception that the industrial sector is “hard to abate.” We are developing the technologies necessary to drive emissions close to zero across the industrial sector, and in many cases, the technology is available today. Deploying it now, with well-designed policies to lift up unions and community benefits, will drive transformational change.

We can do big, hard things. Amid the doom and gloom of nonstop bad news on climate, it's easy to miss what we've managed to accomplish. Coal has dropped from 50 percent of the U.S. power mix 15 years ago to under 20 percent today—all while renewables are now the second-largest electricity source in the country. The U.S. has hit a [tipping point](#) in new electric vehicle (EV) sales that has historically signaled a start to exponential growth. The IRA is already juicing countless new solar facilities, heat pumps, and other climate-friendly projects from residential to commercial buildings. Those victories didn't come easily—in many cases the result of dedicated movement-building and smart policymaking—and transforming heavy industry will take just as much effort.

There's no time to wait. A recent report from the International Energy Agency makes clear that we need at least a 20 percent reduction in industrial emissions by 2030 to avoid the worst impacts of climate change. Moreover, even with the successful implementation of the IRA, the U.S. still falls short of its pledge to reduce emissions



by 50-52 percent by 2030. Without rapid progress, we have little chance of locking in a 1.5°C trajectory.

Smart public policy is critical for hitting those emissions targets. Fueled by new federal investments and invigorated commitments to tackle the climate crisis, the U.S. has the chance to clean up the industrial sector while driving growth and uplifting underserved communities. This memo details the policy agenda that the Biden administration, in concert with state partners, must pursue to seize that opportunity.

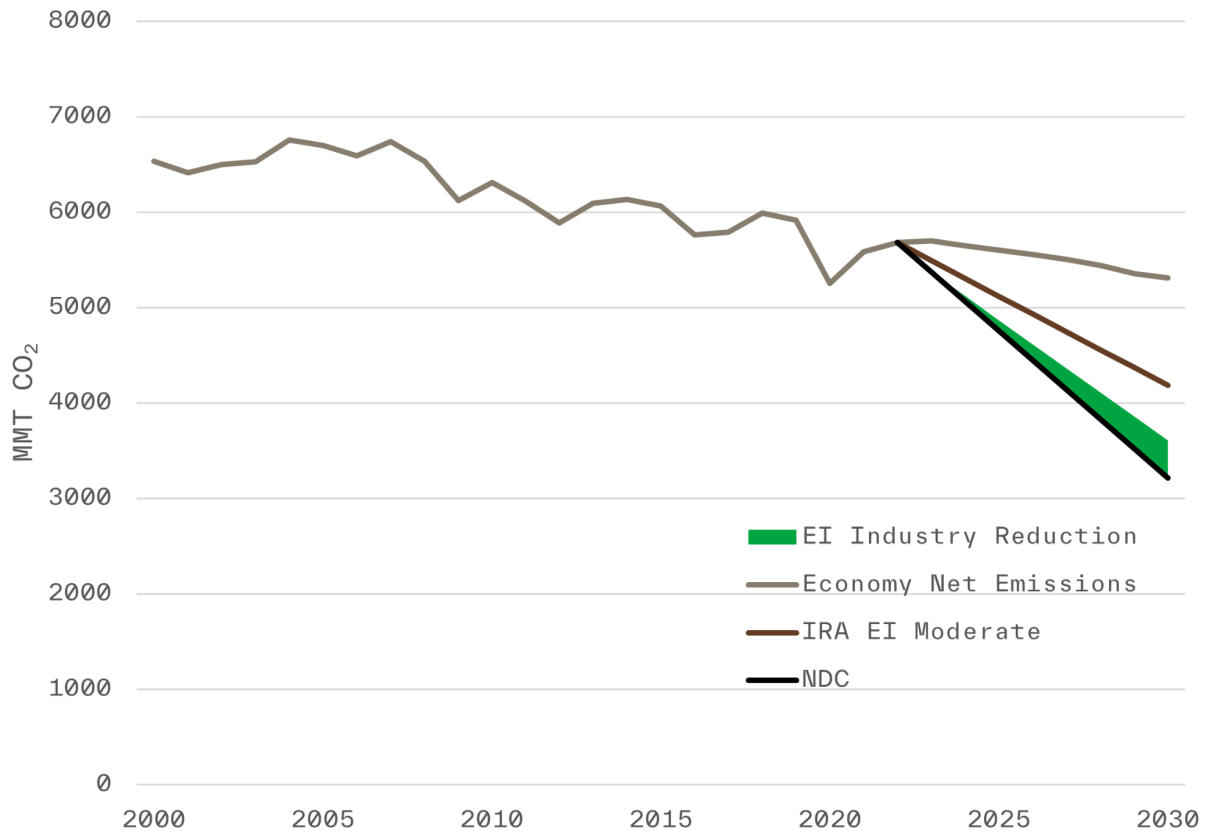
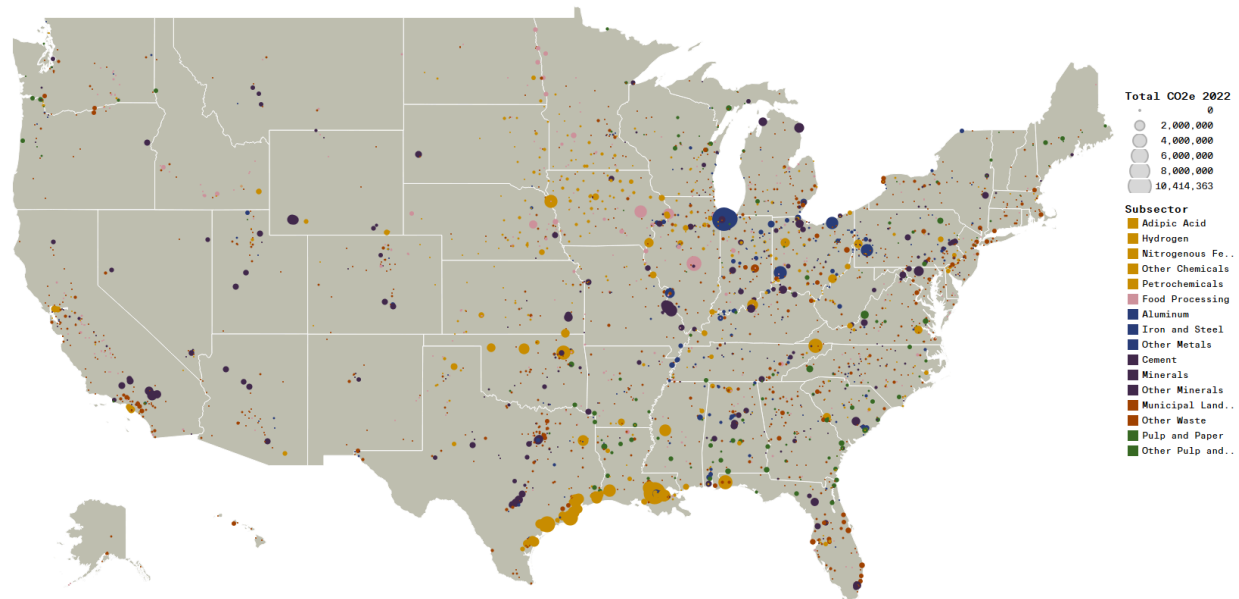


Chart Two: Even with the successful implementation of the Inflation Reduction Act, a gap remains to fill to meet the U.S. Nationally Determined Contribution of 50-52 percent. According to [Energy Innovation](#), further policy development to reduce industrial emissions can fill 40 percent of the gap. Source: Energy Innovation’s Energy Policy Simulator model.

We must also account for the environmental injustices inflicted by pollution from heavy industry. Because of racist land use policies and other structural inequities that have encouraged the siting of large polluters in Black, Indigenous, and people of color (BIPOC) communities, BIPOC communities in the U.S. suffer the most severe health impacts of industrial pollution. [Analysis of industrial emissions](#) by ProPublica looked deeply at more than 1,000 industrial toxic hot spots and estimated that at least 250,000 people living around these facilities “may be exposed to levels of excess cancer risk that the Environmental Protection Agency (EPA) deems unacceptable.”

Fixing this problem requires understanding it. The industrial sector is not monolithic. Its component industries, like steel, food processing, cement, and paper production, each have their own technologies, markets, and solutions.

This diverse set of industries reaches from coast to coast. However, there is some regional specialization, with the paper industry prominent in the southeast, food manufacturing near agricultural hubs, primary iron and steel in the Great Lakes region, and petrochemicals dominating the Gulf Coast region. Landfills, waste incineration, industrial boilers, and cement are more evenly distributed.



Map One: Industrial facilities and their 2022 GHG emissions. More than 5,000 facilities report greenhouse gas emissions exceeding 25,000 tons to EPA annually. Source: Industrious Labs, 2023.

This is not an insurmountable challenge. Though each sector will require creative engagement, many share similar industrial processes, which can be targeted with similar technologies and policies. A significant fraction of industrial pollution, for instance, comes from thermal needs—burning fossil fuels in factories for process heat—regardless of the *type* of factory. This suggests the potential for a pathway focused on reducing pollution from heat sources, an area in which regulators and companies have deep expertise. Likewise, in sectors like cement and steel with unique process emissions, new low-carbon technologies are available for demonstration in new facilities. Ultimately, as kinks get worked out, IRA investments and regulatory standards can directly support deployment of those first-of-a-kind technologies in existing facilities and pave the way for further private sector investment. Certain technologies like [green hydrogen](#) and thermal energy storage could be widely deployed across the industrial sector, with implications for electric grid investments, ratemaking, and renewable energy siting. But the climate community has experience wrestling with such questions, and with dedicated effort, solutions are within reach.

Policy Recommendations

Decarbonizing industry requires weaving together policies to modernize facilities, steering investments toward clean technologies, and setting clear regulatory standards that can keep progress moving. And it requires doing so in the context of global trade, supporting accelerated progress at home while making U.S. industries and technologies attractive worldwide. Undergirding all of these efforts, we need to recognize and value how workers and communities have sustained domestic U.S. industry for decades, often sacrificing their own well-being; we must prioritize efforts to relieve their pollution burdens and position them for success in the next century of industrial growth.

The following recommendations lay out the interlocking policy tools that the White House, in partnership with states and the private sector, can leverage to achieve those goals. Ambitious industrial decarbonization, with cascading co-benefits, is achievable. This is a high-level roadmap for getting there.

Pro-Worker and Pro-Community Initiatives

Industrial decarbonization policy has to start with supporting the people and communities that run our industries. President Biden's industrial *decarbonization* strategy should mirror his broader industrial *policy* objectives. Bidenomics, as [it's been termed](#), prioritizes investments in good jobs in nascent, strategically important industries—but industrial decarbonization, if not executed with attention to job quality and retention, can be at odds with those policy aims. Evolving industries will see changing workforce needs, and not every worker will be able to remain in their current role—or even their current sector. The churn of instituting new processes and retrofitting plants can also lead to lower job quality and pay cuts, unless we work proactively to ensure everyone benefits. We've seen those risks clearly in the [transition to electric vehicles](#), where automakers initially seized on the shifting marketplace to lower pay and allow working conditions to deteriorate until a historic labor action by the UAW, supported by President Biden, reversed that trend. Policymakers must be cognizant of these threats when building an industrial decarbonization strategy.

A well-designed trade policy, as detailed below, is a major piece of this puzzle. Undeniably, decarbonizing heavy industry will [require substantial capital investments](#) and may temporarily result in higher prices on lower-carbon materials. If the market shifts to relying on more polluting international alternatives, it will undercut domestic industry and drive job loss. **Anticipating those anti-worker market incentives in proactive industrial decarbonization trade policy will help preserve the domestic labor pool and maintain good jobs in heavy industry.**

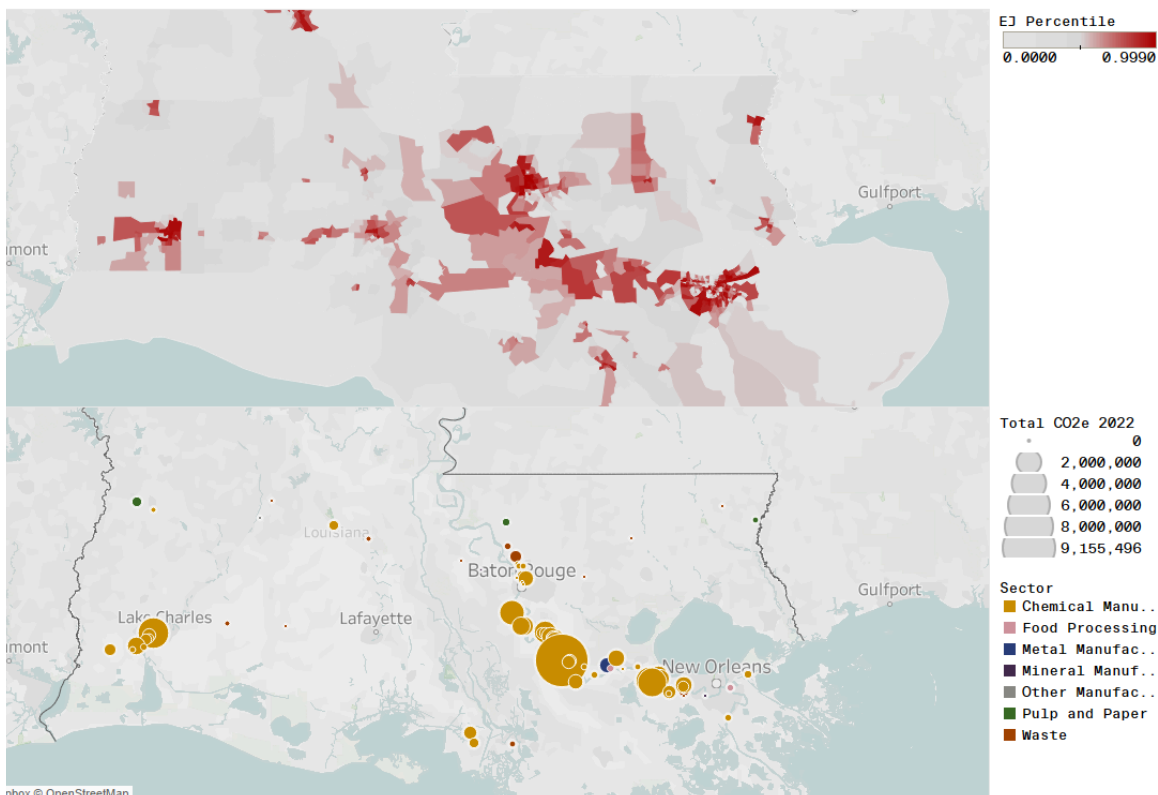
Creating good jobs will also require consistently tying job quality standards to federal funding. DOE has already undertaken this work; the agency requires community benefits plans (CBPs) that include job quality commitments as an element of many grant applications, including for [industrial decarbonization funding opportunities](#). **The administration should standardize that practice across climate programs and more rigorously assess funding applications on the basis of job quality and retention commitments.**

Congress should also consider amendments to the IRA that would further advance these aims. Although the IRA legislation is overall strongly pro-worker, some important provisions (like a [bonus credit](#) for EVs produced in union facilities) were dropped from the bill during Senate negotiations. More ambitious policy tools, like emulating the pandemic-era American Rescue Plan [tax credit for keeping workers on payroll](#), or adding incentives to encourage pollution reductions for existing facilities in underserved communities, could also address workforce risks in the clean energy transition. While President Biden has a great deal of leeway to act on this issue via CBPs and other agency discretion, the next Congress should also go even further.

Environmental Justice Priorities

Industrial decarbonization policy must also secure safe conditions in frontline communities. Low-income BIPOC communities bear a higher rate of exposure to industrial pollution because redlining and other structural injustices have segregated them into so-called residential-industrial zones, where heavily polluting industrial facilities surround residential neighborhoods. An extensive set of data backs up this trend; exposure to industrial air toxins from the cement industry, for example, is [almost 50 percent higher](#) for low-income African Americans than for low-income whites in the United States.

As a consequence, these communities suffer a wide range of preventable, deadly diseases. In [regions of the Cancer Alley](#), lifetime cancer risk is 47 times higher than EPA's acceptable threshold. More broadly, local air pollution from heavy industry causes numerous adverse health effects, including serious heart and lung diseases.



Map Two: A side-by-side comparison of most overburdened environmental justice communities (top) and operating industrial facilities. Source: Industrious Labs, 2023.

For all those reasons, **any policy initiatives seeking to reduce carbon pollution from heavy industry must be paired with measures to cut the emission of air and water toxics.** In some cases, technological fixes for greenhouse gases will leave toxic pollutants unmitigated. In others, the alternatives themselves produce dangerous pollution—hydrogen combustion in ambient air, for example, produces nitrogen oxides (NOx) as a byproduct. As described below, implementing improvements to Clean Air Act standards and enforcement will be critical to protecting public health in frontline communities. More broadly, EPA should also reform its pollution monitoring systems to rely less on self-reporting from polluters and more closely track illegal pollution from bad actors. And measures like New Jersey’s [environmental justice rule on cumulative impacts](#), which accounts for the combined impacts of multiple industrial facilities on nearby communities, can also help overburdened communities ameliorate unsafe local pollution levels.

Federal and State Funding

The IRA and BIL have driven historic investments in industrial decarbonization, spanning ambitious demonstration projects, hydrogen production, clean procurement,

carbon capture, and more via [an array of initiatives and programs](#). To meet President Biden’s climate targets and drive rapid pollution cuts, even more is needed. [DOE anticipates](#) that decarbonizing the eight industries of focus in the IRA—chemicals, refining, iron and steel, food and beverage, cement, pulp and paper, aluminum, and glass—will require capital investments of \$700 billion to \$1.1 trillion. Achieving net zero by 2050 means transforming how America’s heavy industry operates, and the federal government must secure the resources for that generational challenge.

Cutting pollution from heavy industry has a set of inherent financial challenges for manufacturers—they typically operate on thin margins, and capital expenditures to overhaul production lines and transition to cleaner processes can be significant. For example, a recently opened sustainable steel production line cost \$450 million to stand up. And considering that gas rates for industrial customers are artificially low today, conversion to clean electricity without complementary rate design and other electric policy reforms could lead to higher operating costs. Federal financial support can supplement private sector funding, guarantee loans, and help shift the industry further and faster than markets left to their own devices.

In many cases, increased federal support should mean more resources for existing programs. DOE’s Industrial Demonstrations Program (IDP), which funds innovative industrial decarbonization projects, exemplifies the need for further funding: While the IDP has about \$6 billion in grant funding available, [DOE received](#) 411 applications totaling \$60 billion in its first round of submissions in 2023. Not every application will meet DOE’s high standards for approval, of course, but demand for these funds undeniably outstrips supply.

Similarly, the IRA’s funding for the [Buy Clean initiatives](#) described below is relatively limited. The law [cumulatively provides](#) \$4.15 billion for the procurement of low-carbon construction materials—not an insignificant sum but a small share relative to the federal government’s annual \$630 billion procurement budget. In 2012, the [federal government spent](#) \$2.49 billion on concrete and steel for construction projects alone. More funding for Buy Clean and other government purchasing programs will be necessary for a continuous demand signal driving decarbonization.

Down the line, **Congress should also consider new funding sources for low-carbon industrial products.** For example, a production tax credit, modeled on current clean energy incentives, could subsidize the manufacture of cleaner cement and steel. Dedicated funding for advance market commitments could complement the IRA’s appropriations for Buy Clean initiatives. Tax incentives for hiring union workers and averting layoffs would help secure a fair transition. Stepping up resources for EPA’s pollution monitoring and enforcement would support new standards for industrial pollution. The IRA and BIL are a great start, and we have a way to go.

Buy Clean and Advance Market Commitments

Providing stable demand for low-carbon materials is one of the public sector's most powerful tools for driving industrial decarbonization. As detailed above, firms face several challenges to decarbonization; Buy Clean programs and advanced market commitments can provide the financial certainty needed to secure capital-intensive investments.

The U.S. federal government is the world's largest purchaser of goods and services with an annual purchasing power of over \$630 billion. The government is an especially outsized customer for construction materials and other heavy industrial products: Close to 50 percent of all cement consumed in the U.S. is through publicly funded construction. A firm government commitment to buying low-carbon materials moves markets.

The White House has already built a robust Buy Clean initiative, including a Federal-State Buy Clean Partnership with commitments from 12 leading states. The initiative maximizes carbon reductions by focusing on construction materials with high embodied carbon, including steel, cement and concrete, asphalt, and flat glass. We've seen meaningful progress on these efforts in recent months. In June 2023, the General Services Administration (GSA) selected 20 technologies for landmark demonstrations in federal buildings. A few months later, GSA issued the [first IRA-funded procurement](#) for substantially lower embodied carbon materials and the first standard for embodied carbon for flat glass. The same month, EPA [announced](#) \$100 million in grants for companies to assess and report embodied carbon data, which will ultimately expand market access to lower-carbon materials.

The Biden administration and its state partners have room to build on this progress.

Expanding and strengthening state programs will compound the Buy Clean Initiative's effectiveness; for example, states can require [Environmental Product Declarations](#) (EPDs) for government bids, accelerate their approval processes for new concrete mixes, and educate suppliers, designers, and contractors to improve engagement with Buy Clean initiatives. DOE's new [Regional Clean Hydrogen Hubs](#) present exciting possibilities for reducing embodied carbon from fuel consumption, and green procurement programs should account for such developments. As better EPD data—representing products' embodied carbon on a facility-by-facility basis—becomes more widely available, Buy Clean programs should also tighten their benchmarks for product eligibility. The Biden administration and partner states are still developing and growing their programs; they must look to build stable and effective initiatives amid changing market conditions and rapidly decarbonizing industry.

In addition to implementing the Buy Clean initiative, **the White House should explore mechanisms to issue advance market commitments (AMCs) for innovative low-carbon materials.** Buy Clean is an ideal tool for time-tested products from established market actors, but cannot always meet the needs of startup firms with cutting-edge products. AMCs would address two core challenges in that space. First, startups invariably face a high-risk period when upfront capital costs can sink them before they're able to generate sustainable revenue. AMCs can mitigate that risk by providing a guaranteed revenue stream for low-carbon products. Second, the construction industry is especially wary of novel materials. It's a chicken-and-egg dilemma: No contractor wants to be at fault if a novel cement mix in a building's foundation doesn't perform as expected, but it's hard for firms to build credibility without the opportunity for demonstrations in the field. The government can provide lab-tested materials the opportunity to prove their reliability in the field through publicly funded demonstration projects with the materials procured via AMCs.

Environmental Regulation and Enforcement

The Biden administration's historic climate investments, passed through the IRA, represent a vital step forward for industrial decarbonization. But investments alone will not decarbonize heavy industry at the pace needed to address the climate crisis. Investments will be more effective if informed by a roadmap that clear standards can provide. After all, as we decide what new facilities to build, we need to invest consistently in climate and public health needs—and standards provide that clarity. They are even more needed for existing facilities, where standards can support and justify the investments needed to make major retrofits in a sensible way, keeping plants open and serving communities while using new technologies. **The Biden administration must use its full suite of tools, including federal standards, to tackle industrial decarbonization. Leading states can get ahead of the game by issuing their own programs to help industry make needed investments in zero-carbon technologies.**

Right now, we do not have the tools we need to guide investments and protect communities. Compared to other sectors, federal rules limiting air pollution from heavy industry are weak and outdated. The irony is stark—these industries are [leading sources](#) of hazardous pollution, commonly sited in environmental justice communities, and the source of [nearly a quarter](#) of America's carbon pollution. Relying on decades-old rules and limited regulatory coverage of dangerous pollutants brings ongoing harm to communities and the climate.

If this inaction continues, we will also reach the end of this critical decade without a clear regulatory investment signal. That outcome would harm industry by removing incentives to innovate and would leave overburdened communities with high-emitting

sources for many years to come. After all, even after standards are in place, it will take years for industrial sources to install controls.

The available tools are clear, as the CAA covers [a wide range](#) of industrial pollution sources, including facilities producing iron and steel, cement, aluminum, ammonia, and glass, among many others. But the air pollution standards for some heavy industrial processes verge on antique. Despite a required eight-year cycle of standards review, many New Source Performance Standards (NSPSs) haven't been updated—some date back to the 1970s and 80s. And it's the same story with clean water regulations. For example, EPA hasn't updated its water toxics standards for pulp and paper mills since 1998, when it considered closed-loop and chlorine-free technologies (used widely outside the U.S.) only as voluntary measures. The agency should be well aware of these gaps; it's been 15 years since the Supreme Court confirmed that EPA has the discretion and obligation to regulate dangerous industrial sources of greenhouse gases, but not a single industrial sector NSPS regulates carbon dioxides.

Such new standards would also make good on [a commitment the EPA made in 2010](#) during its rulemaking covering Portland cement manufacturing. EPA stated that while “it may be appropriate for the Agency to set a standard of performance for GHGs,” the agency did “not yet have adequate information about GHG emissions sufficient” to set such a standard. To fill that gap, EPA committed that “the Agency is working towards a proposal for GHG standards from Portland cement facilities.” Yet, 13 years later, we have seen no movement on such standards. **The time is long overdue for a new suite of rules from EPA to update NSPSs for heavy industry and incorporate key climate-warming pollutants.**

[Sections 111\(b\) and \(d\)](#) of the CAA give EPA the power to regulate air pollution from new and existing industrial sources. NSPSs cover newly built sources, but the law has an added hook: When EPA adds standards for greenhouse gases to an NSPS, states must plan appropriate control strategies for existing plants as well, considering those facilities' particular circumstances. To be sure, state criteria pollutant plans (for pollutants like smog) can—and should—also reach existing sources, but direct planning for greenhouse gas reductions can accelerate progress and introduce new technologies where possible. Incorporating CO₂ into the NSPS for various industrial sources can thereby drive climate pollution reductions across the sector.

The CAA offers EPA multiple viable pathways to regulating GHGs from heavy industry. The agency could issue rules sectorally, regulating based on [source categories](#) like Portland Cement Manufacturing and Basic Oxygen Process Furnace Primary Emissions. EPA could also approach industrial pollution by driving efficiency improvements for shared emissions sources across sectors; the agency can strengthen regulations on [the industrial boilers](#) used for high-heat processes in several subsectors. These

pathways are not exclusive; EPA likely could act efficiently by addressing the large cross-sectoral emissions from boilers and similar processes, thereby addressing many sectors at one go, while building tailored rules for process emissions from the highest emitting sectors where needed to control emissions and guide public and private investment. Whichever regulatory pathway EPA chooses, it must maximize pollution reduction potential across industrial sources.

EPA also has an opportunity to regulate air toxics from industrial sources more rigorously under [Section 112](#) of the CAA. Heavy industry is a [major source](#) of dangerous air pollution. Children living near industrial areas suffer [reduced lung function](#) and other respiratory symptoms. Proximity to steel mills for even a few days causes [measurable damage](#) to the nervous system, and living near cement plants [increases rates of respiratory disease](#) and mortality. But EPA has similarly neglected to update Section 112 regulations in recent decades. **As the agency looks to decarbonize industry via Section 111 rules, it should take the chance to strengthen community protections under Section 112.**

EPA can also modernize its case-by-case air permitting rules for individual facilities to make sure that non-combustion technologies are considered when permits come open during major new construction or modification. That would help technology advance, even as industry-wide standards are still under consideration. The CAA's permitting programs, with EPA guidance to focus them, can ensure that the best available control technologies—critically including non-combustion technologies—that are being funded by the IRA spread nationally as permits come up for consideration or renewal. In this way, the CAA can leverage and accelerate IRA investments at facilities nationwide.

As an initial step in the near term, **EPA should issue an Information Collection Request (ICR) for industry data that can inform regulatory efforts.** EPA must follow a [time-consuming approval process](#) for formal ICRs, and it will likely need more information from industry to complete regulations—so the agency should start in 2024 with an ICR so it is ready to shape standards in the second term. For example, EPA could usefully seek information on the age, type, size, heat input, and emissions of current industrial boilers at many sites, explore ways facilities currently use waste gas (including by combusting it), identify options for efficiency upgrades, and/or inquire into site plans and configurations (including electrical connections) that could inform electrification decisions. EPA could also explore the vintage of applicable air permits, current controls, and community exposures to build up a sound picture of environmental justice benefits from standards. Complementing those efforts, the agency can gather additional monitoring data via its [Section 114](#) authorities to improve the badly outdated [generalized formulas](#) that estimate toxic emissions by facility and

process type. Taken together, this data-gathering effort can form the basis for robust future rulemaking for both GHGs and toxic pollutants.

But time is short. Information needs to start flowing into EPA soon to get standards in place in time to channel IRA and private investments, as facilities start considering their futures. Although ICRs have never been successfully challenged in court, administrations hostile to regulation have [sometimes canceled ICRs](#) to hamstring the agency. Getting the request out and done by 2025 would help safeguard this critical information and ensure it gets into public and expert hands.

Standards of Performance	Date Last Updated	Pollutants Regulated
Basic Oxygen Process Furnace (BOPF) Primary Emissions	7/25/1977	Particulate matter (PM), visible emissions (VE)
Basic Oxygen Process Furnace (BOPF) Secondary Emissions	01/02/1986	PM, VE
Ammonium Sulfate Manufacturing	11/12/1980	PM, VE
Primary Aluminum Production	10/07/1997	Total fluorides, VE
Glass Manufacturing Plants	10/17/2000	PM
Industrial - Commercial - Institutional Steam Generating Units	02/27/2014	PM, nitrogen oxide (NOx), sulfur dioxide (SO2)
Small Industrial - Commercial - Institutional Steam Generating Units	02/27/2014	PM, SO2
Portland Cement Manufacturing	07/27/2015	PM, NOx, SO2, VE
Petroleum Refineries	11/26/2018	PM, NOx, SO2, carbon monoxide
Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels	08/25/2023	PM, VE

Carbon-Conscious Trade Policy

Robust regulatory standards and federal investments must be paired with equitable, carbon-conscious trade policy to make sure that carbon-intensive industry abroad does not undercut domestic progress.

After all, American industrial producers [routinely import](#) vast quantities of carbon-intensive industrial goods that feed into the domestic supply chain. These imported goods can be manufactured in countries with dirtier electricity generation or less ambitious industrial decarbonization measures. This resulting phenomenon, known as “carbon leakage,” means that any greenhouse gas pollution reductions achieved on a U.S. domestic level may be [undermined](#) by importing high-carbon-intensity products.

Smart trade policy would protect domestic decarbonization efforts and create incentives for new technologies developed in the U.S. to spread to new markets. As U.S. firms decarbonize their operations, they can capture globally competitive markets that will grow as public climate policies and international corporate emissions reduction efforts increase demand for low-carbon materials. For example, the global clean steel market [is expected to be worth](#) \$10-15 trillion through 2050, with only \$400-480 million of demand coming from the U.S. market. It is strongly in the interests of firms, workers, and the country to pioneer and implement low-carbon processes as quickly as possible in order to secure global leadership with a low-carbon industrial base.

As this memo highlights, multiple financial, regulatory, and policy tools exist to create demand and protect supply for low-carbon products in the U.S. But we also need tools to prevent the dumping of high-carbon products from abroad that could, albeit temporarily, undercut this progress. The European Union has modeled a key trade policy tool for doing so: **a [carbon border adjustment mechanism \(CBAM\)](#) that puts “a fair price on the carbon emitted during the production of carbon-intensive goods that are entering the EU.”** By [applying a carbon fee](#) to imported industrial products, a CBAM would incentivize the uptake of cleaner domestically produced materials, maintain American industry’s viability through the clean energy transition, and preserve jobs with U.S. manufacturers.

To be clear, a CBAM is not a prerequisite for cutting carbon pollution from domestic industry. First movers here are likely to put themselves in a better position for global investment and supply contracts for low-carbon products, even in the face of residual competition. Regulatory and incentive efforts need not await trade policy. Conversely, though, trade policy can meaningfully complement and extend these efforts in ways that accelerate the transition and produce even better support for firms and workers—and there is real interest in these mechanisms.

In particular, Congress has shown signs of bipartisan support for a CBAM. Senator Sheldon Whitehouse (D-RI) introduced the Clean Competition Act in 2022 to create a CBAM for energy-intensive heavy industries. In August 2023, Sens. Chris Coons (D-DE) and Kevin Cramer (R-ND) introduced the [PROVE IT Act](#), which would direct DOE to conduct a study of comparing the emissions intensity of American and foreign industrial products—data that can then form the basis for a robust CBAM. Senator Bill Cassidy (R-LA) also [recently introduced](#) a “Foreign Pollution Fee” that would functionally replicate a CBAM, imposing tariffs on carbon-intensive imports. In the House, a bipartisan coalition is preparing companion legislation.

As CBAM proposals continue to take shape, Congress must build international equity considerations into the final policy. A CBAM without complementary equity policies can impose an [insurmountable and unacceptable burden](#) on developing countries that lack the resources to decarbonize. Under the United Nations Framework Convention on Climate Change (UNFCCC), the international community has adopted the principle of “common but differentiated responsibilities” (CBDR), recognizing that certain countries have a smaller historical responsibility for climate change and less capability to tackle it. An indiscriminately applied CBAM would cut against CBDR by imposing high trade barriers on developing nations. As such, it is vital that a CBAM proposal distinguishes between developed and developing countries and their differentiated responsibilities to address the climate crisis.

America’s CBAM must be designed to lift low-carbon industries globally rather than just limiting the import of more carbon-intensive products. That means the U.S. must make good on our international [climate finance commitments](#), engage in robust green [technology transfer](#) to developing economies, and distribute a large portion of CBAM revenues to developing countries. Congress should also exempt [least developed countries](#) and small island developing states from the CBAM. Without incorporating these measures, a CBAM stands to perpetuate long-standing inequalities between developed and developing countries—and hinder the international climate action needed to limit warming.

Our goal should not be to rebuild industry at home while hoarding progress. On the contrary, we should seek innovation at home while also creating markets and incentives for innovation abroad. In that way, we prosper equitably: by reindustrializing at home, driving demand for new low-carbon products, and creating technologies that can lift the global market. A well-designed CBAM can help accomplish just that.

Industry Needs a Second Revolution

Industrial decarbonization is a challenge not for the 2030s and 40s, but rather today. From low-carbon cement to industrial heat pumps, the technology is already here to rapidly reduce industrial emissions. As with electric power, transportation, and buildings, the pathway forward for industrial transformation requires dedicated effort. What we lack more than anything is the political will and imagination to deliver the policies—the standards, incentives, and programs—to ensure steep greenhouse gas emissions reductions.

And if we get this right, we won't just reduce pollution. We'll launch a new era of industrial production that transforms the relationship between industry, its workers, and the communities around its facilities. With implementation of the IRA and BIL picking up speed, demand for industrial materials is set to skyrocket. The Blue Green Alliance estimates that demand for aluminum for clean energy components alone will exceed today's economy-wide demand for aluminum as soon as 2035. A well-executed marriage of climate and industrial policy will take advantage of this tailwind of demand growth by reshoring union jobs and bringing greater economic security to workers, all while drastically lowering the air and water pollution that have harmed communities since the first industrial revolution.

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