Evergreen Collaborative

ACCELERATING THE CLEAN AIR ACT'S INNOVATION ENGINE

Opportunities to Reform Air Permitting Programs to Scale Up Clean Technology

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List of Acronyms

AQMD	Air Quality Management District
APCD	Air Pollution Control District
BSER	Best System of Emissions Reductions
CAA	Clean Air Act
CA BACT	California Best Available Control Technology
CATF	Clean Air Task Force
CCUS	Carbon Capture Utilization and Sequestration
CO	Carbon Monoxide
CO_2	Carbon Dioxide
BACT	Best Available Control Technology
DOE	Department of Energy
EPA	United States Environmental Protection Agency
GHG	Greenhouse Gas
HAP	Hazardous Air Pollutant
ICAC	Institute of Clean Air Companies
IRA	Inflation Reduction Act
LAER	Lowest Achievable Emissions Rate
MACT	Maximum Achievable Control Technology
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NOx	Nitrogen Oxides
NSPS	New Source Performance Standards
NSR	New Source Review
NNSR	Nonattainment New Source Review
PM	Particulate Matter
PSD	Prevention of Significant Deterioration
RACT	Reasonably Achievable Control Technology
RBLC	RACT BACT LAER Clearinghouse
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SOx	Sulfur Oxides
Title V	Title V of the Clean Air Act
Title VI	Title VI of the 1964 Civil Rights Act
TPD	Tons Per Day
TPY	Tons Per Year
VOC	Volatile Organic Compounds

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Executive Summary

It's time to scale up clean technology across the country, reduce emissions from existing factories and power plants across the country, roll out new zero-pollution facilities, and mitigate health risks in communities burdened by air pollution. But the underlying legal architecture federal and state governments use to permit facilities that emit air pollution is decades out of date. And it's holding back permitting agencies from fully realizing the work they can do to move us forward. Without reforming the outdated permit system, we will lose key tools to accelerate air quality improvements in overburdened communities and implement substantial new climate technology investments at the necessary scale to meet our public health and climate targets.

Almost every major industrial and power facility requires Clean Air Act (CAA) permits and corresponding state air permits, and the permitting process is supposed to require the best available technology to clean up pollution at each site. But in reality, this isn't happening because the permitting process is riddled with loopholes and rarely requires truly clean zero-emission technologies. Permitting agencies can and will do better, but the programs they work with need an update to match modern zero-emission technology. This report proposes key fixes to that creaking legal architecture to meet the climate and health crises we face in our current moment. Under the existing system, communities are exposed to unfair levels of cumulative air pollution from poorly permitted facilities, and new technologies and climate investments do not spread as fast as they should. **Our core recommendation is that the air permitting system must be updated to promote truly clean technology and help clean up communities.**

Those permitting programs should be the key tool that takes clean technology from pilot projects to national roll-out. **The good news is that the Environmental Protection Agency (EPA), and state permitters, can take action, without waiting for Congress, to make sure our core air permitting programs actually scale up clean technology—and they can start now.**

What Needs Fixing

The core problem is that the permitting programs have not caught up with modern technology or properly focused on using that technology to eliminate long-standing and unfair disproportionate pollution exposure in many communities. The programs are administered with doctrines and legal tools that assume factories and power plants will almost always burn fossil fuels like coal, oil, and gas, and that air permit writers just need to clean up smokestacks as best they can. The same tools rarely properly account for cumulative air pollution exposures. That means permit writers cannot do their best work to address pollution in communities, since the systems they use need updates. After all, the reality is that technologies are rapidly becoming available to eliminate smokestacks altogether, especially in the communities that are most burdened now.

Most polluting facilities can now be electrified with renewable energy or otherwise eliminate fossil fuel combustion dramatically reducing pollution these facilities are dumping onto communities and our climate. **But as long as the databases and guidance documents constraining permitting agencies are stuck in the past, these new technologies are not being required and our industrial and power facilities do not receive the pointed regulatory scrutiny they need to clean up.**

Instead, permitting agencies have been forced to rely on decades-old combustion-era documents and doctrines that are regularly deployed by lawyers for polluting industry against community members. Unbelievably, modern facilities are being permitted using a "draft" permitting manual that EPA developed in 1990. That manual—a blurry PDF file on an obscure website—is still the go-to reference for the program. Likewise, EPA's last guidance documents on technologies to reduce greenhouse gas (GHG) pollution in permitting date from the Obama administration. And its database of technologies is rarely updated, hard to use, often does not contain clean alternatives, and does not reflect the Inflation Reduction Acts's (IRA) major new investments. Even worse, the actual permitting program is riddled with loopholes, meaning that many polluting facilities avoid even entering the process in the first place. All of these stale constraints mean that dedicated air permitting staff simply cannot do their best work.

The result? Although air permitting is supposed to require the "best available control technology" at big new and modified facilities, state and federal permitters are stuck scrubbing metaphorical smokestacks when they should just be putting up solar panels. Because permitting doctrines and tools are stuck in the past, communities stay polluted, and new technologies do not spread.

How We Can Move Forward

It's time to take the blinders off air permitting agencies and make sure agencies and advocates have the technical language and tools they need to insist on clean technology. That means removing ancient permitting doctrines and guidance doctrines and updating databases to show that clean technologies are truly available. Dedicated state and federal resources to updating the system would bear major dividends by ensuring the permitting system can perform in the way that it needs to. We recommend core actions that EPA and local permitters can take through updates to internal guidance and databases that we discuss below.

The core priorities need to be:

1. **Close permitting loopholes** - EPA and local permitters need to close loopholes that keep polluting facilities out of the system altogether, as we seek to quickly deploy clean technologies at scale.
2. **Make clear that clean technology must be required in permits** - EPA must urge permitting agencies to move further than cleaning up smokestacks and instead to require zero-emission technologies
3. **Make it easy to identify clean technology** - The old technology databases at EPA and local agencies should be updated to list clean technologies available at key industrial and power sector polluting facilities.

4. **Increase public transparency** - Air permits should be published publicly, ensuring that good ideas advance and scale up nationally.
5. **Prioritize addressing local impacts** - EPA and local permitters must emphasize their core civil rights and environmental justice obligations in their permitting decisions and enforcement reviews, making clear that permitters can take these considerations into account in shaping permits or denying them in overburdened areas.

It is time to make our air permitting system work for everyone. Congress set up the CAA's programs to protect us all, but they can only do that if we update them for our century. That work can start now.

How to Use This Report

This report's goal is to daylight these issues for ordinary people, advocates, and communities, and provide targeted recommendations to begin fixing the permitting system. Permitting agencies ultimately want to drive the air quality and climate improvements that come with clean technology, but they need the tools to do so.

Because the system's regulatory guts are so complex and hard to access, we have provided detailed technical doctrines and examples of permitting failures in a series of technical appendices but have kept the main body of this document as free as possible of jargon and technical citations. Interested readers can turn to the appendices cited in the main document for much more on particular issues, as needed. Those appendices are:

- **Appendix 1: Technical Permitting Overview** This appendix provides a more technical description of key permitting and air quality programs.
- **Appendix 2: Flaws in Air Permitting - Technical Specifics and Case Studies** This appendix describes the flaws described in this report in technical terms. It includes examples drawn from public documents where the system has produced bad results, but which could be fixed with the reforms suggested in the report.
- **Appendix 3: Upcoming Actions Heightening the Need for Reform** This appendix provides the larger policy context for reform, including the importance of permitting reform to support IRA and standard-setting processes.
- **Appendix 4: Technical Reform Recommendations** This appendix describes technical implementation pathways for the reforms described in the report.
- **Appendix 5: State and Local Exemplar Reforms** This appendix describes permitting and air quality planning reforms recently implemented in several leading states which may serve as national examples.

Introduction

We have an opportunity to clean up our air for our communities and the climate by using federal and state air permitting requirements as tools to address local pollution. **While environmental justice advocates have persistently called for reduced pollution from the industrial and energy sectors, the existing CAA permitting system has impeded progress.**

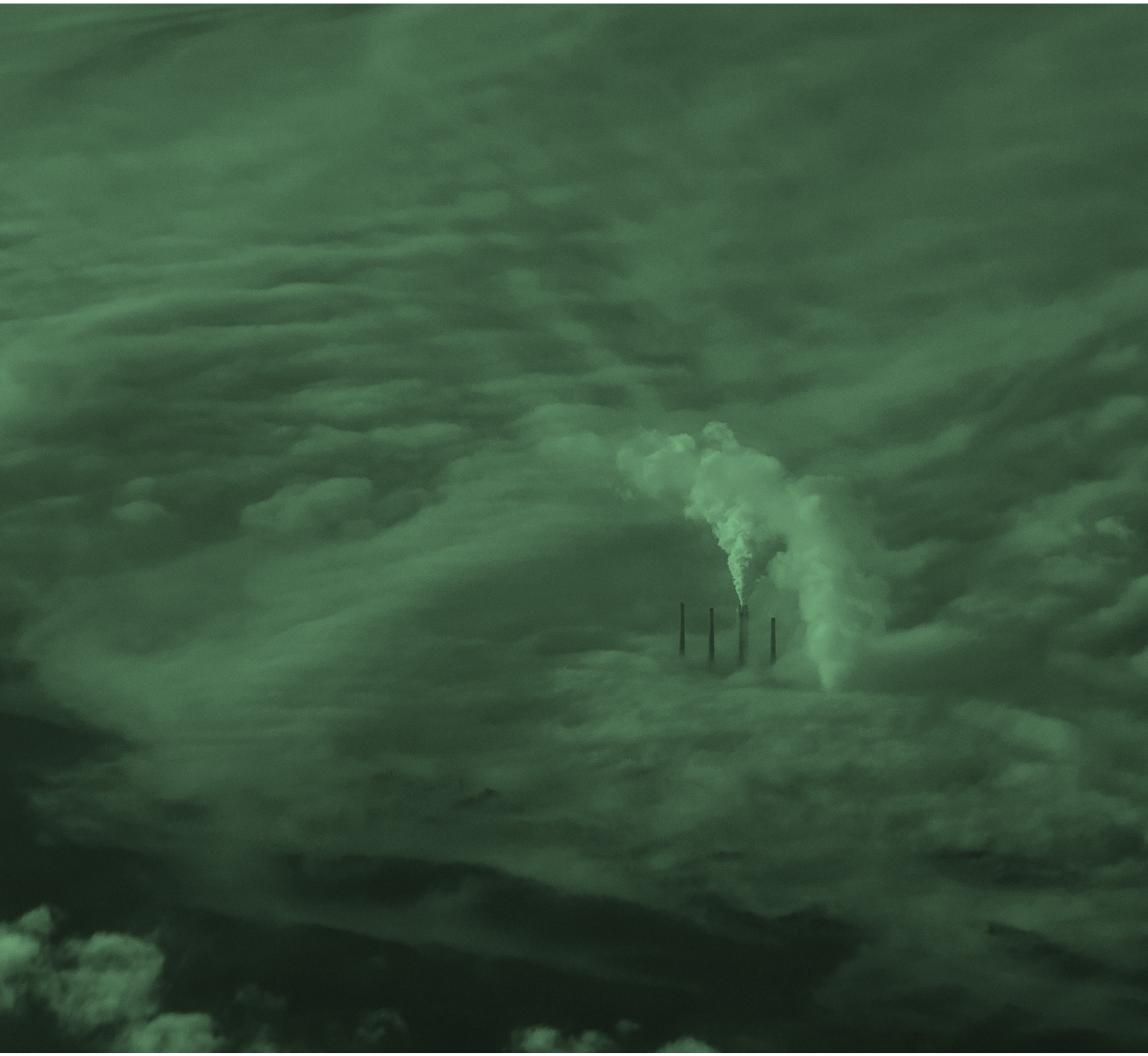
Permitting agencies can do better. Their mission is to improve, but they are held back by old systems and processes that do not emphasize zero-emission technologies. Now is the time to fix the permitting system and ensure that the IRA's historic investments actually improve air quality and lower carbon pollution. **Communities must not be forced to endure another generation of bad air when clean solutions are available now, but we can only make that happen if air permitting programs require those solutions to be installed.** This report offers targeted reform options that policymakers and advocates may choose to advance and clean technology companies can leverage to promote a more sustainable path forward. We aim to contribute to an ongoing dialogue by highlighting the often underutilized potential of the CAA to reduce air pollution and decarbonize industry.

That dialogue has been hard to have because the air permitting system seems almost designed to discourage engagement. Air permitting is unduly complex, time-consuming, and potentially expensive. Decades-old guidance documents and regulations provide the foundation for air permitting programs, yet they often lack clarity. Federal and state guidance has occasionally attempted to resolve these loopholes by providing more clarity, but polluting industries have long fought those improvements—while simultaneously taking advantage of loopholes in these programs. The lack of clear, consistent guidance to industry has historically penalized industries that have acted as early adopters, especially in cases where guidance or policies are rolled back under a new administration. This is a system industry lawyers love but is serving no one else well.

The time for change is now, given that IRA programs offer incentives to revamp our power and industrial sectors using clean technologies. Billions of dollars are being directed to industry players, as well as to states, local governments, nonprofit organizations, and clean technology firms that will collectively determine where and how to invest in clean technologies. Both Democrats and Republicans are calling for solutions to industrial GHG emissions. Even as the IRA allocates unprecedented funds for clean technologies at energy and industrial polluting facilities, **the existing air permitting system will not reliably spread clean technologies to other sources, even if the technologies are cost-effective and demonstrated.**

Time for innovations to spread is tight because, by the end of this decade, a significant portion of IRA investments will have either been spent or authorized. **Air permitting reform would require**

the sorts of clean technologies the IRA funds to spread quickly to other facilities nationwide, and provide the basis for making national pollution standards more rigorous, further driving clean technology. For this to occur, air permitting programs must be designed to provide regulatory support for clean technologies by supporting the shift away from combustion wherever possible. By modernizing our permitting system to encourage the use of newer, cleaner technologies, we can ensure that federal investments yield tangible air quality improvements for communities.



Understanding—and Fixing—Air Permitting

To get the clean technology deployments we need, we need to fix core flaws in the air permitting system. The details of that system may seem daunting, but this report contains detailed technical appendices intended as a toolbox for advocates working to advocate for better outcomes. The core theory of the system, and its resulting problems, however, are straightforward. Let's dive in.

Fundamentals of Air Permitting

Air permitting is full of acronyms and technical jargon, but the core concepts of the CAA are clear and well-intentioned. Air permitters are supposed to require the cleanest available technology when big new industrial facilities or power plants are built, or undergo big new construction projects. Since technology advances over time, each new project permit therefore raises the bar for the next one, ratcheting up ambition and spreading solutions from place to place. Periodically, EPA is supposed to review the state of all these permits, and the technologies they have advanced, and then issue industry-wide standards (including plans and standards to retrofit really old facilities) that raise the bar nationally. At least, that's how it is supposed to work. State-level programs generally work in essentially the same way; states may issue "federal" permits with EPA's permission and can also issue their own permits, often for smaller polluting facilities, and add additional health protective requirements. But this system is underperforming: **The problem is that truly clean technologies often get left out of this process, meaning that the upwards ratchet permitting is supposed to produce does not work as fast or well as it should.**

To understand what's going wrong, we have summarized a few technical terms that are ingrained in air permitting programs. **Appendix 1 of this report goes in-depth into the technical details for those interested in the guts of these programs.** For our purposes now, the key terms are:

- **New Source Review (NSR)** and **Prevention of Significant Deterioration (PSD)** are the legal names for the CAA permitting programs. The "PSD" program is used in areas with cleaner air and is a bit less rigorous than the "NSR" program used in areas with dirtier air (NSR can also be used as a shorthand for permitting as a whole). These programs provide "permits to construct" new facilities or big modifications to existing facilities; those permits are supposed to reflect appropriate pollution controls. Generally speaking, the federal versions of these programs apply to the biggest polluting facilities; many states apply the same basic programs to smaller polluting facilities or add their own requirements on top of the federal programs.
- **Best Available Control Technology (BACT)** is the legal requirement for permitting most polluting facilities in the PSD program. It means what it says—the best technology available to control air pollution at the facility, considering some practical and cost limits. BACT is generally selected by reviewing existing technologies that could be used at the polluting facility, and

then gradually eliminating some technologies that might be too expensive or unworkable, before coming up with final permit requirements.

- **Lowest Achievable Emissions Rate (LAER)** is the requirement in the dirtier air regions the more rigorous NSR program covers. This requirement is similar to BACT, but it is imposed without considering cost and other industry objections as seriously, given the need to clean up dirty air faster.
- **Title V Permits** are operating permits for facilities after they are built. They are supposed to provide a transparent record of all requirements applying to large polluting facilities, such as a factory or power plant, and make sure those requirements can be enforced.
- **Section 111 Standards or "New Source Performance Standards (NSPS),"** named for the relevant section of the CAA, are sector-wide baseline standards for every new polluting facility in a given category (like "power plants" or "cement kilns"). They are updated over time, after reviewing permits and technologies at individual polluting facilities. The idea is that these standards aggregate all the improvements in each permit for a whole new generation of polluting facilities, effectively learning from all those permits to advance pollution control nationally.
- **Title VI of the Civil Rights Act** contains a set of independent mandates to all federal agencies (and state agencies taking federal funds) to avoid racially disparate pollution impacts. It is one of several environmental justice and civil rights mandates that should inform permitting (Title VI).

Now, let's put all this together. The idea here is that when big new polluting facilities are built, the air permitter reviews potential ways to control their pollution. The controls the perimeter selects are baked into new permits, ideally considering civil rights and environmental justice mandates along the way. Each time a new facility is built, the permitting engineer is supposed to look out across the landscape of facilities and permits and pick the most rigorous controls—so air pollution control technology advances over time with each new permit. Then, periodically, EPA raises the bar for everyone by setting national standards. If all this works right, each of these decisions advances technology overall and spreads clean technology nationally—especially when permits are rolled up into new standards. (Using the acronyms above, these concepts translate to: **The PSD and NSR programs produce new BACT and LAER standards, applied according to Title VI, that eventually show up in permits, including Title V permits. Over time, these permits inform Section 111 standards.**)

The permitting process is especially important right now to help take investments to scale, as the IRA pours funds into clean technologies nationwide. The permitting system, if it works well, could amplify individual IRA investments into national progress. Think of it this way: Say a particular cement kiln takes advantage of IRA pilot project funds to install a novel technology to control pollution. If air permitting worked well, every cement kiln after that would have to consider using the same technology when it came up for permitting. Over time, the pilot technology becomes standard with economies of scale driving down its costs and permitting decisions requiring its use in communities that might otherwise experience air pollution increases. Eventually, EPA could even set national standards based on all that learning and permitting. Thus, even after IRA investments expire, the permitting system can continue driving forward cleaner air.

That's the idea, anyway. But as we discuss next, that is not happening reliably, yet. That's a big problem because we are in the midst of a clean technology boom, but companies need regulatory indicators to ensure those technologies are actually adopted and spread nationally. Air permitting is our tool to do that, but it needs to work. **For air permitting programs to help scale and amplify IRA investments, they must effectively recognize and require zero-emission technologies in communities across the country.**

What's Gone Wrong

We have the opportunity to revitalize the promise of the CAA and state-permitting regimes to meet the demands of the present era. In the coming years, states will be deploying billions in climate funds, working to develop first-generation power sector compliance plans under soon-to-be-final EPA rules, and then doing the same for major industrial polluting facilities.

But there's a hitch. **Although the logic of the air permitting system works well, the practice does not reliably drive the progress we need. Although very clean technologies have been available for years, and zero-combustion technologies like solar and wind power and electric heating are ever more available, the American industrial landscape is heavily reliant on combustion.** Worse, air pollution disparities are very clear, with the bulk of American air pollution pouring into lower-income, Black, and Brown communities. How could this have happened when, for decades, the CAA should have been advancing air pollution controls?

The answer is that, while the system has made things better, it is in dire need of an update. Much of what goes wrong happens because this seemingly straightforward system has gotten bogged down in ever more complex technical documents, doctrines, and systems that only an industry lawyer could love. **Appendix 2** of this paper goes into detail on these issues, including a series of permitting horror stories in which clean processes just weren't required, or even (in one case) removed in favor of fossil fuel power.

Whether it is unduly complex approaches to estimating the potential emissions that even *trigger* permits in the first place to technology databases gathering dust for decades to permitting guidance documents developed decades ago, the system just is not ready to recognize and require truly clean technology. The results are apparent in smokestacks all over America. The precise details of what went wrong matter, and are discussed there, because fixing this technical system requires technical work. But for our purposes here, the core problems can be broken down in plain language.

First, polluting facilities try to use loopholes to avoid permitting in the first place. Because new polluting facilities (and big modifications) have not been built yet, industry gets to estimate how big their pollution will be. Unsurprisingly, industry guesses very often tend to be just *slightly* below the permitting thresholds, meaning that permit writers are shut out of the process from the start. The program's guidance documents have made this worse by sometimes allowing industry to estimate "net" pollution by offsetting the pollution from some new smokestack against pollution they claim will be eliminated elsewhere at a site.

Are all these estimates and guesses *right?* No one knows for sure, and it is very hard to prove that a guess is wrong before a polluting facility goes ahead and starts polluting. So, the process starts with loopholes and incentives to cheat. That means many polluting facilities are never even required to obtain permits, and if they do obtain permits, they aren't compelled by the law to use clean technologies to limit their pollution.

This loophole issue is especially important as we enter an era when many polluting facilities may attempt to install carbon capture, utilization, and sequestration (CCUS) technology, or switch to hydrogen fuels, rather than just remove combustion facilities, because those sources will likely claim that the proposed new CCUS installation (for example) won't increase air pollution, and so won't trigger permitting requirements. The result if that claim is accepted by permit writers? No regulator ever asks if that old power plant should *actually* install CCUS and keep running, because there is no permit process to consider alternatives—like closing it down and installing renewable energy or a battery. Loopholes mean old plants might keep operating, and even install new technology, without cleaning up already too-high pollution.

Disagree that a loophole applies? Good luck. Enforcement cases on technical permits quickly devolve into years-long battles over engineering diagrams, hypothetical pollution estimates, and grinding lawsuits with well-funded industry. The PSD and NSR programs are *very* difficult to enforce, and EPA and local permit agencies often lack the funds, stamina, and inspectors to spot and remedy violations. The better approach is to require more zero-emission technology, in more contexts, with fewer loopholes to avoid getting into enforcement tangles in the first place. But that requires a program that can require zero-emission technology—which brings us to the next problem.

Second, the actual permitting process is jammed up by old ideas that block the consideration of clean technology. Remember that much of this process was designed in the 1990s. The core permitting manual is over thirty years old, and EPA's advice on carbon pollution reduction is over a decade old. Permitting agencies have designed their programs around this historical guidance, and now often feel that they have limited authority to work against the status quo. This means that outdated ideas, written down as "guidance" by EPA, have turned into permanent blocks in requiring zero-emission technology. There are several different ways this can happen. Some common ones include:

- **The permit writer is blocked from considering clean fuels, like electricity.** The PSD/NSR processes are supposed to consider all clean technologies that can work at a site, including clean fuels. They are also, separately, supposed to consider alternatives to a given project. But this process does not happen because **EPA does not have clear guidance on alternative analysis and consideration of clean technology and is relying on an out-dated doctrine against "redefining the source" that blocks cleaner tech.** What EPA means by this doctrine is that permit writers do not have to consider changes in fuel type or source design that, in the mind of the applicant, would "redefine" what it wants to build. Want to build a coal-fired power plant even when a storage battery would get the job done? Successfully argue that the battery would "redefine" your project and be outside the scope of reasonable alternatives, and that smokestack can go up—even if a battery would be cheaper, cleaner, and safer. The result is that even when zero-emission technology is clearly BACT or LAER, industry's desire to burn fossil fuels takes precedence over the public health mandates of the CAA. That's not what Congress intended, and it's a huge problem for IRA implementation since it allows permit writers to dismiss the clean technologies the IRA funds, rather than spreading and scaling those technologies via rigorous permits.
- **The permit writer lacks information on clean technologies that are actually operating elsewhere.** Controls that are already "achieved-in-practice" are supposed to almost automatically become BACT or LAER at other sites—that's how clean technology spreads. But it turns out that EPA and local permitters often fail to consider technologies operating in other counties or other states, or even at polluting facilities that are very similar to, but not identical to, the facility under permit. By failing to define what it means to be "achieved-in-practice" with a really sweeping scope, EPA allows regions to become backwaters of pollution, refusing to look at better practices elsewhere—which keeps pollution high and clean technology from scaling up. In a world of global technology improvements, permit writers need the appropriate tools and resources to look broadly for good control ideas, not just to the county line.

- **The permit writer is blocked from finding that clean technology is "cost-effective" at a particular industry site and keeps relying on polluting technologies that raise public health costs.** Air pollution imposes big costs on public health, but permit writing often focuses on the cost of cleaning up that pollution for the polluter. That means air permits often go easy on polluting industry. Worse, permit agencies often use outdated and inconsistent tables of cost-effectiveness to dismiss newer and initially more expensive technologies. That means new, zero-emission technology does not get a permitting push to scale up and stays expensive for longer—and keeps being excluded from permits. That vicious cycle slows down clearing the air. Permit writers need to accept some higher initial costs to lower air pollution costs for everyone (and industry as a whole) over time.

Third, the databases used in permitting are badly out of date. EPA is supposed to maintain a national clearinghouse of clean technology options. But the funding to update that clearinghouse is often in doubt, and local permit writers are rarely required to upload new permits and ideas. The database is hard to query and generally does not contain any clean technology options—only conventional add-on control technologies. And local state and permit writers may well lack resources themselves to do the research they need to find clean technologies, even if they decide to require them.

Fourth, permitters may think they cannot say "no" to more pollution in overburdened communities. Although EPA and local permitters are bound by Title VI to reduce pollution that creates disparate burdens by race and often have additional environmental justice commitments, the air permitting system, itself, is not good at accounting for cumulative impacts. Also, it often lacks clear discretion to just say "no" to more pollution. For clean technology to spread and for emissions to decline, permitters have to be able to reject projects that unreasonably raise burdens and affirmatively plan to clean up these pollution hot spots. Pioneering states are beginning to add these requirements in state law, but EPA can also clarify options under federal law to stop the problem from getting even worse.

Summing up, we have a system that is supposed to clean the air but instead is radically underperforming. This is happening at the exact same time we need to accelerate clean air and climate progress. We can fix this by updating its tools to match the modern era. Not only is the existing air permitting system not working as intended, but without action, the system will fail to adequately address local concerns. Unlike the transportation sector, in which decades of technology-forcing regulations have helped spur innovation and reward early adopters, the industrial and energy sectors have remained relatively stagnant over time. Facilities in these sectors have generally only achieved incremental pollution reductions using add-on control technologies because the air permitting framework does not encourage the use of clean technologies.

With reforms, we could accelerate ahead—and just in time, as core regulatory standards for the power sector and industrials are ahead, big IRA investments are flowing, and clean technologies are ready to scale up. **Appendix 3** describes many of the upcoming policy needs that air permitting reforms can support. **To power us forward and supercharge these efforts, EPA and local permitters can start revisiting the ancient doctrines and databases that are slowing things down and fixing them to match modern tools and technologies.**

IV. Recommendations

The problems before us are clear. While the CAA was intended to improve air quality by ratcheting up the use of cleaner technologies over time, this is not how the program has operated in practice, leaving many communities burdened by poor air quality. It is simply unjust to keep burdening communities in this way, and it is profoundly unwise and inefficient too, since without permitting reforms, we will underuse the IRA-funded technologies that can help fix the problem.

The good news is that EPA and local permitting agencies can turn this problem around through executive actions. EPA needs to issue guidance to resolve these systemic issues and to emphasize EPA's authority to intervene in cases where local concerns are not sufficiently addressed. State and local governments can also step in by adding their own legal requirements to sharpen their systems more quickly, even as the federal program continues to improve. **Permitting agencies can solve these problems—if they have the tools to do so.** The timing to do this is tight given the pressing climate and public health crisis we face and the need to maximize IRA investments.

The devil is in the details, of course, and those details are captured in **Appendix 4,** which outlines specific fixes to the permitting program that can drive changes, and in **Appendix 5,** which describes state-level reforms driven by advocates across the country that have begun to fix this broken system.

Though technical fixes require technical language, the direction forward is clear and can be plainly stated. To resolve the deficiencies we have identified and to ensure that failures in our existing permitting programs are resolved to adequately protect the most vulnerable community residents, we recommend that EPA and state and local permitters take the following actions.

1. **Close Permitting Loopholes** - Savvy polluters can use outdated loopholes to claim that they do not require permits in the first place. EPA and local permitters need to close these loopholes now, as we seek to quickly deploy clean technologies at scale. These actions could include:
    - **Setting very low or zero thresholds for facilities to enter the program.** Debates over whether a facility really triggers permitting can take years and lead to snarled enforcement cases. EPA should remind state and local authorities that they have the legal discretion to lower permitting thresholds for potential pollution—including all the way to zero for sensitive communities or to address technologies of concern. Zero-based or low thresholds can help avoid the battles of hypotheticals that now create loopholes in the program.
    - **Issue guidance and rules eliminating or reducing the use of "netting" and other accounting tricks to weaken the program.** Polluting facilities have spent years claiming pollution increases are netted out or offset by other pollution decreases elsewhere at a facility.

This sort of game-playing may save industry some money in the near term, but it's really just a delay tactic and prevents facilities from cleaning up all the way. Additionally, it does not eliminate pollution disparities in areas with many different pollution sources since cleaning up one polluting facility can be used to "net out" more pollution from another. EPA and local permitting authorities should take steps to disallow or limit the practice in permitting guidance.

2. **Make Clear That Clean Technology Must Be Required in Permits** - There is a clear need to clarify outdated agency doctrines to support the transition to clean technologies. In particular, EPA needs to make clear that permit writers can require electricity and other zero-emission technologies, eliminating smokestacks completely, rather than just cleaning up fossil fuel combustion around the margins by bolting on limited controls to emitting polluting facilities. In particular:
    - **EPA should make clear that the "redefining the source" doctrine no longer applies and emphasize the importance of alternative analysis.** The CAA was never intended to perpetuate the indefinite burning of fossil fuels when zero-emission technologies are available. It's time to revamp outdated doctrines. Going forward, EPA should tell permit writers that they must consider clean fuels—including electricity—in permit decisions, and not just defer to industry advocates who insist there is no alternative to fossil fuel combustion. That decision would prioritize clean technology and clean health over industry proposals to double-down on dirty technology.
    - **EPA should make clear that clean technology is "achieved in practice" if it is used anywhere in the world on a reasonably similar polluting facility.** If a new technology eliminates emissions in Indiana or India, it should be the starting point for permitting a similar polluting facility anywhere else. EPA should make clear in guidance that permit writers may not impose artificial geographic barriers in considering operating controls anywhere and also must broadly consider technology transfers where a technology may work well in a slightly different context than it was first used—helping shared approaches to scale up in many contexts.
    - **EPA should insist that permit writers focus on public health rather than artificial "cost-effectiveness" thresholds.** EPA should emphasize that any cost-based limitations on clean technology consider costs to the community from increased pollution, as well as the near-term costs to a polluting facility. It should consider the importance of technology advancement by not setting cost barriers to technologies unreasonably low. EPA should also require cost thresholds to be clearly justified and regularly updated to avoid holding back progress.
3. **Make It Easy to Identify Clean Technology** - The old technology databases at EPA and local agencies are outdated and hard to use—meaning that good technologies are often unknown to permitters, and are therefore not required. EPA must increase the visibility of available clean technologies in its databases and documents. State permitting authorities should regularly coordinate with each other, the public, and trade associations to identify any new or emerging technologies, include them in the "clearinghouse" used by permit writers, and establish a mechanism for community members to provide public feedback. Of course, EPA and local permitting staff should be funded to do this work—including staffing increases as needed.

4. **Increase Public Transparency** - Shockingly many air permits, even for big sources of pollution, are impossible to find online. To fix that EPA must publish all Title V and NSR permits online in a user-friendly national database. This database must also contain all publicly noticed permits to enhance public engagement. State permitting authorities should do the same, ideally utilizing mapping technology for enhanced public transparency.
5. **Prioritize Addressing Local Impacts** - Regulatory agencies must send clear signals to industry on the need to prioritize local impacts in technology decisions. EPA can emphasize its core civil rights and environmental justice obligations in its permitting decisions and enforcement reviews. And leading states are already passing laws to make sure cumulative impacts and civil rights are respected—a model that should spread nationally. The bottom line is that agencies need to be able to say "no" to new pollution, and respect community concerns.

These reforms could start tomorrow. No legal barriers prevent EPA from taking action, including convening meetings with local governments, key stakeholders, environmental justice advisors, and clean technology companies to establish a focused set of reforms. And nothing prevents leading states and local governments from bringing these approaches home in local guidance. And not only *could* these efforts start tomorrow—they urgently need to.

The CAA, ultimately, was designed to accelerate innovation and clear the air in communities. As Inflation Reduction Act funds flow, we have a major opportunity to use one of the best tools we have to amplify climate action in this critical decade. EPA and state permitting agencies can drive forward progress by using the permitting program as a force multiplier to support the climate and communities nationwide.

Appendix 1: Technical Permitting Overview

The Clean Air Act's (CAA) programs should be working together to rapidly deploy clean, non-combustion technologies. Instead, CAA programs have evolved to reward incremental emissions improvements achieved using add-on control technologies, neglecting transformative non-combustion solutions. Environmental justice and civil rights statutes and regulations should be working in parallel to reduce pollution in overburdened communities, but they have been underused. A list of acronyms used in this context is at the end of this appendix.

The following fact-based regulatory overview makes it clear that **CAA programs rely on outdated guidance documents that do not force or even support the deployment of the cleanest technologies.** To understand how these programs fall short and identify solutions, it is necessary to know how the current system functions.

Under the CAA, pollution sources are meant to be pressured to clean up from the top down and bottom up simultaneously. From the top down, the U.S. Environmental Protection Agency (EPA) sets national ambient air quality standards (NAAQS) at a level that is supposed to protect public health and welfare. In turn, states construct "State Implementation Plans" (SIP) that include permitting rules, sectoral standards, and other programs to achieve the NAAQS. Each SIP (or federal plan, if a state cannot plan appropriately) must include reasonable control measures from anywhere in the country.

From the bottom up, state or local permit writers are tasked with ensuring that each source is legally permitted. Each permit should progressively incorporate the best available control technologies (BACT) for criteria air pollutants, including cleaner fuels, with even stricter standards for toxic pollutants. Permitting decisions made in accordance with federal programs must not only be consistent with meeting the NAAQS—they also need to adhere to federal civil rights requirements that protect communities from disproportionate harm. Effective decisions in individual permitting contexts may be models for broader regulations or implementation plans.

There are two main federal permit programs, New Source Review (NSR) and Title V of the CAA (Title V). Additional minimum standards may apply at stationary sources based on Sections 111 and 112 of the CAA. For air toxics, state and federal permitting regimes can drive the use of cleaner technologies. While our focus here is on NSR programs due to their broad applicability within the industrial and energy sectors, EPA must also set rigorous national toxics standards that state permitters can go beyond wherever necessary and possible for particular sources.

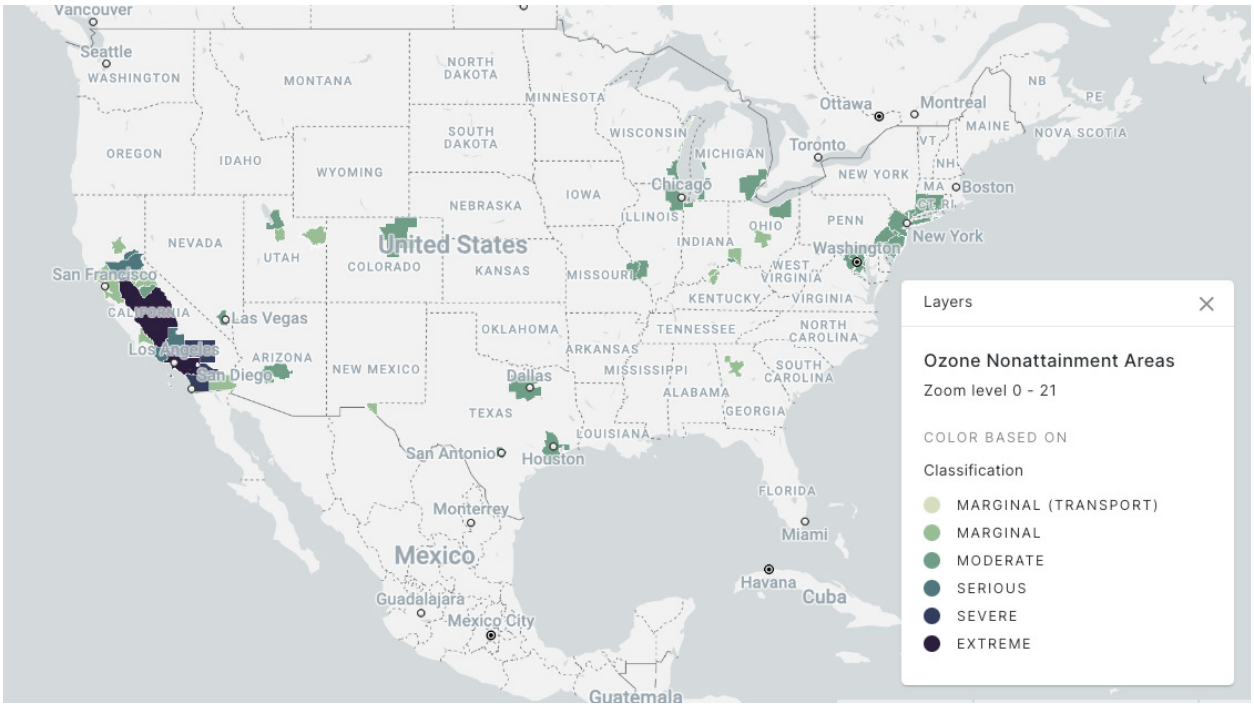
State permit programs may cover smaller sources or categories of sources, impose additional requirements, or otherwise push forward technology and public health protection. Several states have recently significantly modernized their programs, potentially serving as models for federal reforms and other states.

The “top-down” and “bottom-up” sections of the system interact and should be enhanced by distributive justice efforts. For instance, states grappling with more severe NAAQS attainment issues should ideally implement rigorous permitting programs, or may need additional rules or programs to bring sources permitted in the past up to present control standards to attain NAAQS. Communities of color experiencing high pollution levels should see especially aggressive control efforts. When operating optimally, the program as a whole is intended to push cleaner technologies forward, clean up older sources, and improve community health. More recently, it has also begun to phase out combustion sources that worsen the climate crisis, albeit not at the pace we need.

A. Air Permitting Requirements

With every passing year, the science on air pollution has underlined a central truth: even very low levels of exposure threaten human health and welfare. The World Health Organization, for instance, has regularly strengthened its science-based guidelines to recommend steadily lower ambient pollution levels. This scientific truth must be reflected in the NAAQS, which are, per Sections 108 and 109 of the CAA, to be set in accordance with the science to protect both public health and ecosystem welfare. Accordingly, EPA is required to establish NAAQS for each criteria air pollutant at a level that protects public health within an adequate margin of safety, review existing NAAQS, make any necessary revisions every five years. Each state is required under the CAA to adopt and submit a SIP “which provides for implementation, maintenance, and enforcement” of NAAQS in each air quality control region within a state. SIPs must include, among other things, enforceable emissions limits and associated timetable for compliance, and a program that regulates “the modification and construction of stationary sources within areas covered by the plan as necessary to ensure that [NAAQS] are achieved, including a permit program” (42 U.S.C. § 7410).

Figure A1-1: 8-Hour Ozone Nonattainment Areas Are Subject to More Stringent Permitting Requirements



In many parts of the nation, state, and local permitting authorities implement permitting programs through an EPA-approved SIP or by EPA delegating authority to an agency to issue permits. Permitting requirements that apply within the industrial and energy sectors (also commonly referred to as "stationary source") originated from the original CAA and the 1977 CAA amendments. These statutory requirements have not been significantly modified since this time, and EPA guidance used today for permitting stationary sources is at least three decades old.

The federal CAA describes the procedures that regulatory agencies must use to control emissions from stationary sources. Sources that exceed specific emission thresholds are required to have a valid air permit to operate, with enforceable limits that define how much air pollution they can emit without compromising the achievement and maintenance of NAAQS. Air permits can be issued by permitting authorities, such as states, local air districts, Tribes, or EPA. The requirements outlined within permits can come from federal, state, or local requirements applicable to the specific source.

i. New Source Review

The federal CAA outlines permitting requirements that apply to stationary sources of air pollution that emit criteria air pollutants when they are built or modified. Startlingly, the critical permitting program is primarily executed using a "draft" implementation manual issued in the 1990s and never finalized. Despite its draft status, this manual is extensively referenced by permitting agencies and supplemented by similarly out-of-date guidance documents and decisions that date from a time before non-combustion technology was broadly available. As we describe below, this disparity results in a significant gap, as key programs have never been

explicitly updated to reflect modern technology. Consequently, they fall short of fully realizing Congress's intent to spread progressively cleaner technologies quickly and effectively to protect public health.

Those programs are as follows:

Nonattainment NSR (NNSR): Stringent permitting requirements that apply to new major sources or a source making a major modification in a nonattainment area. This program includes the installation of lowest achievable emissions rates (LAER), emissions offsets, and public involvement.

Prevention of Significant Deterioration (PSD): Permitting requirements that apply to new sources or sources making a major modification in an attainment or unclassifiable area (less stringent than nonattainment NSR). This program includes the installation of federal BACT, an air quality assessment, an impact analysis, and public involvement.

Minor NSR: This program applies to a new minor source or a minor modification at both major and minor sources, in attainment and nonattainment areas. Minor NSR program requirements are often defined at the state level and must not interfere with NAAQS or control strategies outlined within a SIP.

The stringency of preconstruction permitting requirements is based on attainment of NAAQS and the potential emissions from the source. Because NAAQS attainment is pollutant specific, some sources may have to meet different control stringencies for each criteria air pollutant emitted. Under NSR, major sources are facilities that have the potential to emit (PTE) in amounts equal to or greater than the applicable thresholds.[1] Minor sources are facilities that emit less than major source thresholds. Synthetic minor sources are facilities that have the potential to emit above major source thresholds, but that voluntarily accept enforceable limits to keep their emissions below major source thresholds to avoid triggering NSR requirements.

It is important to note that state NSR programs can be more stringent than federal NSR. For example, California's NSR program is derived from the California CAA. Each of the 35 local air districts has its own rules and regulations to comply with state and federal laws. In many cases, the thresholds for what is considered a minor source are much lower than federal requirements, which results in lower-emitting sources triggering federal nonattainment NSR-type requirements.

Modifications to existing sources may also trigger NSR program requirements. Stationary sources can avoid installing modern emissions controls by only making minor modifications that do not trigger NSR, meaning they can still increase pollution as long as they remain under applicable thresholds. To be considered a modified source under the PSD program, a facility must make a physical or process change "which increases the amount of any air pollutant

[1] To trigger new major PSD requirements, the PTE threshold is 250 tons per year (TPY) unless the facility belongs to one of 28 industrial source categories where the PTE to trigger requirements is 100 TPY (42 U.S.C. § 7479(1)). For NNSR, requirements are triggered based on the pollutant, and nonattainment classification and range from 100 TPY down to 10 TPY for ozone precursors in extreme nonattainment areas

emitted by such source or which results in the emission of any air pollutant not previously emitted" (42 U.S.C §7411(a)(4)). Increased pollution ultimately triggers program requirements, and these trigger levels are defined in the CAA, but may be more stringent in some areas based on permitting authority regulations.

The stringency of a project's permitting requirements varies under the CAA based on the source size, emissions implication of the modification (if applicable), and the area's attainment status with NAAQS. The two control stringencies associated with the permitting of new or modified sources are described in detail below.

Best Available Control Technologies

At the time of adoption, NSR programs were designed to continually advance technology by ensuring that the cleanest technologies were required to be installed on new or modified sources that triggered BACT. In general, BACT is required on major new or modified stationary sources in PSD areas.

"BACT" is defined in 42 U.S.C. §7479(3) as *"an emission limitation based on the maximum degree of reduction of **each pollutant** subject to regulation under this chapter emitted from or which results from any major emitting facility, which the permitting authority, on a **case-by-case basis**, taking into account **energy, environmental, and economic impacts** and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant." (Emphasis added)*

For new or modified sources that trigger BACT, the evaluation process is predominately guided by EPA's 1990 NSR Manual but was first introduced in a 1987 EPA memorandum on improving NSR implementation. Even then, EPA recognized that "of all the NSR processes, BACT (and LAER) determinations are perhaps the most misunderstood and least correctly applied" (Potter, 1987). The 1987 EPA memorandum directed EPA staff to create guidance on the use of the "top-down" method for determining BACT. According to the EPA's 1990 NSR manual, there are five basic steps associated with the top-down BACT analysis: 1) Identify all control technologies, 2) Eliminate technically infeasible options, 3) Rank all control technologies by control effectiveness, 4) Evaluate most effective controls and document results, and 5) Select BACT.

Using this method, the permit applicant is expected to rank all available control technologies in descending order of control effectiveness. When identifying control technologies during step 1, applicants must also consider "transferable technologies," a term generally understood to mean technologies used to control sources with similar exhaust stream characteristics. The applicant must then review the most stringent alternative first, which should be considered as BACT unless "the applicant demonstrates, and the permitting authority in its informed judgment agrees, that technical considerations, or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not achievable in that case" (US EPA, 1990). If the most stringent technology is eliminated, then the applicant must move down the list until a feasible technology is identified.

According to the 1990 NSR manual, during step 1 of the top-down BACT analysis, the applicant is expected to identify all available control options for the emissions unit in question, which is broadly defined as an "emissions unit, process, or activity." This includes all processes or control devices that are "achieved in practice."

Lowest Achievable Emissions Rate

For major new and modified stationary sources in nonattainment areas that trigger LAER, the CAA sets a different bar, which is often much higher than BACT for the minimum level of control required.

According to 42 U.S.C. § 7501(a)(3), the term "LAER" means *"For any source, that rate of emissions which reflects—(A) the most stringent emission limitation which is contained in the implementation plan of any State [**SIP**] for such **class or category of source**, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or (B) the most stringent emission limitation which is **achieved in practice** by such class or category of source, whichever is more stringent. In no event shall the application of this term permit a proposed new or modified source to emit any pollutant in excess of the amount allowable under applicable new source standards of performance [**NSPS**]."(Emphasis added)*

In many ways, LAER is one of the most stringent regulatory requirements in the CAA. For sources that trigger LAER, technologies are required to be installed regardless of cost, unless it would prohibit any new plants from operating within that industry. Prior EPA guidance states that if "some other plant in the same (or comparable) industry uses that control technology, then such use constitutes de facto evidence that the economic cost to industry of that technology control is not prohibitive." This essentially means that any control strategy that is required in a SIP or "achieved-in-practice" must be installed, unless the permit applicant is able to provide compelling evidence of "unusual circumstances" (Calcagni, 1989).

Although EPA has provided clarification on how cost should be considered during LAER determinations, the agency has never defined the term "achieved-in-practice" beyond one statement in the 1990 NSR Manual. When conducting a top-down BACT analysis the manual states that the permit applicant should consider "technologies in application outside the United States to the extent that the technologies have been successfully demonstrated in practice on full-scale operations" (US EPA, 1990). The lack of federal definitions or guidance on this term has resulted in the term being defined individually by permitting authorities in their regulations and policies. The implication of this is that in some areas, permitting authorities only consider technologies installed within their state, and others have defined the term to only allow for the consideration of technology operation within the United States.

ii. Title V Permits

The requirements imposed by NSR, along with any other requirements, are supposed to be transparently reflected in operating permits. Accordingly, Title V of the 1990 CAA amendments required EPA to establish a national operating permit program that sets the minimum standard for states' permitting programs. Title V operating permits apply to the operation of a source after

it has been built. Permits that are issued are often referred to as permits to operate, or "Title V" permits. Title V permits contain lists of all the emissions sources, control technologies and associated emissions limits. These permits also outline emissions testing, monitoring, reporting, and recordkeeping requirements.

Under the CAA, specific categories of sources are required to have Title V permits to operate (US EPA - b., 2023):

1) Major sources - Sources that have a PTE at or over 100 tons per year (TPY) of any air pollutant, emit over lower thresholds in non-attainment areas, emit 10 TPY of a single hazardous air pollutant (HAP) or 25 TPY of any combination of HAPs,
2) Sources subject to NSR,
3) Sources subject to New Source Performance Standards (NSPS) or National Emissions Standards for Hazardous Air Pollutants (NESHAP),
4) Solid waste incineration units (regardless of size), and
5) "Affected Sources" under Acid Rain Rules (regardless of size).

Most states, local air districts, and one Tribe have an approved state operating permit program (also referred to as a "part 70" permit). These permitting authorities also typically have delegated authority to implement section 111 and 112 requirements.

iii. Section 111 - New Source Performance Standards and Existing Source Controls

The air permitting programs are meant to steadily upgrade technologies on a unit-by-unit basis (e.g. equipment level). In parallel, EPA is also directed to come back periodically and raise the technological floor for all facilities by setting sectoral standards for new and modified sources and existing sources of GHG. But if individual air permits are not actually driving an upward ratchet of improvement, the sectoral program will also underperform because it relies on a survey of demonstrated technologies in use. If permits do not require truly clean technologies at individual facilities, sectoral controls will also lag behind.

Section 111 of the CAA sets the floor for stationary source emissions controls required for new or modified major sources by requiring EPA to set NSPS. Today, there are 71 NSPS standards that apply to sources from petroleum refineries and cement manufacturing to residential wood heaters (US EPA - e., 2023).

Under the CAA, EPA is required to list categories of stationary sources that significantly contribute to "air pollution which may reasonably be anticipated to endanger public health or welfare" (42 U.S.C §7411(b)). Emissions standards set as NSPS must reflect reductions achievable through the application of the best system of emission reduction (BSER). Crucially, BSER must be adequately demonstrated and take "into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirements" (42 U.S.C §7411(a)(1)).

Existing sources are also regulated under Section 111(d) (42 U.S.C §7411(d)). Sources that are listed as a category of stationary sources under Section 111 can be regulated using state plans that establish standards of performance for existing sources, which "would apply if an existing source were a new source" that triggered NSPS. Existing sources covered under these regulations are often referred to as "designated facilities." To date, EPA has issued emissions guidelines for five pollutants from six source categories that are currently in effect, including GHGs from fossil fuel-fired electric generating units.

Under Section 111(d), permitting authorities are expected to require emissions controls on existing facilities, as needed, to achieve NAAQS. Typically, permitting authorities will adopt rules or regulations that set emissions standards for specific equipment that operates within the boundary of a facility. The stringency of these rules often varies based on attainment with NAAQS. In most cases, existing facilities are subject to less stringent emissions standards than new facilities. This "grandfathering" has been allowed because "Congress envisioned that the existing stock of polluting sources would gradually be cleaned up as they were modernized or replaced" (Giles, 2022, 36).

Existing sources are not just controlled under Section 111. Facilities that operate in areas in non-attainment with NAAQS may also be required to install a minimum level of control for the SIP. The minimum level of control required for the SIP varies by pollutant, NAAQS standard (e.g. 2015 8-hour ozone), and the attainment designation. For example, based on the 8-hour ozone NAAQS set in 2015, existing major sources located in moderate or more severe nonattainment areas that emit nitrogen oxide (NOx) or volatile organic compounds (VOC) (both precursors to ozone) are required to implement reasonably achievable control technology (RACT) (40 C.F.R. §51.912). Similar to NSPS, existing sources that trigger RACT are likely required to have less stringent controls than new sources. EPA guidance confirms that RACT must be reasonably available, and therefore may not be as stringent as BACT (Harnett, 2006). CAA SIP requirements contain several other additional requirements for sources in nonattainment areas, including existing stationary source facilities.

The rules adopted by permitting authorities to meet these requirements may contain provisions to specifically address grandfathered sources, such as exemptions, facility-specific emissions standards, and alternative compliance options. In some cases, special conditions for grandfathered sources are written directly into the rules. These conditions may allow for equipment with specific attributes to operate at much higher emissions levels or to be entirely exempt from the emissions limits contained within the rule. These attributes help to identify specific pieces of equipment, such as the equipment's location, age, fuel, manufacturer, etc. In some cases, the special conditions written into rules for grandfathered sources are an order of magnitude higher than the emissions limits for all other sources subject to the rule.

Another strategy to extend the life of grandfathered sources subject to rules for existing sources is to provide alternative compliance strategies. These alternative compliance strategies may allow for the averaging of all emissions sources at a facility covered by the rule, to allow equipment that is cleaner than the rule limits to offset grandfathered sources. Another alternative compliance pathway is providing the option to pay a fee in lieu of compliance, to pay for emissions reductions from another emissions source, often from somewhere else in the region. These alternative

compliance options are often an important element added to regulations to ensure that the regulation is cost-effective.

iv. Section 112 - Hazardous Air Pollutants

Section 112 of the CAA is designed to address the regulation of HAP, which are pollutants known to cause or suspected of causing cancer or other serious health effects including neurological, respiratory, and reproductive effects. The CAA authorizes EPA to identify HAPs and to revise and expand the list of HAPs based on scientific assessments. The CAA also requires EPA to set NESHAP governing sources of air toxics. The process of establishing NESHAPs was initially slow and challenging due to EPA's inability to effectively weigh the health risks posed by air toxics.

The 1990 CAA amendments revised Section 112 to require the issuance of technology-based standards for HAPs. Under this program, EPA is required to identify and list large (or "major") sources of HAPs 42 U.S.C §7412(c) and to prescribe technology-based emissions limits reflecting the Maximum Achievable Control Technology (MACT). MACT standards are established based on the "maximum degree of reduction" that is achievable, considering costs, energy requirements, and environmental impacts, but may not be less stringent than the emissions of the best-performing sources. After implementing those technology-based standards, Section 112 obligates EPA to set health-based standards addressing any residual risks. (42 U.S.C. 7412(f)). EPA is also required to review and update its MACT standards every eight years (42 U.S.C §7412(d)(6)). Unlike BACT and LAER, MACT requirements specifically allow for the consideration of process changes and the substitution of materials (42 U.S.C §7412(d)(2)(a)).

Separately from Section 112, some states, such as California and Texas, have their own individual air toxic programs. Under these programs, states can identify air toxics beyond the HAP list and set requirements for control.

B. Climate Programs and Air Permitting

The air permitting programs should also be working to reduce carbon pollution. EPA has always had the authority to regulate GHG emissions. The agency has worked on climate programs for several decades, especially following a 2007 Supreme Court decision confirming that the scope of the CAA includes GHGs. Although GHGs are supposed to be, and have been, included in the permitting and section 111 programs the underlying stale documents guiding those programs have slowed progress. Indeed, EPA has not updated even its more recent GHG guidance on permitting for over a decade.

In the 1990s, EPA's work on climate change was primarily focused on forming partnerships to achieve the 2002 U.S. Climate Policy commitment of reducing GHG intensity by 18 percent by 2012 (US EPA, 2006), and conducting climate research as international partnerships and treaties began to be formed (US EPA - a., 2023). Only after substantial public interest pressure from NGOs and state governments did EPA begin to use its long-standing authorities to directly address climate change, including publicly determining that GHGs endanger public health and welfare.

EPA's role in climate change programs significantly ramped up in the 2000s, beginning with a key court decision on motor vehicles. Around the turn of the century, Massachusetts and eleven other states petitioned EPA, requesting the regulation of carbon dioxide as an air pollutant. Under the CAA, the EPA administrator is authorized to set motor vehicle emissions standards for "any air pollutant" once the agency issues a report explaining how an air pollutant caused or contributed to air pollution "which may reasonably be anticipated to endanger public health or welfare" (42 U.S.C. § 7521(a)(1). In 2003, EPA denied the petition. Eventually, the case made its way to the U.S. Supreme Court. In 2007, the Supreme Court ruled that EPA has the authority to regulate GHGs under the CAA if they are found to endanger public health and welfare (Massachusetts v. Envtl. Prot. Agency, 549 U.S. 497 (2007)). In 2009, EPA issued an endangerment finding, which concluded that GHG emissions, including carbon dioxide, pose a threat to public health and welfare.

At the same time as this landmark case was occurring, California began taking action to address climate change within the state. In 2006, California passed the Global Warming Solutions Act (AB 32, Pavley), which set a goal of reducing statewide GHG emissions to 1990 levels by 2020. Under this law, CARB is required to develop a plan, referred to as the Scoping Plan, updated at least every five years, to outline how the state will achieve its climate goals. AB 32 also required CARB to develop regulations to implement the bill, including the exploration of market-based mechanisms. This resulted in the development of CARB's Cap-and-Trade program, which reduces GHG emissions in aggregate from major industrial sectors, power plants, and fuels (CARB - b., 2018)).

In the late 2000s, both EPA and CARB redirected many of their new internal resources to climate-related work, which limited the number of resources available to improve existing air permitting programs. As a direct outcome of this action, EPA stopped publishing annual reports on the RACT BACT LAER Clearinghouse (RBLC) in 2007. These annual reports contained valuable information on stationary source emissions control trends by region and sector (US EPA - d., 2023).

After the 2007 court decision that GHGs are considered "air pollutants" and EPA's own confirmation that GHGs endanger public health and welfare, EPA began working to determine how this decision would impact other programs, including air permitting. The NSPS program historically controlled criteria air pollutants, but EPA began working to establish NSPS for GHGs from electric generating units in 2010, around the same time as EPA's adoption of the "Tailoring Rule." The Tailoring Rule set initial emissions thresholds, based on carbon dioxide equivalents (CO_2e), for PSD and Title V permitting. EPA proposed to carve out smaller sources from permitting that triggered NSR solely based on GHGs. In 2014, the U.S. Supreme Court held that EPA may not treat GHGs as air pollutants for the purposes of triggering PSD or Title V, but if a PSD permit is triggered for other air pollutants, then GHG limits based on the application of BACT could be required (see Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427 (2014)).

In the following years, EPA continued to do work to clarify requirements and issue white papers on potential controls, but these white papers were tentative and have not been updated since 2011. Similarly, EPA convened a working group to make recommendations on GHG BACT, but many of the working group's recommendations failed to reach consensus between NGO and industry experts, leaving the nature of actual requirements unclear. Notably, the **EPA working group failed**

to reach consensus on whether clean technologies or cleaner fuels could be included as GHG BACT, and to what degree, leaving this critical area ill-defined. Its unfinished recommendations have not been attended to or updated for over a decade, even though the need for clarity on the questions it considered has grown steadily more acute.

In most cases today, as a result of this ongoing regulatory gap, climate, and permitting programs remain separate. Climate programs depend on permitting programs working as intended to avoid adverse local impacts, especially in environmental justice communities. GHG emissions from industrial sources are sometimes controlled using market mechanisms such as Cap-and-Trade or directly controlled using NSPS rules, including the proposed Clean Power Plants Rule (discussed in Section III). While EPA did take some initial action in an attempt to reduce GHGs from stationary sources during the permitting process, it cast more smoke than light. In 2016, South Coast Air Quality Management District (AQMD), one of the most stringent permitting authorities in the nation, added new sections to their BACT guidelines to prepare for GHG BACT determinations. To this day, EPA has still not finished this work (South Coast AQMD, 2016). Instead, climate programs more commonly rely on permitting programs, such as NSR, to avoid creating any local adverse impacts. This reliance is falling short because of NSR's own unaddressed issues.

Unfortunately, NSR for GHG is extremely confusing and full of loopholes and exemptions that are often unknown to those working outside of the program. In recent years, regulators working on climate programs have assumed that NSR will sufficiently address any local impacts potentially created by new programs. For example, CARB's 2022 Scoping Plan identifies the first strategy for achieving success in the industrial sector as "requiring [CA] BACT in disadvantaged communities" (CARB - c., 2022). Unfortunately, without any amendments to the NSR program, this commitment will do nothing. Under the existing NSR program, CA BACT is not triggered based on proximity to disadvantaged communities, so no new requirements apply.

Similarly, SB 905 (Skinner, 2022) requires CARB to develop regulations that establish a Carbon Capture Utilization and Sequestration (CCUS) program, including permitting and monitoring requirements. The bill requires CARB to ensure that all CCUS projects meet CA BACT[2] requirements as determined by Air Pollution Control Districts (APCD). Additionally, the bill requires CCUS operators to ensure that significant impacts on disadvantaged communities are avoided by adhering to local, state, and federal laws including CA BACT. CARB is still working to determine what will trigger CA BACT under this program. Most likely, unless the deficiencies with air permitting are addressed, and efforts are made to ensure that NSR is triggered, this language will not provide the local emission reduction benefits anticipated.

[2] In this case "BACT" is equivalent to California BACT which is often akin to federal LAER. To distinguish between different requirements "federal BACT" and "California BACT" are used.

C. Environmental Justice Initiatives Related to Air Permitting

The technical requirements of the permitting program are meant to apply in tandem with a broader universe of civil rights and environmental justice obligations. If the system were working properly, the technologies advanced by the permitting program would be focused on cleaning up burdened communities. In practice, this promise has been poorly realized.

The United States needs to address racist and classist siting practices that have badly damaged air quality in communities of color (Tessum et al., 2021). In light of this, environmental justice programs should be working in parallel with the CAA to promote community health. In principle, the CAA could be a useful tool to focus efforts to clean up polluting facilities in overburdened communities. But once again the core programs of the CAA must be able to force clean technology use for these efforts to be maximally effective at advancing environmental justice.

The origins of environmental justice can be traced back to the 1960s when the civil rights movement helped to elevate concerns about public health dangers in communities of color. EPA first became involved in environmental justice in 1968 during the Memphis Sanitation Strike, which was an action taken against unfair treatment and environmental concerns in Tennessee. The environmental justice movement grew and became more organized throughout the 1980s, and in 1990, EPA established a new office, now known as the Office of Environmental Justice, to address environmental issues in communities of color and low-income communities (US EPA - c., 2023).

Within the last decade or so, environmental justice advocates have been pushing strongly on environmental agencies to provide more equitable policies and regulations and to reduce disparities in overburdened communities. In response, several states have adopted initial environmental justice policies or programs, laying the groundwork to hold agencies accountable for responding to community concerns. More recently, several actions were taken under the Biden-Harris Administration, which has promised to make environmental justice a government-wide priority.

- **January 2021:** President Biden signed Executive Order 14008, also known as the Justice40 Initiative. This action transformed hundreds of federal programs to ensure that disadvantaged communities receive the benefits of new and existing federal investments related to climate change, a cleaner environment, affordable housing, and workforce development.
- **August 2022:** EPA's Office of General Council published the Interim Environmental Justice and Civil Rights in Permitting Frequently Asked Questions document, which was intended to provide information to federal, state, and local environmental permitting programs. The recommendations in this document range from providing meaningful community engagement opportunities to denying a permit to avoid a Title VI of the 1964 Civil Rights Act (Title VI) violation if disparate impacts cannot be avoided or mitigated.
- **December 2022:** EPA's Office of Air and Radiation published its Principles for Addressing Environmental Justice Concerns in Air Permitting, which provides EPA regional offices a

framework to promote environmental justice and equity through permitting programs. The principles outlined in this document utilize existing laws and authorities to mitigate potential adverse and disproportionate impacts resulting from a permitting action.

- **January 2023:** EPA's Office of General Council released EPA Legal Tools to Advance Environmental Justice: Cumulative Impacts Addendum, which builds upon the EPA document published in August 2022. This document provides an additional analysis of the agency's legal authority to address cumulative impacts, including the use of EPA's authority under CAA section 505(e) to reopen a Title V permit "if the Administrator finds cause exists to terminate, modify, or revoke and reissue the permit." This document concludes that cumulative impacts can be used to prioritize which Title V permits are scrutinized.

In response to the actions taken by the federal government under the Biden-Harris Administration, many air permitting authorities are now focusing on building stronger environmental justice programs at the state or local level. Common requirements in these programs often include enhanced public outreach and expanded community air monitoring efforts. Some newer programs now include more aggressive measures to directly address industrial sources. For example, in April 2023, New Jersey adopted new Environmental Justice Rules (55 N.J.R. 661(b)), which include stringent control technology and mitigation requirements to prevent any adverse impacts from major industrial source projects near or within disadvantaged communities. More specifically, the rules contain more aggressive control requirements for new or modified sources than historically required under NSR, expanding the suite of technologies evaluated and excluding the consideration of cost. The new rules also apply to Title V permit renewals, prompting a review of required controls, and include mandatory permit denial provisions for new facilities if the disproportionate impact cannot be avoided.

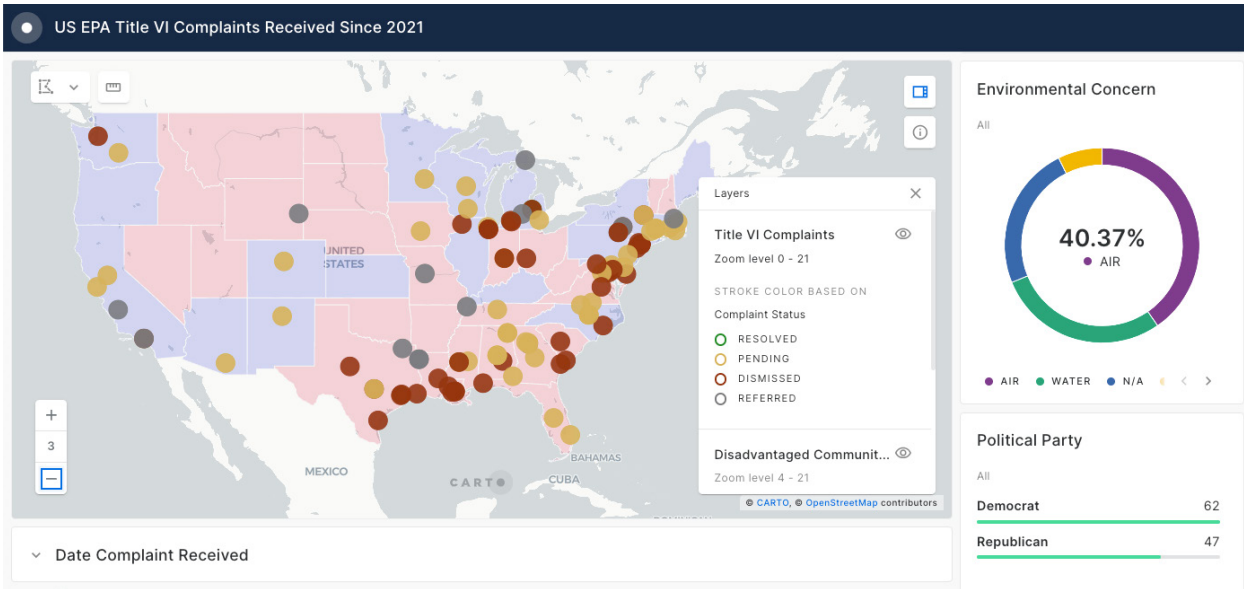
D. Civil Rights (Title VI) Requirements

Finally, civil rights statutes can drive progress if they align effectively with the CAA to improve air quality in communities of color, where many of the country's polluting sources are located (Mohai & Saha, 2015).

The federal government has taken several actions over the past few years to support the development of more robust state and local environmental justice programs. Unlike environmental justice programs, Title VI of the 1964 Civil Rights Act (Title VI), is applicable across the country regardless of political party lines. EPA maintains an online docket of Title VI complaints filed since 1994. The number of Title VI complaints received by the US EPA has increased over the years, with over 40% of the complaints being filed since 2021. These complaints are being filed in both Republican and Democratic states, and the extent of US EPA's ability to address civil rights concerns will be determined as the Agency resolves the recent claims received (A1-2).

Title VI prohibits discrimination based on race, color, or national origin in any program receiving federal financial assistance. Each federal agency, including EPA, has separate regulations implementing Title VI. EPA's regulations, found in 40 CFR Part 7, particularly 40 CFR 7.35 (b) and (c), prohibit discriminatory criteria or methods in programs and the selection of sites or locations that may lead to discrimination.

Figure A1-2: Interactive Map of Title VI Complaints Received by EPA Since 2021



Implementing these requirements is a federal responsibility, coordinated by the U.S. Department of Justice (DOJ), but in practice overseen by the federal agencies providing "federal financial assistance." "Federal financial assistance" can refer to assistance of almost any kind, including grants and loans of federal funds, grants or donations of federal property, details of federal personnel, or federal agreement.[3] As EPA continues to allocate funding to industrial sources through the Inflation Reduction Act (IRA), more companies will likely become recipients of federal funding and therefore must comply with Title VI requirements (US DOJ, 2009). Companies that receive federal funding are easily identified on the USA Spending website.

The responsibility for compliance lies with the recipients of federal financial assistance, such as local environmental, transportation, and public health agencies. Title VI complaints can be based on intentional or disparate impact discrimination. The Supreme Court ruled in 2001 that private actions can only pursue intentional discrimination (US DOJ - b, n.d.). Title VI complaints alleging disparate impact may be pursued by way of administrative complaints, typically leading, for complaints "accepted" for investigation, to formal investigations or, often even without formal investigation, various forms of resolution agreements (US DOJ - c, n.d.).

Of particular relevance to the issue of environmental justice and permitting is the role of "less discriminatory alternatives", which in some ways parallel requirements for BACT, Best Available Retrofit Control Technology (BARCT)[4], and RACM. This consideration comes into play once the federal agency has found that there has been a potentially discriminatory impact imposed on a protected population. The DOJ Title VI Manual discusses this as follows: "Frequently, discrimination results from policies and practices that are neutral on their face but have the effect of discriminating[.] Those policies and practices must be eliminated unless they are shown to be necessary to the operation and there is no **less discriminatory alternative"** (US DOJ - c, n.d.). (Emphasis added)

[3] According to the US DOJ, some non-monetary financial assistance, such as licenses, statutory programs, or programs owned and operated by the federal government, may not constitute "federal financial assistance." In most cases typical tax benefits are not considered federal financial assistance because they are not contractual in nature, but a few court cases have ruled that tax benefits should be considered (US DOJ - a, n.d.)

[4] BARCT is a control technology requirement that applies at is required for some existing sources in nonattainment areas in California.

Taken together, these policies should allow agencies to have greater discretion in executing civil rights requirements, specifically "recipient" agencies such as state, regional, and local permitting agencies. **What is often missed in this typical understanding is that the requirements of the Civil Rights Act apply regardless, and may require those agencies to take steps that are even more protective than those provided for by their respective environmental, health, etc. regulations. Such protective steps may include further increasing the stringency of permits or in some cases even denying the permit.**

While EPA's track record in implementing Title VI faced criticism until at least 2012, recent administrations, particularly under EPA Administrator Michael Regan, have shown improvements. The Biden-Harris administration's commitment to environmental justice and civil rights is evident in executive orders and organizational changes, such as the creation of the Office of Environmental Justice and External Civil Rights.

Practical steps have been taken to address environmental justice and civil rights in permitting, including the issuance of "Interim Environmental Justice and Civil Rights in Permitting Frequently Asked Questions" in August 2022 (US EPA - a., 2022). This 25-page document puts forth in detail the Agency's current thinking, describing several practical steps permitting agencies should take if they want to comply with EJ policies and civil rights requirements. This is perhaps the most elaborate and practical guidance EPA has ever put out, exceeding by far its earlier attempts in 1998, 2000, and 2007 to issue guidance.

In addition to providing guidance, EPA has also provided direct support to permitting authorities that take actions to address Title VI concerns during permitting actions. In May of 2021, with regard to a metal shredding facility in Chicago, EPA Administrator Regan recommended that before issuing a permit for that facility there be "…a robust analysis to assess the full environmental justice implications of siting this facility in a community already overburdened by pollution, and then use that analysis to inform any permitting decision" (US EPA, 2021).

At this point, the permit continues to be denied, although the company continues to pursue a permit by way of litigation. More recently EPA raised Title VI issues regarding a proposed air permit in Ohio "…because of the environmental conditions already facing this community, and the potential for additional disproportionate and adverse impacts…this permitting action may raise civil rights concerns. It is important, therefore, that OEPA assess its obligations under civil rights laws and policies" (US EPA Region 5, 2023).

All of this supports the implication that defensible permitting practices, defensible with regard not only to environmental and health requirements and policies, but also civil rights laws, should maximize consideration of best practices and technologies, systematically considering and adopting "least discriminatory alternatives" wherever possible. In some cases, actions required to eliminate adverse impacts may require companies to install controls or modify processes, beyond the requirements in permitting programs, to avoid discriminatory impacts on the surrounding community.

Appendix 2: Flaws in Air Permitting—Technical Specifics and Examples

In the main body of this report, we describe the problems with the permitting system in plain English. This appendix contains the technical underpinnings of those problems. It is designed with two audiences in mind: Permit authorities looking to make changes, and advocates who may find that speaking in the technical language of permit writers enhances their ability to make change. Each of the major issues described in the main report is described below in more detail with accompanying examples of flawed permit approaches relating to the issue.

A. Loopholes Allowing Avoidance of Triggering Program Requirements

Under the Clean Air Act (CAA), whether a plant needs to undergo New Source Review (NSR) is determined on a case-by-case basis, depending on whether the facility undertakes a "major modification": a physical change in the method of the source's operation that produces a significant increase in pollution. The major modification standard allows facility operators to make minor modifications that do not significantly increase emissions. But facilities have been able to get around triggering NSR using different emissions calculation methods and capitalizing on ambiguities in the CAA. The stringency of the NSR program has also changed over time-based on the politics associated with different Environmental Protection Agency (EPA) administrations, allowing major industrial sources to avoid NSR even when substantially increasing their pollution (Giles, 2022, 37).

EPA's current program offers too many opportunities for major industrial sources to avoid NSR and the modern pollution controls it is meant to produce. For example, sources can claim their modifications are "routine maintenance, repair, and replacement" and therefore exempt from NSR (40 U.S.C. 51.165(a)(1)(v)(C)(1)). Sources can claim that pollution increases stem from increased demand rather than changes to the facility (the "demand-growth exemption", 40 CFR 52.21(b)(41)(ii)(c)). Sources can also adopt unrealistic projections of future emissions without meaningful agency oversight (U.S. v. DTE Energy, 711 F.3d 643 (6th Cir. 2013)). In addition, under Trump-era regulations that the Biden Administration is reconsidering, but has not yet changed, sources can increase source-wide emissions under the radar by accounting for only a subset of the activities occurring at its facility ("project emissions accounting," 85 FR 74,890).

Case Study: Importance of Triggering NSR for CCUS Projects

The consequences of avoiding NSR are very concerning. For example, if NSR is not triggered, there will not be requirements for facilities to avoid new impacts or reduce existing impacts from facilities when carbon capture utilization and sequestration (CCUS) technology is deployed. It is unclear if or when facilities installing CCUS will trigger NSR, and it will likely vary from project to project based on the system design and local requirements.

For example, a recent report from Clean Air Task Force (CATF) modeled the carbon dioxide (CO_2) and criteria air pollutant emissions reductions from CCUS at petroleum refineries and cement manufacturing plants. CATF found that installing CCUS at large industrial facilities could reduce several criteria air pollutants. These criteria emissions reductions were typically associated with the control of pollutants that may contribute to the degradation of the equipment, therefore pretreatment is used to remove or reduce criteria pollutants from the exhaust gas before it reaches the amine absorber. The report states that "because many older plants are not subject to stringent air pollution control requirements that would apply to new plants, emissions intensity (i.e., the amount of pollution per unit production) can vary widely and idiosyncratically across facilities within the same industry." The report also acknowledges that the magnitude of reductions achieved by adding CCUS varies based on the specific emissions profile of the facility in question before the addition of CCUS technology.

CATF modeled the impacts of CCUS at two petroleum refineries, one in California and the other in Texas, showing that the air pollution benefits of installing CCUS at refineries could vary widely, depending on pretreatment controls. The study found that the outdated pretreatment controls at the Martinez Refinery in California would need to be replaced by four new add-on controls to ensure that the CO_2 capture equipment would operate effectively. The Texas facility evaluated in the study is already operating with more advanced conventional controls, and would therefore only require the installation of two new add-on controls prior to operating the CCUS system. The need for additional pre-treatment, including selective catalytic reduction (SCR) at the Martinez Refinery, accounted for 35 percent of the cost of CCUS, and only 5 percent of the total cost at the Texas Refinery. The nitrogen oxide (NOx) emissions reductions estimated from the Martinez Refinery were 73 percent and 33 percent in Texas. This difference was based on the efficiency of the pre-treatment controls.

The report also evaluated criteria pollutant emissions impacts of installing CCUS on cement plants. The engineering analysis performed found that there would only be a 2 percent reduction in NOx because SCRs are not widely installed at cement plants in the United States. This again shows that unless the facility is required to upgrade existing control equipment, there may be minimal criteria air pollutant reductions, unless electively installed to protect the CCUS equipment. For both the refineries and cement plants, volatile organic compounds (VOC) emissions increased by an average of 2.86 Tons Per Year (TPY) per year (Brown et al., 2023). VOC and air toxic emissions from CCUS projects can vary based on the amine solvents used and plant design.

Separately, the California Energy Commission conducted a review of a pilot CCUS project in California at a 500 MW gas power plant operating within a disadvantaged community. The agency's

review revealed increases in ammonia and VOCs, including the carcinogens acetaldehyde and formaldehyde, with a capture rate of only 11 tons of CO_2 per day (0.04 percent of the stack exhaust). The facility was required to apply for a permit for the new equipment installed, but the additional emissions only triggered a minor source revision to a Title V permit. The project did not trigger Best Available Control Technology (BACT) because increases in the VOC emissions from the project were under existing thresholds. The formaldehyde emissions rate exceeded chronic state toxic air contaminant trigger levels and therefore required a health risk assessment. This assessment found that the cancer risk of the additional emissions created by the project was under risk thresholds, and therefore additional controls were not required (Heiser, 2022).

In summary, this case study underscores the importance of triggering NSR, to ensure equipment is upgraded and local emissions impacts are addressed when installing CCUS projects. For CCUS projects the focus is on reducing greenhouse gas (GHG) emissions, however, as shown in the CATF report, in many cases new controls are not considered, and minimal emissions reductions are achieved (such as NOx emissions reductions from the cement plants). The refinery comparison in the CATF study unintentionally highlights how the permitting system has failed to force equipment upgrades. The catalytic cracking unit at the California refinery that is in operation today isn't even clean enough for CCUS to work effectively, despite more advanced controls being readily available and in operation at the Texas refinery. This could be because NSR has not been triggered for many years, or due to cost. For the pilot study, all permitting program triggers were based on new emissions created by the project. Unless NSR is triggered for all CCUS projects, there is a risk of creating an industry preference to utilize technologies that do not require reopening a facility's existing operating permits (potentially triggering more stringent control requirements), not encouraging the use of technologies that provide the most comprehensive emissions reduction benefits.

B. Insufficient Consideration of Clean Technologies

The original NSR programs are from a different era, when add-on conventional control technology was "advanced." The program itself was not constructed to deal with clean technologies, processes, and fuels. As a result, today's NSR programs, as interpreted by the Agency and the courts over decades, do not consider the widespread availability of true zero-emission technology or much cleaner fuels, and therefore struggle to push sources past fossil fuel combustion to available clean alternatives. Failure to consider clean technologies in permit reviews has resulted in a major tool that could push sources past fossil fuel combustion, being taken off the table. With limited exceptions, these antiquated permits and the legal regimes producing them block the spread of clean technologies and the reduction of local pollution burdens. The limitations of NSR and the numerous loopholes that exist to avoid the installation of cleaner controls have allowed for the continued operation of decades-old equipment with limited emissions controls.

1. Redefining the Source

Since 1988, EPA has advanced a policy allowing the exclusion of technology options that "redefine the source" from BACT analysis (Doster, 2010). This is a serious limitation of NSR that arises not from statute but from EPA doctrine, and it requires urgent revision. In 1990, EPA issued guidance on redefining the source in their NSR Manual, stating that "EPA has not considered the BACT requirement as a means to redefine the design of the source when considering available control alternatives…However, there may be instances where, in the permit authority's judgment, the consideration of alternative production processes is warranted and appropriate for consideration in the BACT analysis" (US EPA, 1990). This "redefining the source doctrine" has been criticized as a barrier to air pollution reductions in multiple publications (see (Ertman, 2017) and (Behles, 2015)).

The definition of BACT explicitly includes considerations of changes to "fuels" as possible BACT measures, but this possibility is often ignored in practice due to concerns over redefining the source (42 U.S.C.7479(3)) and as a result of ignoring or under-using the Act's separate direction that full alternatives to a project be considered even beyond the BACT process. With regard to these related alternative processes, EPA has argued that permitting authorities have some discretion to determine if the technology in question changes what was originally proposed by the permit applicant or if it disrupts the applicant's basic business purpose for the proposed facility. Multiple courts have ruled that BACT analysis need not include alternatives that would change an inherent aspect of the facilities' design requirements as they would redefine the source.[5] In response to these cases, the lack of guidance provided by EPA, and concerns over litigation, many permitting authorities have interpreted actions prohibited by redefining the source guidance broadly.

As a result of both the "redefining the source" doctrine, and of ignoring broader alternatives analyses, permitting agencies focus on trying to make the source as clean as possible within its category, permitting older, dirtier technologies even if cleaner sources are readily available. For example, if a permitting authority today were to receive a permit application for a diesel engine, its policies, and practices would likely only require the consideration of the lowest emissions limit achievable with add-on control technologies powered by diesel fuel. Due to concerns about redefining the source, the agency would not consider cleaner technologies such as fuel cells, or alternative equipment such as turbines.

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[5] See Sierra Club v. EPA, 499 F.3d 653, 655 (7th Cir. 2007) (Desert Rock Energy Company, LLC, PSD Appeal No. 08-03 et al., Slip. Op. at 64 (EAB Sept. 24, 2009) Helping Hands Tools v. U.S. EPA, 848 F.3d 1185 (9th Cir. 2016)

The good news is federal courts have begun to express deep skepticism about the "redefining the source" doctrine, noting its profound tension with the CAA's focus on driving forward clean technologies and improving public health. In 2020, a federal circuit court held that the regulator failed to sufficiently consider electric motors during the BACT evaluation for engines used at a proposed natural gas compression station (See Town of Weymouth, Mass. v. Mass. DEP, 961 F.3d 34, 41-47 (1st Cir. 2020)),. Another federal appellate court case in 2020 found that even if there is a federal redefining of the source doctrine, state regulators should not follow such a doctrine at the state level unless justified on state law terms (See Friends of Buckingham v. State Air Pollution Control Board, 947 F.3d 68 (4th Cir. 2020). In this case, the petitioners claimed that the permitting authority failed to consider electric turbines as a BACT technology for gas-fired turbines at a natural gas compressor station. The courts found that the permitting authority violated the law when they failed to even consider the zero-emission alternative. The idea that clean technologies should not always be required is now more than thirty years out of date. It is time for EPA to do everything it can to remove or limit the doctrine.

Case Study: Clean Technologies Are Not Required Due to Inadequate Alternatives Analyses (Backup Engines)

In 2019, California began implementing a Public Safety Power Shutoff (PSPS) program through which utilities turned off electricity when gusty winds and dry conditions caused heightened fire risk. By October 2019, over 800 PSPS events in the state had impacted nearly 1 million residential, commercial, and industrial customers. Power outages lasted an average of 43 consecutive hours. After each event, there was additional outage time to allow for inspections of power lines prior to restoring power. CARB estimated that the emissions impact from operating stationary backup generators during October 2019 was 125.7 tons of NOx and 8.3 tons of diesel particulate matter (PM) (CARB - a., 2020). The NOx produced in a single month from stationary backup generators was roughly equivalent to the annual NOx emissions from a large biomass energy facility or nearly five and a half years of operation of the state's single largest stationary source of diesel Particulate Matter (PM), Southern California Edison (1.6 tons/year Diesel PM).[6]

Following the event, many industrial clients began requesting new authority to construct permit applications to ensure that they had sources of reliable backup power on-site. The magnitude of these requests was not trivial. In the Bay Area alone, the number of backup permit applications received from data centers would more than double the number of backup engines and power (in megawatts) that was permitted prior to the PSPS events. Additionally, over 60 percent of the new engines were located within state-designated disadvantaged communities (CARB, 2021). In response to this concern, CARB began working with the local air districts to perform a technical assessment of available backup technology options.

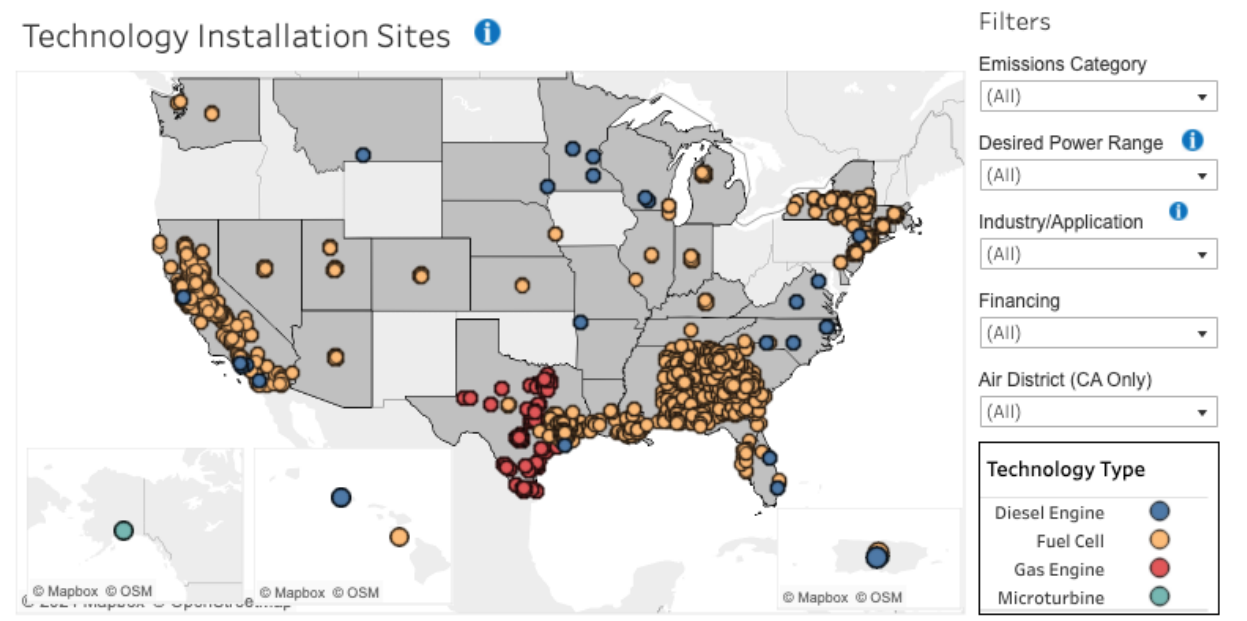
As a result of the technology assessment, CARB found that there were many types of advanced conventional and cleaner technologies commercially available and in operation. These technologies

[6] Based on 2020 CARB emissions inventory data from California's Cap-and-Trade Facilities. Data made available through CARB's Air Pollution Mapping Tool.

went beyond the Tier 3 BACT limits in place at the time for a wide variety of applications (e.g., different power ranges and uses). Examples included natural gas backup engines installed throughout Texas that were clean enough to meet CARB's distributed generation standards (i.e., the standards that apply to sources that provide electricity to California's grid). There were also hundreds, if not thousands, of fuel cells operating across the country, especially in the Southeast. In this region, fuel cells were electively installed as an alternative to diesel engines due to their resiliency during natural disasters and the availability of tax credits.

For facilities with high power needs during an emergency, such as data centers, the assessment revealed that fuel cells and Tier 4 emergency backup engines were demonstrated as alternatives to Tier 3 emergency backup engines. The Tier 4 emergency backup engines identified were electively installed in states such as South Dakota, Wisconsin, and Washington, so no BACT determination was ever made (CARB - b., 2020). CARB published the results of this analysis online in an interactive map (Figure A2-1).

Figure A2-1: Carb's Commercial Emergency Backup Options Map Contains Clean Technology Options That Are Commercially Available and Operating Across the United States



Source: (CARB - b., 2020)

Despite identifying readily available alternative technologies, California air districts determined that they could not require permit applicants to install natural gas engines or fuel cells because they were a different class and category, which would "redefine the source." Based on this assessment, the only feasible option to reduce emissions from emergency backup engines was to update BACT determinations to reflect EPA Tier 4 diesel engine standards. Bay Area Air Quality Management District (AQMD) was the first air district to initiate an effort to establish Tier 4 as "achieved-in-practice" BACT for backup emergency engines operating at major sources. The effort to establish these requirements was contentious. Bay Area AQMD initially based its BACT analysis on a Microsoft Data Center operating in Washington State. The district used operation and test data from this facility to demonstrate commercial availability, reliability,

and effectiveness. Industry argued that Bay Area AQMD's policy stated that control devices or emissions limits must be "verified by source tests or other appropriate documentation approved by this District or another California air district," and therefore out-of-state operations could not be used to demonstrate feasibility (Bay Area AQMD, 2002).

Other major air districts across California began simultaneous efforts to propose Tier 4 emergency backup engines as BACT. In South Coast AQMD, the air district had to independently address similar concerns raised by industry related to the definitions of "achieved-in-practice" in their BACT policy. South Coast AQMD is required to go through its Scientific Review Committee to update a BACT determination. Originally, South Coast AQMD attempted to propose Tier 4 backup engines as CA BACT Lowest Achievable Emissions Rate (ie. LAER) several years ago, but the proposal was heavily opposed by industry. In response, South Coast AQMD decided to list Tier 4 backup engines as an emerging technology in Section III of their BACT guidelines in 2018 (technology that is optional but not required), citing two emergency backup Tier 4 engines that had been in operation within the air district since 2016.

In June 2021, South Coast AQMD began its second attempt to recognize Tier 4 engines as BACT for backup emergency engines. During this process, industry claimed that Tier 4 engines did not meet South Coast AQMD's definition of "achieved-in-practice" because there was no way to prove that emergency engines demonstrated their reliability over a six-month period due to their intermittent use. In response, the District identified dozens of installations both within the district and across the United States. The District cited the December 2020 Bay Area AQMD BACT guideline for backup emergency engines over 1000 BHP and the June 2021 Sacramento Metropolitan AQMD BACT determination as evidence that the technology was "achieved-in-practice" (Bay Area AQMD, 2020) (South Coast AQMD, 2021). Ultimately, it took nearly an entire year for South Coast AQMD to go through the SRC process and their Governing Board to make a determination that emergency backup engines were required to meet Tier 4 standards, despite the adoption of several other BACT determinations by other air districts during this time.

2. Achieved-in-Practice Determinations

Clean technologies are not adequately identified under BACT or lowest achievable emissions rate (LAER) determinations. To be identified as LAER, a technology must be "achieved-in-practice" for a "class and category" of source or required in a state implementation plan (SIP). EPA has not provided guidance or definitions for the terms "achieved-in-practice" or "class and category," so state and local permitting authorities have come up with their own individual definitions. While the term "achieved-in-practice" is specifically used within the definition of LAER, in many cases this is also the most stringent level of control considered in a BACT analysis (and may be required or eliminated during a top-down BACT analysis).

In general, "achieved-in-practice" is used to identify control technologies that are available, reliable, and effective. The criteria that permitting authorities use to verify commercial availability

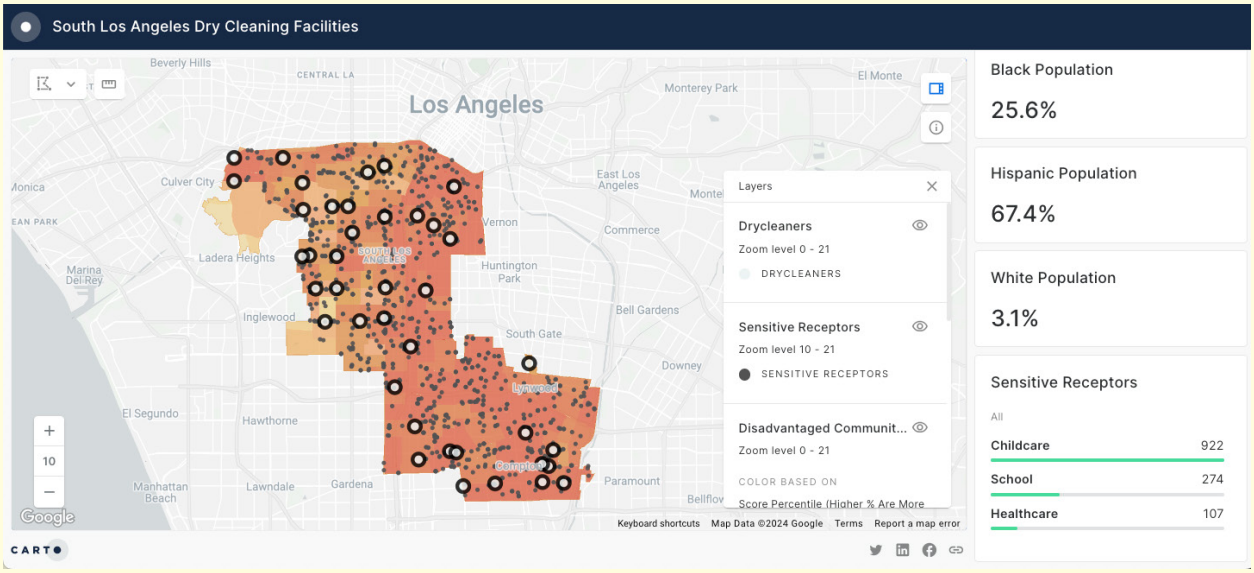
and reliability of the controls varies across the country. In many cases, permitting authorities have narrowly defined achieved-in-practice as conventional add-on control technologies that are readily available from several technology vendors (no backorder time), and have operated for at least six months in the United States without any government grants or incentives.

Even in cases when clean technologies are currently installed on the same source type, commercially available, and proven as reliable, they are never considered as "achieved-in-practice." The primary reason is that technologies are reviewed and determined to be "achieved-in-practice" for a class and category of source. Permitting authorities do not believe that they can force an air permit applicant to move to a different class and category, as it would be considered redefining the source. Some permitting authorities also require their achieved-in-practice determinations to be approved by the Governing Boards, a process which can take several months.

Case Study: Inability to push zero-emission using BACT (Dry Cleaning)

On February 25, 2021, CARB designated South Los Angeles under the Community Air Protection Program to develop community emissions reduction and air monitoring plans. These plans were developed with three community co-lead organizations, including Physicians for Social Responsibility - Los Angeles (PSR-LA), Strategic Concepts in Organizing and Policy Education, and Watts Clean Air and Energy Committee. Both South Coast AQMD and CARB supported the development of these plans. Community members identified dry cleaners as a source of concern due to the adverse health impacts associated with hydrocarbon solvents, and their close proximity to communities of color (Figure A2-2).

Figure A2-2: Interactive Map of South Los Angeles Dry Cleaning Facilities



South Coast AQMD's Rule 1421 phased out perchloroethylene (PERC) from drycleaning by the end of 2020, but non-PERC solvent continues to be used by drycleaning operations (South Coast AQMD - a., 2022). In 2019, PSR-LA asked Dr. Peter Sinsheimer, Executive Director of the University of California Los Angeles Sustainable Technology and Policy Program, to act as a technical consultant to support their work on the Southern Los Angeles community emissions reduction plan, funded by a Community Air Protection Grant.

During the first phase of the project, Dr. Sinsheimer completed an analysis of South Coast AQMD criteria for minor source BACT. He found "strong reliable evidence" that both professional wet cleaning and CO_2 dry cleaning met the criteria for BACT. The analysis developed by Dr. Sinsheimer also recommended that South Coast AQMD amend Rule 1102 to eliminate the Group II exemption, including the exemption for decamethylcyclopentasiloxane (D5), which is banned in Europe, from the regulation. In addition to toxicity concerns, D5 has extremely high energy use compared to zero-emission wet cleaning and CO_2 dry cleaning (Sinsheimer, 2022).

Dr. Sinsheimer's analysis concludes that the alternative drycleaning technology options meet South Coast AQMD's criteria to be considered "achieved-in-practice." South Coast AQMD's BACT guidelines allow for an emissions limit or control technology to be considered achieved-in-practice for a class or category of source if it exists in regulatory programs or is listed within state and federal BACT determinations or databases. For new technologies to become achieved-in-practice, they must meet all of the criteria outlined in Table A2-1 (South Coast AQMD - b., 2022).

Table A2-1: Achieved-in Practice Criteria Evaluation Performed for Dry Cleaning BACT Analysis

Achieved-in-Practice Criteria	South Coast AQMD Requirements (South Coast AQMD - b., 2022)	BACT Analysis Findings (Sinsheimer, 2022)
Commercially Available	At least one vendor must offer the equipment for full-scale operation within the U.S.	Professional dry cleaners are electively using GreenEarth, CO2, and professional wet cleaning within the district.
Reliable	Control technology must be installed and operated for at least 12 months on a comparable commercial operation	The dry cleaners using alternative technologies have operated for many years and demonstrated reliability and effectiveness. This was confirmed by peer-reviewed studies on operations in Southern California and Massachusetts.
Effective	Control technology must be verified to perform effectively over a range of operations expected for the equipment	
Cost Effective	Must be cost-effective for a substantial number of sources within the class or category	All alternatives were cost-effective, and professional wet cleaning was found to be "extremely cost-effective given that operating cost of this zero-emission technology was lower than no-perc dry cleaning technologies."

In addition to the BACT analysis, a South East Los Angeles community resident Hans Kim submitted testimony to South Coast AQMD, stating that he had converted over 100 perc and hydrocarbon dry cleaners to professional wet cleaning. None of these projects were within the South East Los Angeles community. His comment letter contained several recommendations, including for South Coast AQMD to modify their BACT determination for non-perc solvent dry clean machines to set the emissions limit at zero (Kim, 2022).

In response to the community requests received, South Coast AQMD evaluated the feasibility of requiring wet cleaning as BACT. The air district determined that wet cleaning could not be required using BACT because it is a different class and category of source and would thus redefine the source. South Coast AQMD found that if they wanted to require wet cleaning for new sources, they would have to set the emissions limit to zero in a rule. Rulemaking efforts often take several years and many resources to develop and implement. Therefore, in the interim, the air district has created an incentive program that provides funding to encourage dry cleaning operations to transition to wet cleaning. The Southern Los Angeles community emissions reduction plan contains a detailed description of a dry cleaning facility in the area that has committed to using community incentive funds to replace the hydrocarbon dry cleaning equipment with a wet cleaning system, provide training, and cover the cost of a three-year equipment lease for demonstration purposes.

3. Innovative Technologies

While Nonattainment New Source Review (NNSR) and prevention of significant deterioration (PSD) were clearly not designed to support the transition to clean technologies, EPA did realize early on that there needed to be a mechanism in PSD to support the advancement of technology. EPA defined "innovative control technologies" in 40 U.S.C. § 52.21(b)(19), as "any system of air pollution control that has not been adequately demonstrated in practice."[7] According to the 1990 NSR manual, innovative technologies are explicitly exempted from step 1 of a top-down BACT analysis (US EPA, 1990), and are therefore only electively installed by industry.

Rather than using regulatory requirements, EPA attempted to provide an incentive to encourage the use of innovative technologies within the PSD program. PSD permit applicants are exempted from some of the traditional federal BACT requirements (40 U.S.C. § 52.21(v) if they elect to use innovative technologies. Unfortunately, this program has not worked as intended. The innovative technology program has limited benefits and high risks. For example, if the innovative technology fails to perform as expected, industry is expected to replace the technology with conventional controls. As a result, over the past few decades, this program has rarely been used.

The path to move technologies from demonstration to full deployment can be slow and challenging. This is particularly true for clean technologies and processes within the industrial sector. Without regulatory support, these manufacturers must focus on removing all market

[7] The term "demonstrated in practice" is synonymous with "achieved-in-practice." Some permitting authorities have defined these terms to explicitly preclude alternative technologies from being considered as "achieved" or "demonstrated".

barriers to make their technologies attractive solely based on economic factors, even if the technologies are fully demonstrated. Today, billions in Inflation Reduction Act (IRA) funding are being awarded to industrial sources to demonstrate and support the commercialization of clean technologies; However, the technologies demonstrated will not be considered in future air permitting projects, as intended, based on existing federal air permitting guidance.

4. Additional Considerations

Beyond ambiguous federal guidance and a lack of sufficient regulatory incentives, several significant challenges are delaying the transition to clean technologies in the industrial sector, including:

- Industries sometimes collectively resist or discourage the use of cleaner technologies to avoid establishing a new lower achieved-in-practice emissions limit.
- Zero-and near-zero-emission technologies do not require permits and are therefore often not recognized or identified during BACT or LAER evaluations.
- Some advanced controls may reduce emissions limits to levels that are below permitting thresholds. If this occurs, permitting authorities often believe that they cannot require controls for a source they cannot regulate under PSD or NSR. In these cases, permitting authorities believe that new requirements to transition sources to zero-emission technologies would have to be done through rulemaking, not the permitting process.
- Existing permitting programs do not prevent industrial sources from backsliding by replacing already installed zero-emission technology with conventional technology, so long as the conventional technology meets BACT or LAER.
- Permitting authorities may be cautious about requiring new technologies with shorter track records, as they may be held liable by industry if the technology does not perform as expected.
- Projects that trigger NSR require emissions offsets in addition to LAER. If zero-emission technologies are required, offsets would no longer be generated, which would reduce regional offsets available for future projects, but also create a powerful incentive for industries to pilot cleaner technologies.
- In many cases, air permits are not easily accessible to the public online, and may require a public record request. Air permitting authorities typically determine what information is available to the public, including the availability of air permits and public notice requirements.

C. Reliance on Outdated and Insufficient Review Approaches

According to the 1990 NSR manual, permit applicants are expected to identify all “demonstrated and potentially available control technology alternatives” using a variety of information sources, including the RACT BACT LAER Clearinghouse (RBLC), South Coast AQMD’s BACT guidelines, control technology vendors, NSR permits, EPA’s NSR bulletin board, and technical journals, reports, and newsletters. Today, permit engineers often refer to databases that

contain recent BACT or LAER determinations, including RBLC and CARB's BACT Clearinghouse (Technology Clearinghouse), when determining the appropriate controls for new, modified, or existing sources. However, specific requirements for what information sources must be used vary widely by permitting authority.

The information contained in the RBLC has a broad impact on permitting and rulemaking efforts. Its importance cannot be overstated. For example, when determining control measures needed for the SIP, the Arizona Department of Environmental Quality conducts its analysis based on information in the RBLC (Arizona DEQ, 2023). The primary concern over the federal RBLC is that it is no longer a trusted resource to determine what is BACT. Unfortunately, the database does a poor job of identifying technologies that should be considered during a BACT analysis for several reasons, discussed in detail below.

1. Lack of adequate federal support to maintain databases

Concerns over EPA's RBLC have been noted for years by both internal EPA staff and external stakeholders. In each RBLC annual report from 2000 to 2011, EPA identified the need to update and improve the RBLC (US EPA, 2000). These reports were historically used to help provide more information to permitting authorities on trends in permitting and new technology available. Without annual reports, users are expected to run their own queries to try and identify any new information that may have been added to support the permit review process.

More recently, the National Association of Clean Air Agencies (NACAA), which represents permitting authorities, raised concerns about the accuracy and completeness of the RBLC. In April 2019, NACAA provided a list of suggested improvements for the RBLC to EPA (Mongoven, 2019). Unfortunately, given the extent of revisions needed, EPA ultimately determined that they did not have the resources needed to address the concerns raised.

2. Lack of database standards, including definitions, makes it difficult to determine what should be required

Similar to the RBLC, CARB's historical BACT database also lacks accuracy and completeness. As part of California's first environmental justice program, the Community Air Protection Program, CARB was required by statute in 2017 to update its BACT Clearinghouse (now referred to as a Technology Clearinghouse). CARB has been working with the local air districts (permitting authorities) since this time, but the unique information, terminology, and categories used by each individual permitting authority to characterize BACT determinations under their own individual rules and policies have been challenging to resolve.

During this process, CARB discovered several concerns over the data being submitted to CARB and subsequently to the RBLC, including:

- **Unable to determine if the limits were actually permitted at an existing source.** BACT determinations and guidelines were both submitted to CARB but were not identified appropriately, meaning real installations and theoretical requirements were intermixed. BACT

determinations are made on a specific piece of equipment or process and can be used to confirm the technical feasibility of a technology. BACT guidelines provide an overview of emissions limits that may be required but may combine limits from several different permits that may not have ever been collectively achieved together. CARB has since taken action to separate determinations and guidelines, and now requires determinations to be verified by a permit to operate or an authority to construct, and for the permitting authority to confirm whether or not the project has been completed and is in operation (CARB - a., 2022).

- **Different definitions make it difficult to compare information.** "BACT" and "achieved-in-practice" are important terms that are defined differently by each permitting authority. In California, the use of the term "BACT" for major sources in non-attainment areas is generally meant to mean "California BACT," which can be more stringent than federal LAER or federal BACT. For minor sources, "BACT" is typically equivalent to federal BACT. However, these definitions are not consistent across all permitting authorities, therefore the stringency level of each determination is not clearly identified or consistent. This is especially important when permitting authorities attempt to use the database to identify LAER. Under federal law, LAER is required for new and modified stationary sources in non-attainment areas under NSR. LAER is generally considered to be the most stringent emissions limitation contained in any SIP, or the most stringent emissions limitation that is "achieved-in-practice." The term "achieved-in-practice" is not defined under federal law, and is therefore defined by each individual permitting authority. The expectations of what is needed for a technology to be identified as "achieved-in-practice" vary greatly by permitting authority.
- **Different classifications and emissions limit units make it difficult to determine the minimum level of control required.** Each permitting authority may use different terminology to identify the emissions source, industry, and process impacted by the BACT determination. This terminology is then used to group information together to help categorize BACT determinations. Some permitting authorities may use more terms and classification codes when entering a BACT determination into a database to ensure the determination is applied more broadly to all sources with similar exhaust stream characteristics, while others may define the determination more narrowly which limits the scope of the determination. In most cases, the "class and category" is determined on a case-by-case basis. Additionally, once a group of similar determinations for a source or process are identified, the permitting authority may use different emissions limit units that are sometimes not easily convertible, leading to further confusion on what the most stringent technology required is today.

While many of these challenges are slowly being resolved in California, federal progress has been limited. The absence of database standards may appear to be a trivial concern, but a deeper evaluation reveals that the inconsistent approaches used to define and identify BACT have resulted in unanticipated and broad latitude across permitting programs, allowing for less stringent permitting decisions.

[8] Permitting authorities are required to submit LAER determinations to the RBLC (42 U.S.C. § 7503(d)) and receive section 105 grant funding for submitting this data, along with many other tasks.

3. Most technologies are entered into the RBLC on a voluntary basis

In many cases, adding BACT determinations to the RBLC is not required by law, and information is only entered on a voluntary basis.[8] In addition, technology is sometimes voluntarily installed on projects in attainment areas that do not trigger BACT. In these cases, a determination is never made. For example, when separate projects in South Dakota and Wisconsin utilized Tier 4 diesel backup engines, the projects were unknown by permitting authorities, and so Tier 3 engines continued to be installed when projects triggered BACT across the country. It wasn't until California's Public Safety Power Shutoff program increased demand for backup engines that these cleaner installations were discovered (CARB - b., 2020)

4. Clean technologies are not identified

One of the biggest issues with the RBLC is that it does not adequately identify clean technologies that should be considered during a top-down BACT analysis. Some permitting authorities will list alternatives that are technologically feasible but not cost-effective within their BACT guidelines. But this information is rarely entered into RBLC and other database systems. **Omitting cleaner technologies from the database systems used to determine what limits should be required in permits significantly hinders the advancement of technology.**

The availability of clean technology does not fit well into the existing BACT framework. Clean technologies that do not trigger air permits are always viewed as voluntary and are never considered "achieved-in-practice." This is because many of these clean technologies use alternative processes that may be considered by permitting authorities as "redefining the source." In some cases, technologies may require the same process as proposed by the applicant, but if a permit is not issued, the technology is not recognized within the existing database systems. CARB is attempting to resolve this issue by including a "next generation technology" module within their Technology Clearinghouse, but due to the number of emissions sources operating within the state, they are relying on public feedback to prioritize their technology evaluations.

Case Study: Lack of consideration for clean technologies (PureH2 Innovations)

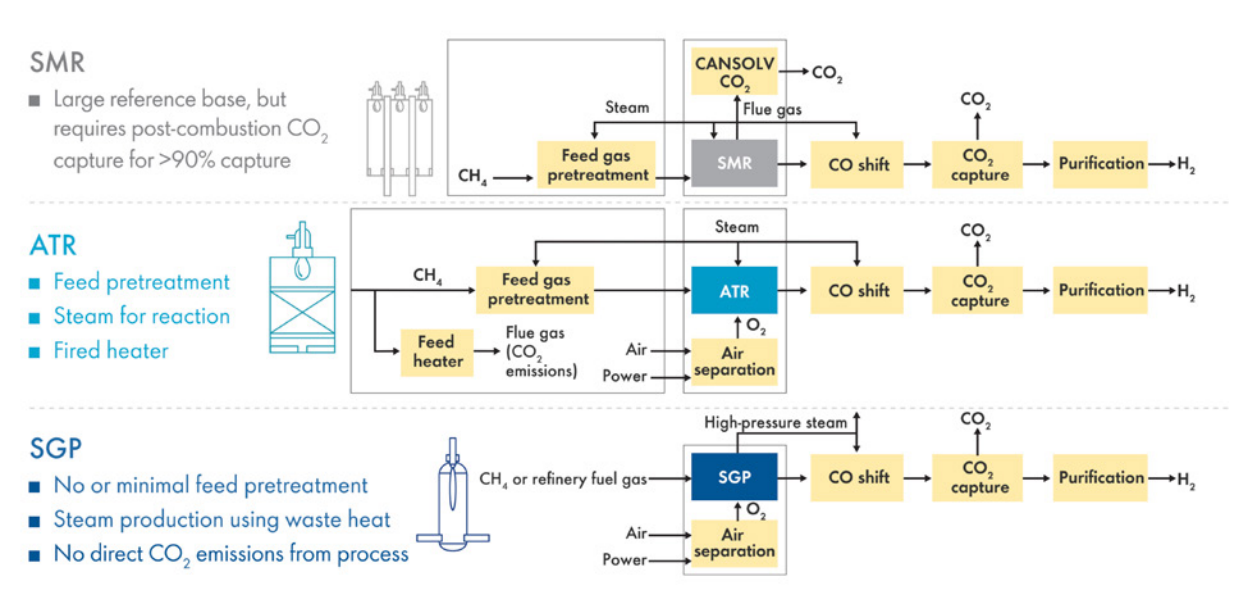
For the industrial sector, clean technology manufacturers provide technologies and processes that are not identified as BACT or LAER. Without regulatory support, these manufacturers have to rely solely on economics to encourage industries to effectively utilize options that achieve limits below existing standards. To do this, clean technology manufacturers must build relationships with industry and find participants willing to demonstrate their innovative technologies and processes. This often occurs outside of the purview of regulatory agencies, especially when sources are exempt from air permitting requirements. Today, some of the industrial technology manufacturers have chosen to deploy and demonstrate clean technologies overseas first. In these cases, some companies have found it difficult to enter the U.S. market without substantial incentive funding, even though their technologies are far more advanced in efficiency and cleanliness than those required under NSR.

For fear of damaging their relationships with industry partners and eliminating future business opportunities, technology manufacturers are often hesitant to share information about voluntary deployments with regulatory agencies. This case study explores the difficulties clean technology manufacturers face in the industrial sector, but the name of the technology company and associated facilities have been changed for the reasons described above.[9]

Naturally, this case study is not intended as a specific endorsement of the technology discussed—but as an example of why such technologies do not receive appropriate consideration in permitting.

PureH2 Innovations is a technology manufacturer that has developed a near zero-emission process to produce hydrogen, ammonia, and synthetic fuels. This new process was originally piloted in the United States and at scale in Europe and testing was done at the facilities to confirm the performance and emissions levels. Actual operating data was submitted to demonstrate near-zero criteria pollutant limit levels and exemption from permitting through Federal and State agencies. Additionally, Shell Blue Hydrogen is now using this same production process, Shell gas partial oxidation (SGP) at over a dozen hydrogen plants in Qatar outside of PureH2 Innovation's patent-protected areas (Figure A2-3). Yet, the U.S. EPA fails to recognize the technology as BACT.

Figure A2-3: Different Processes Used to Produce Blue Hydrogen. SGP is the Only Technology Listed That Does Not Produce Criteria Pollutant Emissions.



Source: Shell Blue Hydrogen White Paper (2020)

PureH2 Innovations has spent years working with industries to try and deploy this technology within the United States. In 2017, PureH2 Innovations began working with an ammonia producer, Golden State NH3, on a joint venture to develop an anhydrous ammonia fertilizer facility in a disadvantaged community in California. The partners were forced to apply for an Authority to

[9] Regulatory Agencies are encouraged to contact Evergreen directly to be connected with the manufacturer that provided this case study.

Construct (ATC) from the local air district to demonstrate it was a Low Emitting Unit. Following an eight-month engineering analysis, the equipment needed to produce ammonia, including vents and a flare, were all deemed to be exempt from air district permitting requirements due to their low emissions below two lbs/day. The ATC was issued for a combined cycle gas turbine to produce some or all of the electricity needed for the ammonia manufacturing plant on-site. On-site power was proposed after the electrical utility company determined that they would not be able to provide adequate power to the facility.

During this process, the air district was paid by the project applicants to perform an engineering analysis and review the actual operating data from a larger scale unit in Germany downsized for this project submitted by the applicant. The applicant asked that the air district issue a BACT determination based on the information reviewed and paid for an accelerated process. It was at this point that the air district told PureH2 Innovations that they could not issue a BACT determination because the emissions from the process were below Low Emitting Unit permitting exemption levels and therefore would not trigger the need for a permit. The district said that without an air permit application number, they were unable to enter a BACT determination into the RBLC.

PureH2 Solutions wanted to take whatever steps necessary to ensure that other new ammonia or hydrogen facilities would be aware of their technology during the permitting process. But without a BACT determination, the information would not be readily available. At this point, PureH2 Innovations asked the air district to issue a permit exemption determination for the process. PureH2 Innovations then provided this permit exemption determination to US EPA Region 9 to add the information to the RBLC. EPA headquarters provided guidance to use the ATC application number for entry into the RBLC because no PSD permit number existed.

This demonstrates that, short of extreme measures taken by the technology manufacturer, clean technology is not able to be entered into the RBLC, which is used by permitting authorities to determine available technologies. Further, even though PureH2 Innovations' technology was listed in the RBLC, it did not mean the technology was BACT because the RBLC is only a collection of information and the data entered does not have to be confirmed as BACT.

Despite these efforts, Pure H2 Innovations found that unless specific terms were searched for ammonia or hydrogen production in the RBLC, this permit exemption was not found. More than eighty-five applications have been granted PSD permits without considering their technology. Permit applicants can avoid considering this technology during a top-down BACT analysis by searching the RBLC narrowly. Today, the RBLC's listed processes are so fragmented that technology used for hydrogen or ammonia production with a steam methane reformer or autothermal reformer may be listed under specific categories such as "steam or gas preheater," or "gas heat exchanger." Before 2017, the categories were much less specific, and technology was much more easily identified for sources with similar exhaust stream characteristics. When PureH2 Solutions raised concerns to EPA about industries excluding their technology from BACT analyses, they were told that it was up to them to bring lawsuits against the applicants that violated BACT, and not something EPA was responsible for enforcing.

D. Inadequate Cost Evaluations

All too often, permitting programs rely on arbitrary cost-effectiveness thresholds, calculated as the cost to the *facility* per ton of pollutants avoided by the *facility*, even though the Act ultimately is concerned with providing benefits to the public. This mismatch between methodology and goal is not dictated by the statute, which prescribes neither a specific methodology nor any specific cost-effectiveness thresholds. Thresholds are often set by air permitting authorities in rules that are left unchanged for years, or determined by rule of thumb, with no consideration of larger public benefits from avoided pollution. The result is that permitting decisions often focus on the economic cost of pollution control, rather than the public benefits secured. This frame significantly slows the uptake of somewhat more expensive early-phase technologies, slowing pollution control progress.

The variability of cost evaluations is easily identifiable when comparing California air district cost thresholds for BACT. According to CARB, the cost thresholds for VOCs range from $40,797 to $17,500 per ton, and for PM10, from $34,717 to $5,300 per ton. It is important to note that the BACT cost-effectiveness thresholds may vary based on attainment with National Ambient Air Quality Standards (NAAQS) and may be calculated using different methodologies and interest rates, but there is a wide range of thresholds used for the five air districts compared by CARB (CARB - b., 2022).

Cost thresholds help evaluate the feasibility of controls based on a regional, rather than a local, need. As previously discussed, clean technologies are hardly ever considered during BACT evaluations, and many zero-emission technologies ultimately reduce costs to the facility itself, but not all do. Even comparatively more costly technologies may be appropriate to install in light of the CAA's technology-forcing and public-health-promoting purposes. Ultimately, Congress has determined that substantial costs to industry are worthwhile in order to secure more substantial public benefits. That judgment has been borne out. EPA has repeatedly determined that the CAA has yielded trillions in net benefits, outweighing costs by a ratio of more than 30 to 1. These benefits range from lives saved and illnesses avoided to the direct economic benefits associated with new technologies that have transformed entire industrial sectors.

In 2022, South Coast AQMD recognized the deficiencies of existing cost-effectiveness methodologies in their 2022 Air Quality Management Plan. South Coast AQMD determined that the existing NOx cost-effectiveness threshold of $59,000 per ton (2022) "may be too low to achieve the needed stationary source emissions reductions" and likely eliminates low and zero-emission technologies from consideration. The report contains the table below (Table A2-2) to help compare the NOx cost-effectiveness values of recent CARB regulations to the existing air district cost threshold (South Coast AQMD - c., 2022).

Table A2-2: Near-Term Cost-Effectiveness for Recently Adopted CARB Mobile Source Rules

CARB Regulation	Approximate Cost-Effectiveness (through 2032)
Airport Shuttle Bus	$430,000 NOx
Innovative Clean Transit	$271,000 NOx
At Berth (Ocean Going Vessels)	$120,000 NOx
Low NOx Omnibus	$39,000 NOx
Advanced Clean Trucks	$22,000 NOx

Source: (South Coast AQMD - c., 2022)

The need, therefore, is for EPA and permitters to revisit cost calculation and cost-effectiveness methodologies. This could include making modest but effective methodological adjustments, such as avoiding unduly low cost-effectiveness thresholds; adjusting thresholds regularly for inflation; setting higher thresholds for more polluting projects or those in areas experiencing more severe pollution; or eliminating arbitrary thresholds entirely in favor of holistic analyses of costs as a percentage of overall operating revenues or similar metrics. But EPA can also consider a broader set of social benefits, as OMB has recently advised for federal regulatory analysis. Ultimately, in light of the CAA's overall goals, cost considerations should only rarely eliminate technologies that produce substantial public benefit from consideration in the permitting process, especially in overburdened communities.

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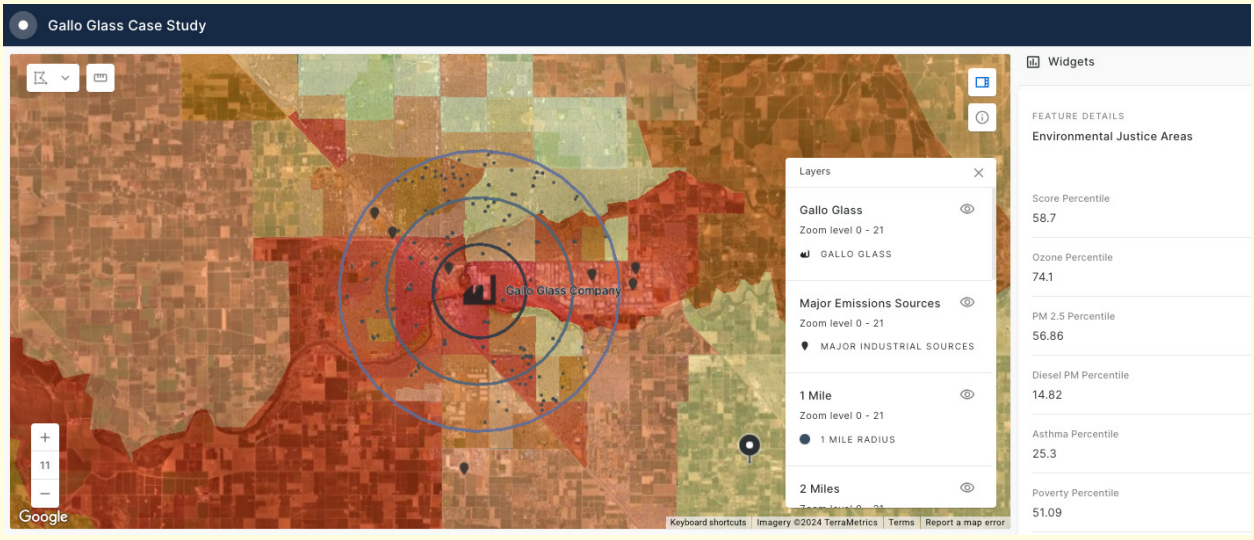
Case Study: Making the Switch From Electric to Conventional Equipment (Gallo Glass - Modesto, CA)

Commercially produced glass is typically manufactured by preparing raw materials, melting the materials in a furnace, forming the product, and then finishing. Glass manufacturing is often considered a “difficult to decarbonize” industrial sector due to the high amounts of heat required to melt glass in furnaces. Emissions limits that apply at commercial glass-making facilities may vary based on the facilities’ location, furnace size, the end product (e.g. flat glass, container glass, blown glass, etc.), and other factors.

In California, glass furnaces are typically fueled by fossil fuels including natural gas and oxy-fuel. In the 1970s, there was a surge in demand for electric glass furnaces due to high oil and natural gas prices. Between 1960 and 1980, Toledo Engineering Co. (TECO), a worldwide leader in glass plant projects, built over 100 all-electric glass melters. The company has found in more recent years, energy preferences have shifted away from electricity “largely due to new availability of low-cost gas and oil and volatility of the electric markets. More recently, with the decreasing cost of oxygen generation, oxy-fuel melting has become an attractive alternative to electric melting.” As a result from 1980 to 2005, the company only built about 20 new electric melters. In 2005, TECO performed an economic evaluation for a client to compare the cost of a new 77 tons per day (TPD) melter in California. The evaluation found that at that time the cost for the oxy-gas melter would be $39/ton of glass, while the cost for electricity alone was $70/ton of glass when industrial electricity costs were $0.095/kWh (Hibscher et al., 2005, 3).

The largest glass plant in North America is Gallo Glass Company which operates a container glass manufacturing operation in Modesto, California. The facility is located in an industrial area within a state-designated disadvantaged community (Figure A2-4).

Figure A2-4: Interactive Map of the Community Surrounding Gallo Glass in Modesto, California with Demographic Data Summarized at 1, 2, and 3 miles from the Facility



In 2017, San Joaquin Valley Air Pollution Control District (APCD) received an authority to construct (ATC) application from Gallo Glass Company, which is a Title V facility, to demolish glass furnace #3 and rebuild a larger furnace with an increased throughput from 352.1 to 430 tons of glass produced per day. The ATC also included a proposal to replace three existing electric lehrs with 5.0 MMBTu/hr natural gas lehrs, which are tunnels that the formed glass passes through during the annealing process. The furnace and lehrs both operate 24 hours a day, 365 days per year. The pre- and post-project annual emissions associated with the proposed project are Summarized in the table below (Table A2-3).

Table A2-3: Criteria Air Pollutant Annual Emissions Associated With the Proposed Glass Plant Project

Pollutant	Furnace #3 (Oxy-fuel)		Lehrs (Natural Gas) - EACH	
	Pre-Project Annual lbs/year	Post-Project Annual lbs/year	Pre-Project Annual lbs/year	Post-Project Annual lbs/year
NOx	167,072	204,035	0	3,197
SOx	127,231	149,103	0	125
PM 2.5	41,151	50,622	0	333
PM10	58,382	71,299	0	333
CO	1,285	1,570	0	657
VOC	2,570	3,139	0	241

The project triggered a Federal Major Modification for NOx emissions from furnace #3 and the lehrs. Additionally, the project triggered SB 288 requirements which prohibit backsliding in California. Therefore, CA BACT (which at a minimum requires LAER) was triggered for NOx, Sulfur Oxides (SOx), and PM 10 from both the glass furnace and lehrs. The top-down BACT analysis performed for furnace #3 identified the limits achieved-in-practice based on San Joaquin Valley APCD's BACT guideline 1.5.9 for container glass furnaces. In San Joaquin Valley APCD BACT guidelines are required to be updated every 5 years. Electric furnaces were identified as an "alternative basic equipment" which is defined by the air district's BACT policy as "emitting less air pollutants than the basic equipment or process proposed by the

applicant." The electric furnace option was excluded from the evaluation because the project was a modification, and the district's BACT policy states that alternative basic equipment is only considered for new equipment (San Joaquin Valley APCD, 2022). In this case, the applicant proposed the achieved-in-practice limits for the glass furnace, therefore a cost-effectiveness analysis was not required.

For the three new lehrs, the control technology options evaluated were based on San Joaquin Valley APCD's BACT Guideline 1.5.10 for container glass lehrs. This guideline contained achieved-in-practice emissions limits for NOx, and required the use of natural gas to control PM10 and SOx. The alternative basic equipment listed was the use of an electric lehr, which was the equipment the natural gas lehrs were replacing. The air district reviewed the RBLC and CARB, South Coast AQMD, and Bay Area AQMD's BACT Clearinghouses, but no BACT guidelines were identified for container glass lehrs. The top-down BACT evaluation found that the electric lehrs were not achieved-in-practice because they were alternative basic equipment. A cost effectiveness evaluation found that the annualized cost of the electric lehr was $132 k/year compared to $43 k/year for the use of a natural gas lehr. Therefore the achieved-in-practice lehr limits were required (San Joaquin Valley APCD - a., 2017).

Separate from the permit application, the project triggered a California Environmental Quality Analysis. This analysis found that the project had less than significant impacts on GHGs, finding that because the facility is subject to CARB's Cap-and-Trade programs and any growth in emissions must be accounted for under the cap. San Joaquin Valley APCD found that "facilities subject to and in compliance with CARB's Cap and Trade requirements will not, and in fact, cannot, contribute significantly towards any global GHG emissions growth" (San Joaquin Valley APCD - b., 2017).

E. Dependency on Resource Intensive Enforcement Actions

Functionally, the current permitting program is exceedingly difficult to enforce. For instance, EPA spent thirteen years between filing an NSR enforcement action against DTE, a major Michigan utility polluting communities of color, and final approval of a settlement agreement. These timelines are not at all uncommon, because gathering the information needed for an enforcement case is exceedingly difficult. How does one conclusively prove an unmonitored source actually emitted over emissions thresholds in prior years, for instance, or compellingly challenge an engineering claim on technological feasibility before a non-expert jury? It's no wonder that senior EPA personnel have deemed the program deeply flawed. Further, because each aspect of an enforcement case turns on subtle judgments, administrations hostile to environmental protection have had little difficulty in functionally waiving enforcement altogether by announcing that they will not second-guess industry claims.

Program oversight is a key element of any enforcement program. The very best regulatory programs deliver emissions reductions, without being overly complex or requiring a significant

amount of Agency resources, including enforcement staff. There is a great example of the resources required to enforce NSR for coal-fired power plants in Cynthia Giles' book "Next Generation Compliance." In this book, Giles recognizes that "NSR is the opposite of a tight box" (Giles, 2022, 42).

Under the CAA, new or modified coal-fired power plants are required to apply for an NSR permit and must meet, at a minimum, New Source Performance Standards (NSPS) emissions standards. As previously discussed, determining when NSR is triggered for a modification is determined based on a case-by-case project evaluation, which for coal-fired power plants was "fiercely contested." For these facilities, the cost of installing modern emissions controls was so high that many facilities chose to argue that the regulatory requirements did not apply because their projects did not trigger NSR - an argument that could be made because of the complexity of the program. Ultimately, determining if NSR applied was "subject to a highly technical debate" (Giles, 2022, 36-38).

Another enforcement challenge with NSR, is that the facility operator determines if requirements are triggered, and if not, the permitting authority does not need to be notified about the modification. Due to the high cost of compliance, low visibility of the facility modifications, and low cost of penalties, the NSR program encouraged non-compliance in this sector. Ultimately, EPA ended up suing "70 percent of the top 25 coal-fired companies" and the evidence collected revealed that most had "significant renovations without undergoing NSR." This was a huge undertaking and "the resulting enforcement dominated the docket at EPA and also the [DOJ] for the next two decades." Expecting EPA and permitting agencies to devote this level of resources for each source category is not realistic. These problems are endemic to the program as designed, but they can at least be lessened by a sustained structural focus on moving the program away from combustion.

An important part of air permitting enforcement is the involvement of local community advocates in helping to identify ground-level issues. In many cases, the community members are much more familiar with potential enforcement concerns than regulatory agency staff because they have first-hand experiences witnessing issues such as excess smoke and odors. In some cases, environmental justice organizations have become increasingly involved in "citizen surveillance" actions, where work is performed to evaluate potential problems and bring their concerns to regulatory agencies. A great example of this is the community-led efforts to evaluate the validity of emissions reduction credits issued by San Joaquin Valley APCD.

As part of environmental justice programs, some states are moving forward with commitments to prioritize enforcement activities in overburdened communities. In Illinois, the Chicago Department of Public Health (DPH) originally adopted standards and requirements for Recycling Facility permits in 2014. In 2020, Chicago DPH adopted another rule specifically aimed at Large Recycling facilities. The 2014 rule requires recycling facilities to pass a compliance history evaluation before being issued a new permit or renewing an existing permit (Chicago DPH Article XX, Section 11-4-2510). The rule also provides the Commissioner with clear authority to deny any permit that does not pass the compliance history evaluation. Separately, the 2020 Large Recycling Facility rule requires applicants "to demonstrate that the proposed facilities will be

designed and operated "in a manner that prevents public nuisance and protects the public health, safety, and the environment" (Arwady, 2022).

In 2020 the Chicago DPH received a Large Recycling Facility permit application from General Iron[10], a scrap metal recycling facility. In response to community concerns over the proposed project, EPA recommended to Chicago DPH that the city complete an environmental justice analysis, which is similar to a health impact assessment. The findings of this assessment document that concerns over "unique risks to the environment, health, and quality of life" were found, and that part of the facility includes "certain areas that are more vulnerable to pollution than Chicago overall." Additionally, the city documented several enforcement concerns, including a failure to obtain operating permits for some of the equipment on-site. Ultimately, the city denied the permit based on Chicago DPH's finding that the facility poses a risk to a vulnerable community, and concerns over the facility's ability to comply with rules and permit conditions in the future (Arwady, 2022).[11]

Case Study: Need for Public Transparency To Support Citizen Surveillance (Emission Reduction Credit Review)

Emissions reduction credit (ERC) programs originated in the 1970s under the CAA, in an effort to address significant air pollution problems. The concept was that providing a "quasi-market based mechanism" would incentivize over-compliance by some emissions sources, and the offsets generated could be traded or purchased by facilities that could not cost-effectively reduce their emissions. ERCs are in particularly high demand in National Ambient Air Quality Standards National Ambient Air Quality Standards (NAAQS) nonattainment areas (CARB - c., 2020). One popular way to generate ERCs today is by installing zero-emission equipment (beyond regulatory requirements).

In 2017 Earthworks released a report, which examined how natural gas operators in Pennsylvania were "deliberately underestimating their air emissions in order to avoid the more stringent pollution control and project review requirements of federal [Title V] permits for major emissions sources." Following the publication, Earthworks began working with California partner organizations, including Central Valley Air Quality Coalition (CVAQ), that were similarly concerned about the San Joaquin Valley APCD's emission reduction credit (ERC) system. The San Joaquin Valley has some of the worst air quality in the nation, with most areas within the region identified by the state as environmental justice communities due to the exposure of low-income communities and communities of color to significant environmental hazards. CVAQ had been actively investigating oil and gas facilities in San Joaquin Valley for years to determine pathways that industry might be using to avoid reducing emissions.

In early 2018, Earthworks submitted a public records request for air district records and spent months sorting through the records trying to understand how the ERCs were connected to

[10] The name "General Iron" is commonly used, but other names include Southside Recycling and Reserve Management Group.
[11] As of June 2023, the permit denial was reversed by the Chicago Administrative Law Judge, sparking discontent. The city of Chicago had 35 days to appeal, which Mayor Brandon Johnson did on June 30th, 2023. Hearings are ongoing.

different permitting actions. By November 2018 Earthworks released a report that found that "a significant proportion of ERCs in the San Joaquin Valley APCD's bank appear to be invalid" (Steinzor & Baizel, 2018). On January 24, 2019, several environmental justice and public health organizations testified at CARB's Board Hearing to request that the state conduct an audit of San Joaquin Valley APCD's ERC bank.

In April 2019, CARB hosted an initial kick-off public workshop for the ERC review. As an oversight Agency, CARB is not a permitting authority and therefore does not have direct access to air district records, including air permits. Air district rules and policies establish publish notice requirements and if, and when, air permits are sent to CARB, however, Title V permits are submitted to EPA for review prior to issuance (CARB - b., 2022). To conduct the ERC review, CARB sent information and data requests to San Joaquin Valley APCD, and the air district provided electronic copies of hundreds of documents and access to their online permitting database to conduct the review.

As a result of the ERC review, CARB found that the ERC program needed to be more transparent to the public and industry, policies and procedures needed to be upgraded to be more rigorous, and the air district's assumptions in the equivalency determination needed to be reviewed and revised (CARB - c., 2020). The findings of the ERC review were shared with CARB's Board on June 26, 2020. **But it remains the case that full ERC system has not been reformed, and community groups are litigating the validity of existing permits based on the existing system.**

F. No Clear Regulatory Mechanism to Address Adverse Impacts

Politicians, regulatory agencies, and community residents are demonstrating clear interest in reducing emissions from the industrial sector. The record-breaking incentives offered through the IRA demonstrate the federal government's clear support of reducing GHGs from industrial sources across the nation. At the same time, a heightened interest also exists in reducing local impacts from industrial sources. The number of Title VI complaints filed related to air permitting concerns is increasing, and the federal government is encouraging permitting authorities to take action to address adverse impacts from industrial sources. These competing programs are doing two things: 1) Sending mixed signals to industry, which may further delay their technology decision-making process due to valid concerns over making poor investments with their limited capital; and 2) Relying on states to rapidly develop regulatory programs to address community concerns, using vague and sometimes inconsistent guidance from EPA.

What is missing from this equation is a unified message from EPA, supported by regulatory action. For environmental justice and Title VI programs, it is unreasonable to believe that every permitting authority in the nation will design and adopt its own individual programs to address adverse community impacts. Just as the public often assumes that the government will prevent public exposure to any unsafe pollutants, industries often assume that if they meet all federal,

state, and local requirements, they will meet all regulatory requirements. Today this isn't the case. As demonstrated by the Title VI complaints and the permit denials being issued by some state and local permitting authorities, this landscape is rapidly evolving.

Permitting authorities are beginning to adopt rules and regulations that allow for permit denials, which is something that was not historically done if the permit applicant was compliant with all rules and regulations. At the time of writing, in all cases where permits have been denied due to environmental justice or civil rights concerns, the denial has been based on a rule or policy that gives the agency clear authority and a process to deny the permit. In some cases, these programs require emissions reductions beyond the limits defined as BACT or LAER, or on-site mitigation. Permitting authorities are realizing that they need to address flaws in the existing permitting programs and conduct evaluations on a case-by-case basis to avoid adverse impacts in overburdened communities.

The industrial sector is not the same as the transportation sector and cannot be treated as such. For mobile sources, typically a regulatory agency will procure vehicles, test new controls, develop regulations to require new controls by a specific date, and then the controls will begin to be installed on new vehicles by a specific model year. For industrial sources, sector-wide requirements are a great first step and will provide a clear signal to industry to make investments. Ultimately, each industrial source must be dealt with individually through the permitting process. To spur additional investments from industry to minimize local impact, EPA needs to send a stronger message on program expectations and all the regulatory mechanisms available to address adverse impacts. Taking decision action will reduce the risk of stranded assets as future community concerns are raised.

Case Study: Inability to Address Adverse Emissions Impacts (Vehicle Triage Center)

The community of Bayview Hunters Point in San Francisco, California has a long history of environmental justice issues, including radioactive waste contamination. Bayview-Hunters Point has "long served as San Francisco's dumping ground," which includes one of the most polluted Superfund sites in the country. The majority of the city's sewage, garbage, and recycling is processed there, and the area includes heavy industrial facilities and a naval shipyard, surrounded by diverse low-income residential neighborhoods. Several California community assessment tools have confirmed that the area has high air pollution impacts and health inequities, and is considered one of the least healthy places to live in the Bay Area. There are also higher cancer and disease rates and nearly 90 percent of residents are minorities (Bay Area AQMD - b., 2022).

In October 2021, the City of San Francisco approved a new "Vehicle Triage Center" project in Bayview Hunters Point. The center, which opened in January 2022, provides services for unhoused individuals living in their vehicles, including electricity, water, and sewer. Originally, the center opened with 53 parking spots, but the city has plans to expand to 135 parking spots during the two years of operation it was approved to operate for. The site selected to operate the center has electrical utilities, but upgrades would be needed to provide permanent power to the site.

This means that in order to operate, prime diesel-powered engines have been brought in to provide power until the electrical upgrades are completed. In the original proposal, the City of San Francisco committed to removing the diesel generators and providing electrical power from the grid by the spring of 2023. In October 2023, the San Francisco Board of Supervisors voted unanimously to approve a two-year operating extension for this center, despite its continued reliance on diesel engines (Kukura, 2023).

In January 2023, a citizen group filed a lawsuit in federal court against the City of San Francisco. The complaint alleged that the city operated 16 generators for several months without obtaining any air permits. The plaintiff claimed that the city was still operating the 16 generators when it filed for authority to construct with Bay Area AQMD and failed to disclose the on going use of diesel engines (CBS News, 2023). Prior to this lawsuit, Bay Area AQMD had issued public notices in August 2022 and December 2022 on an application they received for authority to construct at the Vehicle Triage Center. The application was for the use of three temporary prime generators, including two Tier 4 diesel-powered generators and one liquified petroleum gas (LPG) generator to provide temporary power to the site until upgrades were made to the grid.

In the permit evaluation completed by Bay Area AQMD, the district evaluated the emissions impacts on the community. All three engines had toxic air contaminant emissions for diesel PM that exceeded trigger levels, requiring health risk assessments. Bay Area AQMD evaluated the operation of the engines to determine if they exceeded cancer risk thresholds. Because the engines were operating within an overburdened community, they were required to comply with a lower cancer risk threshold of 6.0 in a million, based on requirements set forth in air district rules. The impacts of the engines were modeled over a three-year period, and the cancer risk was determined to be around 1 in a million for the diesel engines, and 0.33 in a million for the LPG generator. Additionally, permit conditions were put in place to specify exactly where the engines could operate, a minimum stack outlet height, and operational restrictions. The two diesel engines are not permitted to operate more than 678 and 801 hours per year. The LPG engine can be operated for up to 2,352 hours per year (Bay Area AQMD - c., 2022).

Despite clear concerns raised by community residents, Bay Area AQMD was unable to stop this project because the permit application met all state, local, and federal requirements. Instead, the air district worked within its existing authority to minimize emissions impacts by utilizing permit conditions and encouraging the use of engines that met BACT limits (BACT was not triggered). Bay Area AQMD has worked closely with this community for years and has provided air filtration systems to residents, as well as air grants and other initiatives to build community capacity. In 2023, the air district supported the community's nomination to be selected for a community emissions reduction plan under CARB's Community Air Protection Program. This program will allow residents to develop a plan to reduce emissions exposure and provide additional funding.

Most recently, Bay Area AQMD was able to directly address community concerns associated with this project, by providing a battery system to the City of San Francisco, which resulted in the permit application being withdrawn.

Appendix 3: Upcoming Actions Heightening the Need for Reform

A series of science-based federal and state regulatory actions are just around the corner that will enhance the need to deploy clean technologies. From strengthened federal National Ambient Air Quality Standards (NAAQS) to a series of sector-specific decarbonization rules, the current regulatory landscape underlines the need to update the existing permitting and planning structure and shift away from polluting fossil fuel combustion.

A. Updates To Federal Ambient Air Quality Standards

The Environmental Protection Agency (EPA) has regularly tightened the NAAQS, triggering rounds of state planning to attain them, per Section 110 of the Clean Air Act (CAA) (and related provisions). But as combustion sources persist, attainment has proven increasingly challenging.[12]

In principle, the CAA's stationary source permitting programs are meant to support attainment.[13] But in practice, permitting programs have been underused because clean technologies are not regularly required, meaning a substantial residual of stationary source pollution remains in state inventories.

This combustion hangover is about to become more acute. EPA is lowering the national PM2.5 NAAQS from its current annual standard of 12 micrograms per cubic meter to between 9 micrograms per cubic meter. EPA is also in the process of revising the ozone NAAQS, likely by 2026 or sooner, and the science suggests a tightening of over 10 percent from the current standard. In each of these regions, stationary source programs, by law, must consider tightening permit limits for existing and new or modified sources. Once these processes are completed, planning will be required for air basins across a wide swath of the country.

In addition to NAAQS updates, the bar is also being raised in other ways on what will constitute an approvable State Implementation Plan (SIP). In October 2022, EPA published a proposal to disapprove the San Joaquin Valley Air Pollution Control District's (APCD) 2012 Particulate Matter (PM) 2.5 SIP, based on "adverse comments submitted." Several reasons for the disapproval were cited, including environmental justice and civil rights concerns. The notice reaffirmed EPA's commitment to environmental justice and Title VI, stating that the "new SIP development process provides an important opportunity for CARB and the District to identify potential adverse disparate impacts on the basis of race, color, or national origin from its revised Serious area

[12] California, which has the worst air in the country, is a good example of the challenge of attainment. Even at current NAAQS levels for ozone, CARB has been candid that very significant reductions are required. For California to meet its own standards, CARB has asked the federal government to introduce major controls on long-underregulated interstate mobile sources such as trucks, ships, and trains along with a continued focus on stationary sources.

[13] Section 165 of the Act requires source permitting to be consistent with the NAAQS

plan for the 2012 annual PM2.5 NAAQS and address them as appropriate." In the notice, EPA also acknowledges that guidance on the implementation of SIPs (42 U.S.C. § 110(a)(2)(E)) is "forthcoming" and will address SIP necessary assurance requirements (42 U.S.C. § 110(a)(2)(E)) as they relate to Title VI. EPA recommends that CARB and San Joaquin Valley APCD refer to the available EPA Title VI and environmental justice guidance resources when developing the SIP. EPA also volunteered to provide technical assistance on Title VI compliance to CARB and/or the District as they develop the revised SIP (US EPA - b., 2022). This is the first time EPA has made an explicit written request for a state to consider Title VI guidance in the federal register, therefore raising the bar on expectations for an approvable SIP.

B. Pending Federal and State Standards for Power Plants and Industrial Facilities

In principle, the CAA requires EPA to update its "new source performance standards" (NSPS) under Section 111 every eight years, requiring new and modified industrial sources from a wide range of source categories to meet a minimum standard consistent with the best system of emission reduction (BSER). Existing sources of greenhouse gasses (GHGs) must also make reductions consistent with state plans established in response to EPA guidelines issued under Section 111. EPA is in the midst of implementing sets of standards and guidelines for power plants by the end of 2024 and is expected to continue forward with programs for other industrial sectors in the coming years, as the law and science require. EPA intends these Section 111 standards to support NAAQS attainment where relevant.

Over time, new source review (NSR) should also advance the technology required by sectoral rules, as innovations from individual permits get exported to sectors as a whole during the regular eight-year updates. To repair this broken system, air quality permitting and regulatory teams must work closely together to ensure that permitting programs are updated to support the commercialization of clean technologies. Improving air permitting programs can significantly reduce air pollution from existing sources over time, providing emissions benefits, especially in communities of color already experiencing disproportionate pollution impacts.

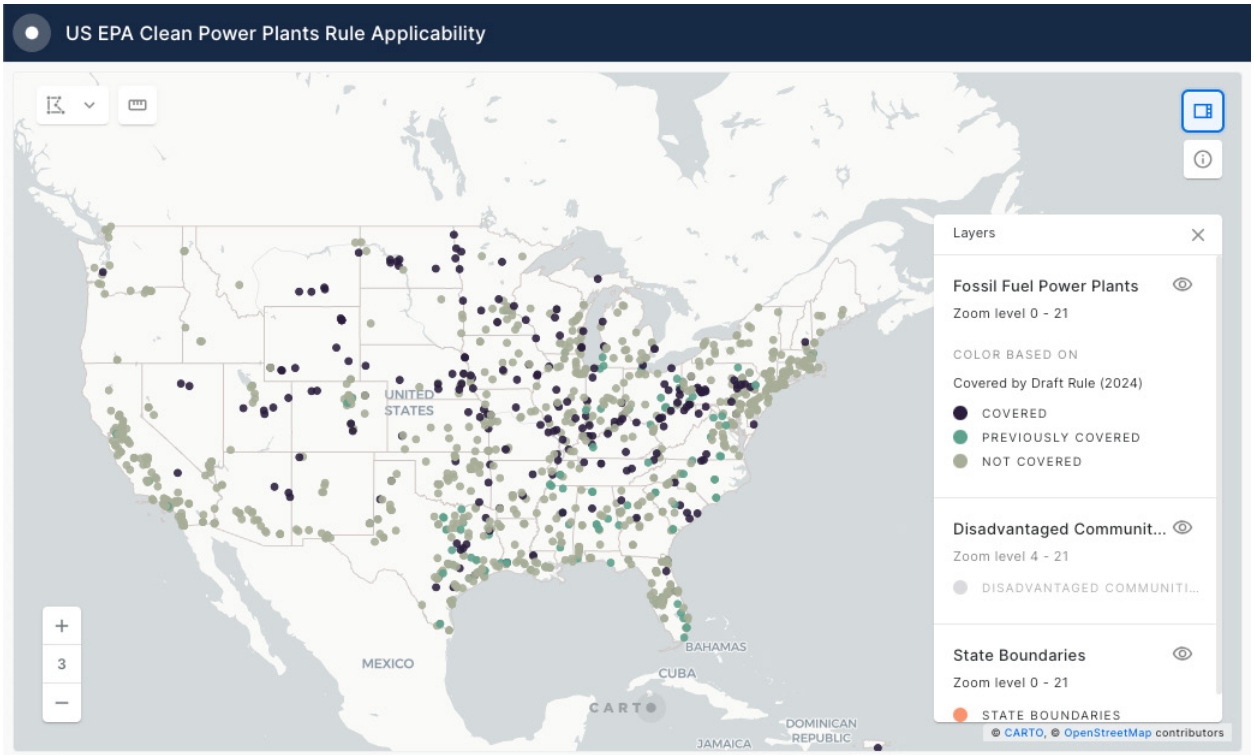
1. Clean Power Plants Rule

EPA is on the verge of finalizing carbon pollution rules for new and existing power plants under Section 111(b) and 111(d) of the CAA. These rules generally set their stringency based on the use of either hydrogen co-firing or carbon capture utilization and sequestration (CCUS), but existing and modified facilities need not necessarily comply by using either technology. Instead, once federal guidelines are finalized, the CAA allows states the discretion to implement their own compliance plans to achieve the equivalent control level. States could achieve compliance using these technologies, but could also include facility retirements and replacements with clean renewable energy or other technologies.

EPA anticipates widespread benefits from its Section 111 rules and has encouraged robust engagement during the compliance planning process A recent report from the Tishman Environmental Design Center summarizes how the climate crisis and local pollutants are

closely linked together, yet few policies address these pollutants in a comprehensive manner. To evaluate the potential implications of the proposed rulemaking, the authors selected three states and conducted a spatial and emissions analysis of existing power plants. They found that 70 percent of power plants built or modified since 2000 were located in an environmental justice community. The report states that "[i]t is imperative that federal, state, and local strategies used to reduce carbon dioxide (CO_2) emissions also reduce co-pollutants in environmental communities and not allow co-pollutant emissions to increase or even remain at existing levels in these areas" (Sheats et al., 2023).

Figure A3-1: Interactive Map of Power Plants That May Be Subject to EPA's Proposed 111 Rules



In response to the environmental justice concerns raised, EPA has suggested that state compliance plans may help address these concerns. While plans may help address these issues, the air permits of covered power plants also warrant close attention. If the installation of control technologies triggers NSR, or a re-opened Title V permit, there may be opportunities to consider replacements of combustion facilities or, at least, much stricter pollution limits that can also reduce cumulative impacts. But such implementation work can proceed most effectively only if the air permitting system itself can recognize the value of clean technologies.

2. Industrial Source Decarbonization

There is a clear federal interest in decarbonizing the industrial sector due to growing concerns about climate change and the need to reduce GHGs. Federal agencies can boost impact if they commit to implementing strong permitting and standards. This will send a clear market signal, driving industrial decarbonization by steering significant federal funding and catalyzing private

sector investment. Because regulatory programs create the guidelines for funding choices and can accelerate and generalize technological progress via the CAA's various upward ratchet mechanisms, it is crucial that these programs be able to recognize progress made by multi-billion dollar investments from Congress.

Recent federal investments in industrial decarbonization are manifold. They include over $6 billion in Department of Energy (DOE) one-time funds for innovative decarbonization projects and the 45X and 48C tax credits, which can support emissions reductions at existing and new facilities. Specifically, the 45X credit supports renewable energy provision and the 48C credit can support emissions reductions at sources, among other uses. The 45V credit for hydrogen production provides clear guidelines on what is considered clean technologies, to ensure that the push for cleaner fuels doesn't increase local emissions. Combined with the DOE's major demonstration project program, these credits could generate a wide range of technological choices and innovations that could become the basis for best available control technologies (BACT) and other permitting and sectoral regulatory standards. Indeed, that is how the Act is intended to work—to pick up on major innovations at any particular facility and spread them nationally via permits and standards.

Under the Inflation Reduction Act (IRA), DOE has created its Industrial Demonstration Program, which focuses on the highest-emitting and hardest-to-abate industries. The program has several priorities, including providing market viability for piloted technologies, technologies deployed internationally but not in the U.S., or emerging technologies that face market or adoption risks. One of the program goals is to provide a "path from demonstration to deployment" and to spur "non-federally funded follow-on investments" (DOE, 2023).

The CAA should be a force multiplier for these investments. But whether it can be—or whether these investments fail to spread—turns heavily on the NSR program and, ultimately, on the Section 111 standards and SIP planning programs as well. EPA and state and local permit bodies must be able to recognize clean technologies developed with federal funding support, as BACT, lowest achievable emissions rate (LAER), and BSER. This may mean modifying state and local policies to ensure that projects awarded federal funding or operating outside of the U.S. **become the new floor for new and modified sources that trigger NSR** (see Achieved-in-Practice on pg. 41). If they do not, then these investments will be far less effective than they should be at lowering carbon pollution in the industrial sector. The CAA works best when it drives technological and industrial progress forward, and it does that by incorporating innovations into new permits and standards. It needs to do so now, or risk significantly weakening both the nation's decarbonization potential and the ability of American industry to modernize and compete in a decarbonizing world.

In addition to unprecedented amounts of available federal funding, some states are also moving forward with new programs to spur sector-specific decarbonization. In 2021, California adopted SB 596 (Becker, 2021), which requires CARB to develop a comprehensive strategy to achieve net-zero GHG emissions by 2045. Concurrently, CARB is also proposing updates to its Cap-and-Trade program, which limits GHG emissions from large industrial sources, including cement plants.

In response to California's cement decarbonization efforts, the Coalition for Sustainable Cement Manufacturing & Environment submitted comments in October 2023 on the proposed amendments to the Cap-and-Trade program. The letter stated that CARB has had a "strong track record of success that was built by adhering to a handful of key principles" including "creat[ing] a **predictable regulatory environment** that **encourages allocating capital** to the long-term investments needed to reach carbon neutrality" and "develop[ing] **sector-specific approaches** that balance the desire for a unified framework with the need to recognize that different industries face different challenges and circumstances with respect to decarbonization" (Guerra, 2023). As demonstrated by the cement industry letter, industries are often hesitant about making big investments in technologies when not directly required to make changes. This is especially true for industries that are at high risk for leakage.

For regulatory agencies seeking to decarbonize the industrial sector, air permitting programs can provide valuable lessons learned on the trials and failures to advance "innovative technologies." Existing air permitting programs that have historically driven technology requirements at stationary sources offer no reward for overcompliance, only disincentives. These disincentives can be enforcement-related, for example, when new technology underperforms and fails to meet permit limits and must pay an enforcement penalty. Another disincentive is the financial risk associated with overcomplying and potentially setting a new floor for LAER. Some industry associations have discouraged overcompliance in the past due to concerns over new or modified sources having to meet more stringent requirements in the future. Air permitting authorities are sometimes aware of this issue, but are concerned that if they push too aggressively with regulatory requirements, there is a risk that industries will relocate to areas with less stringent programs and standards.

Another huge hurdle that regulatory agencies must overcome when decarbonizing the industrial sector includes concerns over stranded assets and limitations in capital funding. In many cases, industries are hesitant to spend their limited capital on GHG abatement or mitigation, without regulatory certainty. These concerns are amplified by the fact that several competing programs, not just climate programs, are demanding more stringent control of industrial sources. Newer guidance issued on environmental justice and Title VI is exploring new mechanisms permitting authorities can use to deliver local benefits.

Appendix 4: Technical Reform Recommendations

This appendix describes a host of technical steps which United States Environmental Protection Agency (EPA) and local governments can explore, in partnerships with advocates and communities, to implement reforms noted in the body of the report.

A. Recommended EPA Action

1. Ensure Projects Trigger New Source Review (NSR)

Environmental Protection Agency (EPA) has significant opportunities to clarify to permit writers that they can close key permitting loopholes, and eliminate or reduce problems associated with netting and with permitting of new sources in sensitive areas.

The Environmental Protection Agency (EPA) is currently re-considering the Trump Administration's Project Emissions Accounting Rule. This rule both opens opportunities to increase source-wide emissions without complying with NSR and renders facilities' compliance calculations even more opaque to state and federal permitting authorities (85 FR 74,890). EPA should promptly complete a rule squarely establishing that: (1) facilities must account for all contemporaneous emissions increases at the source when determining whether any change produces a net emissions increase; and (2) consequently, sources may only rely on offsetting emissions decreases if they follow the contemporaneity, source-wide, and enforceability requirements described in "step 2" of EPA's netting regulations (40 CFR 52.12(b)(3)(i)(b). EPA should further require that all sources relying on emissions decreases, or ascribing emissions increases to demand-growth, comply with the recordkeeping, monitoring, and reporting requirements of its "reasonable possibility" rule (40 C.F.R. 52.21(r)(6)).

One way to further reduce opportunities for NSR evasion is to consider providing guidance to regulatory authorities as a reminder that they have the legal authority to define thresholds that trigger NSR in their own individual programs. Rather than establishing regional thresholds, permitting authorities should be encouraged to consider lower thresholds that apply based on the facility's location, such as within disadvantaged communities. For example, in 2021, Bay Area Air Quality Management District (AQMD) adopted regulatory amendments to their NSR for Toxic Air Contaminant Rules to set more stringent health risk limits for projects located in overburdened communities that trigger a health risk assessment (Regulation 2-5-302.1). These limits were reduced from 10 in a million down to 6 in a million, and these facilities are also subject to additional public notice requirements (Bay Area AQMD - a., 2022). This is an example of an action that can be taken by permitting authorities with separate air toxic programs.

Another option is to set lower thresholds based on the category of source. This pathway would ensure that specific categories of sources with a high level of community interest, or categories that are especially prone to grandfathering, would trigger NSR for new or modified sources. One permitting authority, Sacramento Metro, has even set a 0 tons per day (TPD) PTE trigger level for new emissions units at major source facilities in their NSR rule (Rule 214). Theoretically, a similarly low trigger level could be set for categories of sources that are seeking to install carbon capture utilization and sequestration (CCUS) to ensure NSR is triggered and that criteria and toxic air pollutants are considered and reduced during the permitting process.

2. Provide Regulatory Support for Clean Technologies

One of the most critical actions that EPA needs to take immediately is to provide clear guidance on the terms redefining the source and achieved-in-practice—including scrapping any aspects of the doctrines that are inconsistent with the Act's clear technology-forcing intent. These aspects of the draft 1990 manual should no longer be constraining technology advancement in the 2020s. New guidance should clarify that clean technologies, including zero-emission and advanced conventional technologies that abate or eliminate emissions to levels below permitting thresholds, must be considered during a top-down best available control technology (BACT) analysis and can also become achieved-in-practice as lowest achievable emissions rates (LAER).

In regards to redefining the source doctrine, the guidance should also clarify that ***clean technologies must always be identified*** during step 1 of a BACT analysis. This includes the use of alternative fuels, processes, equipment, and controls. In almost all cases, these technologies should not be removed due to concerns over redefining the source. EPA must acknowledge that permitting agencies have the authority to determine requirements and what constitutes redefining the source, but should encourage them to remove an option from consideration only if it meets one of the following conditions:

1. If the cost of the required equipment, controls, processes, or fuels would prevent any new industries from operating (similar to LAER), unless the project will result in disproportionate impacts on an overburdened community; or
2. Requiring the use of alternative fuels if the entire purpose of the proposed facility is to process waste or materials from an adjacent facility.

In the guidance, EPA could demonstrate how the use of both of these rules is aligned with the findings of previous court cases on this topic, including Sierra Club v. EPA, 499 F.3d 653, 655 (7th Cir. 2007. Furthermore, removing the ambiguity surrounding redefining the source can help address environmental justice concerns by improving the transparency of permitting decisions made and ensuring that clean technologies are rarely excluded from consideration for projects impacting overburdened communities.

In addition to clarifying the redefining the source doctrine, EPA should also address the issues created by never defining achieved-in-practice. Without a unified national definition of achieved-in-practice, there will never be a floor for LAER, and the program will continue to not work as intended. The need for EPA to provide guidance on achieved-in-practice is demonstrated by the

2001 California Air Pollution Control Officers Association (CAPCOA)/CARB Achieved in Practice [CA] BACT Determinations Guidance (CAPCOA & CARB, 2001). Over 20 years ago, California attempted to provide guidance to define this term, but the issue still remains today. EPA needs to clarify the requirements that must be met for a technology to become achieved-in-practice to ensure that clean technologies are considered and set as LAER when appropriate. These requirements should include:

1. **Commercial Availability** - Must technologies be considered if deployed anywhere in the world (as stated in 1990 NSR Manual)? Must the technology be demonstrated at full scale? How many vendors must offer the technology? Can federal or state funding be used for the demonstration project (including grants and tax incentives)?
2. **Reliability** - How much time does a source need to be operating? Do clean technologies prove their reliability by providing the same output as the conventional counterpart without unreasonable downtime?
3. **Effectiveness** - What type of information should be accepted to confirm effectiveness? How can clean technologies prove their effectiveness without performance test results or monitoring?

Finally, the guidance should clarify that in cases where a technology is proven to meet the criteria for achieved-in-practice but the emissions are below permitting thresholds, permitting authorities should issue certificates of exemption instead of permits to operate. These should outline that no requirements apply so long as emissions stay below permitting thresholds.

3. Identify Available Clean Technologies

Today, the resources available to identify BACT and LAER are insufficient. The RACT BACT LAER Clearinghouse (RBLC) can easily be used by industry to justify poor technology decisions. There is no recognition of zero-emission technologies or even technically feasible but not cost-effective conventional options. If a permitting authority has the desire to require more rigorous control than what is listed, the permit engineer assigned to the project must conduct their own research and contact emissions control manufacturers to try and determine if their technology is commercially available, reliable, and cost-effective. It is also impossible to determine what the new minimum requirements for LAER are without extensive research.

Antiquated database systems are not only an issue for permitting authorities, but for technology manufacturers as well. In most cases, these systems fail to identify clean technologies, so technology manufacturers must rely on making a case for their technology to individual facilities. This often means attempting to compete with existing technologies economically. Even if an innovative technology does get installed and demonstrated, the information on that technology is not required to be entered into the RBLC, and therefore technology manufacturers have to continue to make the same arguments for the installation of their technology to each individual facility that they approach.

In response to these concerns, EPA must update the RBLC to address all the deficiencies identified and to ensure clean technologies are considered. Additionally, either EPA or an association representing technology manufacturers, such as the Institute for Clean Air Companies (ICAC), should be provided a federal grant to annually publish a report on the state of technology. This report should summarize the actions being taken in various states on permitting and the controls required. The report should help provide industry and permitting authorities with a clear sense of where the new floor is for LAER and where technology is headed. This type of report would also send clear signals to technology manufacturers on which sectors need innovation and where there are opportunities for technology transfer. Technology manufacturer associations should also be encouraged to provide support to permitting authorities, on behalf of their members, if they receive inquiries from permitting authorities on controls available for different source categories.

This approach would help move the technology review process away from simply utilizing an outdated database system. Even if redesigned to better support technology decisions made by permitting authorities, the RBLC should no longer be the primary source of information used to determine emissions limits under NSR. To expand the utility and completeness of this system, technology manufacturers must have a way to submit their projects to EPA staff or permitting authorities for review and acceptance into the RBLC. Crucially, this would allow manufacturers to demonstrate deployments of their technologies, for permitted equipment and locations where the technology is too clean to require a permit. In these cases, either EPA or the permitting authority should also conduct a BACT evaluation to determine if the technology is commercially available, effective, and reliable, and if so, issue a BACT or LAER determination.

4. Increase Public Transparency

EPA must take immediate action to publish Title V and NSR permits for industrial sources across the nation in a single, easily searchable, spatial dashboard to address environmental justice concerns over public transparency. Today, if community members want to better understand what sources are operating in their community and the stringency of emissions controls required, they may not be able to access the full permits without a public records request. This is because each permitting authority and EPA Regional Office has its own practices on what types of permits are published online and when. In some cases, permits are only available online when a public notice is required and then removed promptly after the notice period is over. Air permits must be published online prior to any public notice period, and left online after the notice period closes.

Publishing air permits online also enables citizen surveillance of air permitting actions. If air permits are published in a searchable, filterable manner, it is much easier for the public to compare permits. These comparisons can help the public identify enforcement issues without the need for cumbersome public records requests.

Placing Title V and NSR permits online would not require significant resources. Over the past several years, EPA has made substantial efforts to move both Title V and NSR air permits into a new Electronic Permit System (EPS). EPA Region 9 has used the EPS system to create an electronic dashboard to provide the public with both Title V and NSR permits. This effort was

a huge step forward in making permits publicly available, but additional efforts are needed to replicate this effort nationally and to improve public accessibility by adding filters and a map, similar to Santa Barbara Air Pollution Control District's (APCD) permitted facility map.

5. Prioritize Addressing Local Impacts

Throughout this document, we have made the case that the signals coming from the federal government on the need for industry to consider local impacts are weak. Some federal agencies, such as DOE, have enhanced their efforts to require industry to think more carefully about the impacts of potential projects that receive federal funding on community residents. Some federal funding opportunity announcements (FOA) now require the submission of Community Benefits Plans that contain specific, measurable, achievable, relevant, and timely actions that industry can commit to as part of their FOA application. Each individual request for proposal may have different community benefits defined that should be included in these plans such as labor engagements, investments in job quality and a skilled workforce, and diversity and equity considerations.

Today there are no clear federal requirements on how community impacts should be considered as industries begin to evaluate decarbonization pathways. The federal government has issued guidance from different offices that provide guidance on environmental justice and civil rights, but the audience for these documents is individuals at state and local agencies that are working within a specific niche. In most cases, these documents are not visible or relevant to industry.

What is visible to industry is when state and local agencies take direct action to adopt environmental justice programs, or when an industry is involved in a Title VI complaint. Both of these options are reactive. Industry must adapt after the regulatory action is taken, or after a complaint is filed, and then figure out how to take action. States that are early adopters of environmental justice programs are facing the risk of industry leaving those states and moving to more “business friendly” areas due to concerns over the potentially high cost of compliance. Some industrial sectors are especially susceptible to leakage and cannot pass the cost of compliance down to the consumer if they wish to remain competitive. Expecting individual states to address significant national environmental justice concerns, such as poor citing decisions, should be addressed across the nation in a consistent manner, to avoid penalizing states taking action.

To resolve these challenges, EPA needs to either develop a uniform national program, or issue guidance to permitting authorities that instructs them to take specific immediate action. If EPA elects to provide guidance to permitting authorities, there needs to be an associated public campaign to raise industry and community member awareness of federal expectations for considering local impacts in permitting decisions. This includes clarifying the actions that residents can take if they feel that a permitting action has violated civil rights laws.

If EPA chooses to support states in taking more aggressive actions to address local impacts, we recommend highlighting the potential role of the following regulatory mechanisms:

- **Permit Denials** - EPA should provide clear support to states on the development of programs that allow for permits to be denied if local adverse impacts cannot be avoided. This will help

support future regulatory programs, to ensure that facilities are evaluated on a case-by-case basis and that additional requirements may be placed on certain facilities (including risk assessments, modeling, and advanced controls) based on the pollutants emitted and their proximity to vulnerable populations. This should be tied back to Title VI, and must explain the increasing litigation risk for agencies that do not take action to ensure that their programs contain the appropriate mechanisms to address community concerns prior to issuing a permit. Agencies should also be encouraged to consider how to limit the consideration of cost if a source will contribute to adverse impacts within an environmental justice community.

- **State Implementation Plans** - States use different approaches to achieve emissions reduction requirements for their state implementation plans (SIP). In non-attainment areas, agencies commonly use regulations to achieve emissions reductions from specific source categories that operate within an entire region. This is beneficial until further regulation is no longer cost-effective for some source categories, which is occurring in some parts of the country. In these cases, EPA should highlight the value of adding individual sources, especially those impacting overburdened communities, into the SIP. This strategy is used by states such as New Jersey and Texas (see agreements section), which often use "single source SIP revisions", "agreement orders", or "MOUs" to achieve reductions from individual sources. EPA should also acknowledge that this might be helpful in cases where there are one or more facilities where residents have raised Title VI concerns that, if unaddressed, could lead to EPA's disapproval of a SIP.
- **Agreement Orders** - Outside of a SIP, permitting authorities can also negotiate with individual facilities to reduce their emissions. In some cases, permitting authorities may not want to spend several years working on a rule to address emissions from a specific facility or source category. If there are only a handful of sources that would be subject to a rule, it may be much faster to negotiate new permit limits directly with the permitted facility. In Santa Barbara APCD, the air district determined that a rule would only apply at one facility. So, to expedite emissions reductions, they worked with the permitted facility and community residents, using a public process, to establish new enforceable emissions limits that were directly incorporated into the permit. The air district prepared a BARCT analysis that clearly outlines the cost of each control option as part of this process.
- **Regulations** - Beyond requiring emissions reductions from specific source categories, permitting authorities can also limit the use of offsets, required under new source review (NSR), to be generated and used at the specific facility or within the surrounding community. This allows for rules that would not historically be considered cost-effective to be adopted, and for the facilities subject to these requirements to identify other on-site emissions reductions that may be feasible. This is exactly what Ventura County APCD did when they amended their stationary gas turbine Rule 74.23 to allow equivalent offsets to be generated or used within the facility or locally to ensure community-level benefits.
- **Title V Permits** - If permitting authorities choose not to take sufficient action prior to a permit being issued, or after public concerns are raised, EPA can take independent action. As documented in EPA's August 2022 Legal Tools to Advance Environmental Justice: Cumulative Impacts Addendum, the agency has the legal authority to reopen a Title V permit under Clean Air Act (CAA) section 505(e). Once this action is taken, a permitting authority must be notified and given an opportunity to propose an action. If they fail to act, the EPA administrator

can terminate, revoke, or reissue the permit. This pathway is under immediate threat given EPA's proposed amendments to clarify the scope of "applicable requirements" under Title V. As proposed, these changes would eliminate the possibility of EPA objecting to a state's issuance of a Title V permit on the basis that the facility has unlawfully avoided complying with major NSR.

A national program or publicly distributed guidance will ensure industries know that environmental justice and civil rights should impact technology choices at facilities. EPA should not rely on the Title VI process to address local adverse impacts because often, by the time these complaints are filed, an action has already been taken. Additionally, Title VI complaints can have a high price tag, both for federal agencies due to the resources required to investigate the complaint, and for industry if mitigation is required. Instead, immediate action is needed to avoid future harm and ensure technology decisions are evaluated comprehensively for both climate and local impacts.

B. Recommended Local Action

In most cases, states or local air districts have the authority to determine air permitting requirements, each having its distinct rules and regulations governing the implementation of federal air permitting programs. While the report predominantly focuses on the regulatory and legal challenges associated with air permitting programs, it is crucial to recognize that the issues raised directly impact local air quality. Although we believe that there is a clear need for EPA to take action to address the deficiencies identified in this report, we acknowledge that implementing each proposed action is a complex task that cannot be achieved overnight. Consequently, while awaiting federal action, we recommend permitting authorities undertake separate initiatives derived from the recommendations made to EPA:

1. **Ensure Program Requirements Are Triggered**
    - Establish more stringent NSR trigger thresholds for specific source types or in environmental justice areas. This ensures that an appropriate level of control is mandated, reflecting a commitment to safeguarding community well-being.
2. **Support the Transition to Clean Technology**
    - Work with the National Association of Clean Air Agencies (NACAA) to develop standardized achieved-in-practice definitions that allow for the consideration of technology operating outside of the U.S. when determining lowest achievable emissions rates (LAER).
3. **Improve Quality of Information Available**
    - Coordinate with trade associations on a quarterly basis to identify any new or emerging technologies being demonstrated or deployed on a commercial scale.
    - Amend permitting authority rules and policies to mandate the inclusion of information on technologies that surpass BACT levels into the RBLC. This should apply irrespective of project size and even if installed voluntarily.

- Establish a mechanism for community members to provide public feedback on sources of concern. Collaborate with other permitting authorities to assess the feasibility of innovative technologies for community identified sources, and make the results of these assessments easily accessible online.

4. **Enhance Public Transparency**
    - Publish permitting actions online through a clear, searchable database, ideally utilizing mapping technology for enhanced public transparency
5. **Provide Clear Signals on the Importance of Minimizing Local Impacts**
    - Provide training, guidance, outreach, and disclosures to industry to clarify that meeting existing permitting requirements offers no protection against potential Title VI complaints. Emphasize the potential actions that may be deemed necessary as a result of those cases.
    - Develop or update environmental justice programs to necessitate the consideration of clean technologies and processes. Minimize the consideration of cost when determining the appropriate level of control within environmental justice areas.
    - Adopt or enhance environmental justice programs to minimize any new adverse impacts within overburdened communities, and provide a pathway and procedure for permit denials if adverse impacts cannot be mitigated.
    - Consider utilizing SIPs or agreement orders to drive industrial source pollution reductions. This may involve reopening individual permits, introducing sector- or source-specific controls, and evaluating control requirements in line with emerging clean technologies.

Appendix 5: State and Local Exemplar Reforms

The reforms proposed in this report can be used to amplify and improve upon recent programs at the state level in several jurisdictions that have attempted to improve air quality in communities and spread clean technologies in a focused way. We detail these programs here for reference to interested reformers. The three states we examine—California, New Jersey, and New York, were selected because of the scope of recent reforms, but good ideas, of course, are underway in jurisdictions across the country.

Environmental justice and Title VI air quality programs have evolved over time. In recent years, some state agencies have adopted programs to maximize emissions reductions and avoid adverse local impacts from industrial sources. Each new state environmental justice program tends to build on the requirements of the previous one and more directly address community concerns. In New York and New Jersey, this has resulted in programs that aim to directly address the flaws with existing permitting programs, including New Source Review (NSR), to ensure local emissions reductions from industrial sources.

The table below identifies how three state environmental justice programs address permitting-related program requirements, followed by a robust overview of each program (Table A5-1).

Table A5-1: Comparison of Transformative Environmental Justice Programs in 3 States

Pollutant	Air Pollutants Addressed	Permitting Related Program Requirements				
		Enhanced Public Engagement	Requires Upgrades at Existing Facilities	Requires Risk Modeling	Requires Mitigation of Adverse Impacts	Allows for Permit Denials
California	Criteria, Toxics	X				
New York	Criteria, Toxics, GHG	X	X	X	X	X
New Jersey	Criteria, Toxics	X	X	X	X	X

California

In 2017, California adopted a "first-of-its-kind" Community Air Protection Program (AB 617, C. Garcia, 2017) designed to improve air quality in overburdened communities. This program was novel because it promised measurable emissions reductions within communities, achieved by way of a community-specific action plan. Under the program, communities are selected for community emissions reduction and community air monitoring programs to help diagnose and address local concerns.

Separately, the bill also included provisions to swiftly target large industrial sources subject to the state's Cap-and-Trade program. Air districts were expected to review emitting equipment at large industrial sources, and develop a schedule for requiring existing sources to meet best available retrofit control technology (BARCT) emissions limits by the end of 2023. Unlike best available control technologies (BACT), California's BARCT limits, which is a control level defined under state law, can apply in the future, and can therefore require technologies that are not yet commercially available. According to the California Supreme Court, BARCT is technology forcing. The court has held that BARCT is especially rigorous and has a "technology-forcing character" that is "designed to compel the development of new technologies to meet public health goals" (see American Coatings Ass'n v. South Coast Air Quality Dist. (2012) 54 Cal. 4th 446, 465, 466). While BARCT can be technology-forcing, many of the air district assessments found that new controls were not cost-effective, using existing cost thresholds. In response, in 2022, South Coast Air Quality Management District (AQMD) committed to reviewing opportunities to increase their cost thresholds to support the consideration of clean technologies during the rulemaking process, including the use of health-benefit based thresholds (South Coast AQMD - c., 2022).

Since AB 617 was enacted, the Environmental Protection Agency (EPA) has released several new guidance documents that pertain to environmental justice and Title VI in air permitting (see Regulatory Background section). These guidance documents recommend actions that go beyond community outreach and engagement. In particular, EPA's "Interim Environmental Justice and Civil Rights in Permitting Frequently Asked Questions" states that "if there are no mitigation measures the permitting authority can take, whether within or outside the permitting program, that can address the disparate impacts, and there is no legally sufficient justification for the disparate impacts, denial of the permit may be the only way to avoid a Title VI violation" (US EPA - a., 2022)

California's environmental justice program was created before this EPA guidance was issued, and is unique because air districts in California have the authority to regulate and permit stationary sources. According to CARB, AB 617 "does not explicitly require additional permitting restrictions in disadvantaged communities…Changes to the air permitting requirements would require amendments to an air district's permitting rules." CARB also acknowledges that under current air district programs, permits are issued if "the project meets the requirements in all local, state, and federal air quality laws and regulations" (CARB - b., 2022). To date, no permits have been denied by California air districts due to environmental justice concerns, but more recent programs in New York and New Jersey help to illustrate how state programs might better reflect EPA's recent guidance.

New Jersey

Community leaders and environmental justice advocates in New Jersey successfully passed one of the strongest cumulative impacts laws and associated state regulatory programs that will address many of these issues. New Jersey's program expands upon the requirements of AB 617, to more directly address concerns over industrial sources. More specifically, New Jersey's program established more aggressive air permitting requirements, including the consideration of innovative technologies, and severe consequences for those that fail to comply. New Jersey's environmental justice program was created based on three key actions

- **April 2020:** New Jersey issued Executive Order 23, which directed agencies to "incorporate the principles of environmental justice into their policies and decision-making procedures."
- **September 2020:** New Jersey's Governor signed the Environmental Justice Law (N.J.S.A. 13:1D-157, et seq.), which is described as "the nation's most empowering environmental justice legislation." The legislature made several findings associated with this law, including declaring "that it is in the public interest for the State, where appropriate, to limit the future siting or expansion of such facilities in overburdened communities" (NJ DEP, 2023).
- **April 2023:** New Jersey adopted implementing rules for the Environmental Justice Law that establish requirements and procedures for permit applicants with projects located in overburdened communities (N.J.A.C. 7:1C).

The New Jersey environmental justice program has several new unique requirements that appear to specifically address deficiencies in existing NSR and Title V programs. In general, the rules define a "facility" that is subject to the rule as: 1) a major source of air pollution, 2) a resource recovery facility or incinerator, 3) a slide processing facility, combustor, or incinerator, 4) a sewage treatment plant with a "permitted flow", 5) a transfer station or other solid waste or recycling facility, 6) a scrap metal facility, 7) a landfill, and 8) a medical waste incinerator (N.J.A.C. 7:1C-1.5). The requirements of the bill are triggered during the permit application process for a new facility, the expansion of an existing facility, or during the renewal of an existing facility's Title V permit, when the facility is located "in whole or in part" within an overburdened community (N.J.A.C. 7:1C-2.1(b)). Facilities that trigger rule requirements must prepare an environmental justice impact statement, which evaluates environmental and public health stressors.

For new facilities, the control measures proposed by the applicant must prevent a disproportionate impact by "avoiding facility contributions to all adverse environmental and public health stressors in the overburdened community." If the control measures proposed cannot avoid a disproportionate impact, the permit must be denied, unless the applicant can demonstrate "that the proposed facility will serve a compelling public interest in the overburdened community" (N.J.A.C. 7:1C-5.2). For expanded facilities, when the control measures proposed by the applicant cannot avoid a disproportionate impact, the NJ DEP is required to impose conditions. (N.J.A.C. 7:1C-6.2(b))

Applicants that seek to demonstrate a compelling public interest are required to propose control measures (N.J.A.C. 7:1C-5.4(a)). New or expanded major source facilities that serve a compelling public interest, with a PTE above any of the criteria air pollutant or HAP thresholds defined in the rule, must document Localized Impact Control Technology (LICT). Applicants are required to evaluate pollution control technologies or measures, similar to the top-down BACT analysis. What is unique about LICT is that New Jersey specifically defined LICT to **not be limited to** "measures **demonstrated to be reliable in practice** and that have been applied to other existing sources in this same source category and shall include measures applied to sources in similar source categories, as well as **innovative control technologies, modification of the process or process equipment,** other pollution prevention measures, and combinations of the above measures (N.J.A.C. 7:1C-7.1(c)(1)). Technologies or measures identified can be removed from the list due to concerns over technical feasibility, and environmental or energy impacts, which are all similar criteria to what can be considered during a top-down BACT analysis. Unlike BACT, **cost cannot be considered when determining LICT.**

Similar to expanded facilities, for existing facilities that cannot avoid disproportionate impacts, the Department is required to impose conditions (N.J.A.C. 7:1C-8.2(b)). If an applicant is seeking the renewal of a Title V permit, where a disproportionate impact is present, the applicant is also required to submit a facility-wide risk assessment. Additional conditions may be imposed by the Department to lower risks to a "negligible level" (N.J.A.C. 7:1C-8.4). To address grandfathered equipment, the rule requires a technical feasibility analysis if the equipment or controls comprise at least 20 percent of the facility's overall PTE for particulate matter (PM) 2.5, Nitrogen Oxides (NOx), or volatile organic compounds (VOC), and either were installed at least 20 years prior to the expiration date of the current operating permit, or were not subject to review in the 15 years prior to the expiration date of the current operating permit. The technical feasibility analysis must include a top-down analysis, similar to the LICT requirements, as innovative control technologies and process modifications are considered. Unlike the LICT top-down analysis, for existing sources total and incremental costs are considered (N.J.A.C. 7:1C-8.5).

New York

In New York, the state legislature and the Department of Environmental Conservation (NY DEC) have worked closely with EPA Region 2 over the past two decades to fine-tune the state's air pollution regulations. Much of this work has been focused on addressing power sector emissions by creating a comprehensive program that addresses climate change, criteria and toxic air pollutants, and environmental justice concerns. The list below contains the adoption date[14] and a short description of some of the key actions that the state has taken to address emissions from energy generating facilities and other industrial sources since California adopted AB 617 in 2017:

- **May 2019:** NY DEC adopted a regulation that sets carbon dioxide (CO_2) emissions rate limits for existing major electricity generating facilities. These regulations include more stringent standards for new or modified facilities (6 NYCRR Part 251).

[14] Adoption date may be different than implementation date

- **December 2019:** New York passed the Climate Leadership and Community Protection Act (CLCPA), which was created by environmental justice advocates. Among other things, the bill requires the issuance of a Scoping Plan that outlines the state's plan to reduce greenhouse gas (GHG) emissions (NY Senate Bill S6599, 2019)
- **December 2019:** New York adopted a regulation that sets NOx emissions limits for simple cycle peaking turbines (6 NYCRR Subpart 227-3).
- **September 2020:** NY DEC published a policy on dispersion modeling procedures for air quality impact analyses that are submitted to support air permit applications. More specifically, this modeling assists applicants with modeling compliance with National Ambient Air Quality Standards (NAAQS) and estimating the impacts of toxic pollutants (NY DEC, 2020).
- **December 2020:** New York adopts amendments to their RGGI regulation to expand the applicability to peaking turbines 15 MW and larger, and to further reduce the CO_2 emissions cap by another 30 percent by 2030 (6 NYCCR Part 242).
- **December 2020:** NY DEC adopted a regulation, as required by CLCPA, to establish statewide greenhouse gas (GHG) limits. This regulation requires GHG emissions to be reduced by 60 percent of 1990 GHG levels by 2030 and 15 percent of 1990 GHG levels by 2050 (6 NYCRR 496).
- **October 2021:** NY DEC denied Astoria Gas Turbine Power, LLC's and Danskammer Energy Center's Title V permit applications due to concerns over the inability to satisfy requirements in the CLCPA (Whitehead, 2021 a) (Whitehead, 2021 b).
- **December 2022:** NY DEC released its Scoping Plan, which includes a target of achieving 100 percent zero-emission electricity by 2040 (New York State Climate Action Council, 2022).
- **December 2022:** New York adopted the Cumulative Impacts Bill which requires New York government agencies to consider environmental impacts when approving, funding, or taking actions that may impact the environment. Agencies are prohibited from approving actions that may cause or contribute to disproportionate impacts on disadvantaged communities, including issuing permits (NY Senate Bill S8830, 2022).
- **December 2022:** NY DEC published a policy that outlines the process for reviewing air pollution control permit applications to ensure compliance with CLCPA. Projects that are inconsistent with Statewide GHG emissions limits may be required to implement feasible alternatives or mitigate emissions at the project site or in the surrounding community (NY DEC, 2022).
- **September 2023:** NY DEC released a draft policy that outlines the process for reviewing permit applications for projects impacting disadvantaged communities that result in GHG emissions or co-pollutant emissions. The guidance also includes a detailed description of the information that needs to be contained in a disproportionate burden report (NY DEC, 2023).

New York has created a comprehensive regulatory framework that is unmatched anywhere else in the nation. The above suite of actions has created a pathway to significantly transform the state's electricity sector. For example, New York credits their CO2 performance standards for helping "to retire the last of New York's coal plants" (New York State Climate Action Council, 2022). This alone is a crucial step towards meeting the state's decarbonization goals. More recent actions have established procedural requirements that allow for the evaluation of projects on a

case-by-case basis, which is important in the industrial sector due to the uniqueness of each facility and the needs of the surrounding community.

Consider NY DEC's 2021 Astoria and Danskammer Title V permit denials. This decision demonstrates how New York draws upon the strengths of different regulatory programs to reduce emissions, meet climate targets, and address concerns raised by community advocates. While many states have established climate targets, these targets typically do not impact individual permitting decisions. Technically speaking, the Astoria power plant denial was possible because EPA delegated authority to NY DEC to issue Title V air permits, which contain criteria and air toxic emissions limits, to major sources. Historically, if a permit applicant proposed to install technology that met the applicable criteria and toxic air pollutant emissions limits, the permit to construct was issued.

For the Astoria and Danskammer power plant projects, NY DEC determined that the projects would be inconsistent or interfere with the statewide attainment of GHG emissions limits and failed to demonstrate a reliable need for the project. The Astoria permit denial letter also stated that the project may have a disproportionate impact on disadvantaged communities, and that even if Astoria were able to satisfy the climate requirements, the Department would not be able to issue a Title V permit unless the disadvantaged community requirements were also met.[15] New York's environmental justice programs, which are intertwined with their climate and air pollution programs, not only illustrate how permit denials can be used to stop projects inconsistent with the Agency's goals, but also how local environmental justice organizations in New York helped to transform the air permitting program to prevent future adverse impacts.

The state programs identified demonstrate the value of considering the flaws in NSR when designing climate, environmental justice, and Title VI programs. **The use of permit denials by New York and New Jersey provides a great example of how regulatory agencies can use existing regulatory mechanisms, such as the permitting process, to require more stringent controls or to prevent adverse impacts within disadvantaged communities.**

[15] At the time of publication the only US air permit that we are aware of that has been denied solely based on environmental justice concerns is the General Iron permit in Chicago, Illinois

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